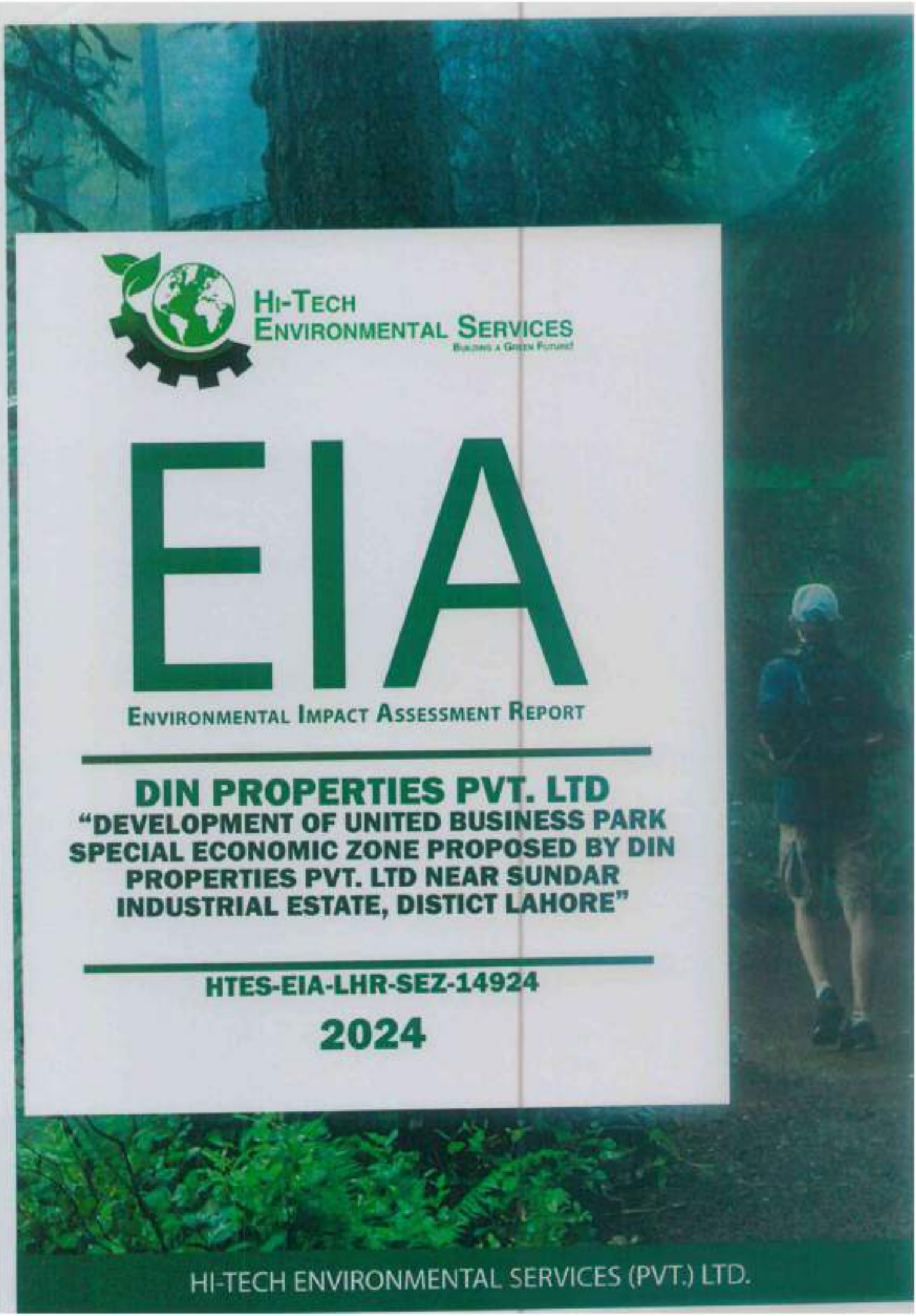

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EIA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

DIN PROPERTIES PVT. LTD

"DEVELOPMENT OF UNITED BUSINESS PARK SPECIAL ECONOMIC ZONE PROPOSED BY DIN PROPERTIES PVT. LTD NEAR SUNDAR INDUSTRIAL ESTATE, DISTICT LAHORE"

HTES-EIA-LHR-SEZ-14924

2024

HI-TECH ENVIRONMENTAL SERVICES (PVT.) LTD.

Document Control

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Project Ref.:	HTES-EIA-LHR-SEZ-14924
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FOR DIN PROPERTIES PVT. LTD | UNITED BUSINESS PARK SPECIAL ECONOMIC ZONE

HI-TECH ENVIRONMENTAL SERVICES

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EXECUTIVE SUMMARY

Title and Location of Project

Din Properties Pvt. Ltd intends to develop an industrial estate titled as "United Business Park Special Economic Zone, Lahore" over an area of 258.70 acres, where issues of industrialists are handled and problems solved through 'One Window' operation. We expect to introduce a mix of industrial companies in United Business Park Special Economic Zone. It is estimated that this sector will create up to 800,000 jobs for the local population, earn foreign exchange through exports and save foreign exchange through import substitution.

In 2010, through the 18th Amendment to the Constitution of the Islamic Republic of Pakistan, 1973, environment became a provincial subject, empowering each province to make its own law. In 2012, Punjab adopted the Federal Act with minor amendments, calling it The Punjab Environmental Protection Act, 1997 (the "Punjab Act"). Section 12 of the Federal and Punjab Acts requires the filing of an EIA for projects that are likely to cause adverse environmental effects.

This EIA of the proposed project has been conducted in accordance with national and provincial environmental regulations and guidelines. In addition, other relevant international environmental laws and regulations (such as those of the World Bank (WB), International Finance Corporation (IFC) and Asian Development Bank (ADB)) have also been considered. At the current time, only the national and provincial environmental regulations are applicable to proposed Project. However, other relevant international environmental laws and regulations (such as those of the WB, IFC and ADB) have been considered as they may be required in the event that the proposed Project goes for lending from any international agency.

Under the CPEC special economic zone initiative a number of SEZs are being planned. However, most of these schemes will serve large scale industries, which can be located away from the population centres. The present proposal is for serving the needs of small and medium size enterprises and located near Lahore and almost adjacent to Sundar Industrial Estate. Since the Sundar Industrial Estate has no more capacity to entertain new units, therefore, this SEZ will serve those industries desirous of shifting their units outside the city but still remaining closed to city and the new industries planned to be set up near Lahore. Being closed to Lahore will facilitate the workers and communities to approach their workplace on daily basis without much of difficulty and being closed to industrial hub will facilitate the enterprises in acquisition of trained labour and raw material.

This EIA report provides an assessment of anticipated positive and negative environmental and social impacts of the proposed Project, along with the appropriate measures to further enhance the beneficial impacts and to mitigate any adverse impacts.

The United Business Park Special Economic Zone is located in District Lahore. The google earth map showing the location of the zone is shown in Figure below and attached as ***Annexure III*** on A3 size.

The proposed site is located on main Mull-Talib Sarai road, at a distance of 1.8 Kilometres from the Sundar Industrial Estate Gate and on one side touches the back wall of the said Estate. The closest bigger town is Raiwind which is around 9.5 Km from the gate of proposed SEZ. It is around 25 Km from Thokar Niaz Beg and around 25 Km from Gajju-Matta Ferozpur Road. It is well linked with the main roads as well. Distance from the proposed SEZ to Multan Road (Sundar) is around 7 Km.

Name of the Proponent/Developer

The affairs of the company are controlled by Muhammad Nauman Khan, is the representative of the company.

Proponent Name	Din Properties Pvt. Ltd.
Representative	Muhammad Nouman Khan
Address	Din Industries, 1.0 Km Defence Road, Bobhtian Chowk off Rewind Road Lahore
Contact No.	+92 321 9047487 & +92 333 4518560

Name of Organization Preparing the Report

Hi-Tech Environmental Services (Pvt.) Ltd. is a business entity managed by geoscientists and environmental experts. The company has the expertise of highly diversified experience and has completed a total of more than 200 environmental studies across Punjab. The consultant has a range of expertise available in following areas:

a) Economic Geology

b) Determination of geological exploratory techniques and mine design
c) Preparation of feasibility reports, IEE report, EIA reports, Development Schemes & Prospecting Scheme.
d) Preparation of Environment Management Plans
e) Preparation of reports on HRD /Mines Rescue &Recovery.
f) Assessment of Impact of mining on environment and mitigating measures.
g) Mine surveying & interpretation of boundary disputes.
h) Legal opinion on mine regulatory regime.
i) Energy fuels and selection of choice fuels for specific energy
j) Drilling and blasting for underground and surface mining techniques.
k) Safety measures for mines operation.

Contact Details	
Consultant Company	Hi-Tech Environmental Services (Pvt.) Ltd.
Address	26-B, Zahoor Elahi Road, Gulberg-II, Lahore.
Representative	Engr. Harris Naeem
Contact	(+92) 304 0444440
e-Mail	harris.naeem@hitecha.com

Sr.	Name	Qualifications & Brief Experience	Roles Assigned
1.	Engr. Harris Naeem	M.Sc. Mining Engineering	• Director operations • Mining Techniques
2.	Ch. Awais Ahmad	LLM (London)	• Site Visits • Legal Reviews • Coordination with Locals
3.	Razi Allah	BS Hon. Environmental Sciences	• Environmental Compliance Officer • MBA, FCCU & Cranfield UK • BS (Hons). Environmental Science & Geography (GIS), FCCU Lahore (TQM | ISO 14001
4.	Attiqa Hameed	Environmental Scientist PhD Scholar	• Preparation of Environmental Management Plan (EMP) • Preparation of Environmental Monitoring Plan (EMP) • Author of EIA Report
5.	Engr. Maryam Nazir	Mining Engineer and GIS Management B.Sc. Mining Engineering	• Development of Maps • Secondary data collection • Compilation of report • Coordination with the team

Environmental Legislative, Regulatory and Institutional Framework

National environmental laws, regulations, guidelines and policies applicable to proposed project have been provided below:

- Pakistan Environmental Protection Act 1997 is the supreme environmental legislation in Pakistan.
- "Pak-EPA Review of IEE and EIA Regulations, 2000" make the provisions for the preparation, submission, review and approval of the Initial Environmental Examination (IEE) and the Environmental Impact Assessment (EIA) reports and post monitoring of environmental approvals by Pak-EPA. Regulations, 2000 also provide the classification of projects requiring IEE and EIA. According to the classification provided by the Regulations, 2000, the proposed project having significant environmental and social impacts, requires an Environmental Impact Assessment (EIA) to be conducted.
- Pak-EPA Policy and Procedures for Filing, Review and Approval of Environmental Assessment establish a policy context and administrative procedures for environmental assessment in Pakistan.
- Pak-EPA Guidelines for "Preparation and Review of Environmental Reports" is confined to general aspects of the environmental reports.
- Pak-EPA Guidelines for Public Consultation during IEE/EIA.
- Pak-EPA Sectoral Guidelines for Major Thermal Power Stations.
- National Environmental Institutions in Pakistan.

Pakistan Environmental Protection Agency (Pak-EPA)

Key functions of Pak-EPA are: Implementation of PEPA, 1997 i.e., to develop regulations and guidelines as referred by the Act. Review and approval of IEE and EIA reports submitted to them. In addition, Pak-EPA is mandated to prepare or revise, and establish the National Environmental Quality Standards (NEQS) with approval of Pakistan

Provincial Environmental Setup in Punjab

Punjab EPA enacted the Provincial Environmental Protection Act in April, 2012 by making appropriate amendments in PEPA, 1997. The EPA; Punjab now undertakes functions as delegated under the Punjab Environmental Protection Act, 1997.

EIA related functions are performed through Environmental Approval Section of the Punjab EPA. Environmental Protection Council (PEPC).

International Environmental Requirements

Provided below is a listing of international environmental and social requirements relevant to the proposed project.

Environmental Requirements of IFC

- IFC Sustainability Framework.
- IFC Performance Standards on Environmental and Social Sustainability.
- IFC Environment, Health and Safety (EHS) Guidelines.
- IFC's "Environmental and Social Review Procedures.

ADB Environmental Assessment Guidelines

ADB Environmental Assessment Guidelines describe how to fulfill the requirements outlined in ADB's Environment Policy and Operations Manual on Environmental Considerations in ADB Operations. Information on ADB's policies and procedures for conducting and reporting on the environmental assessment is also provided for all types of projects.

Environmental and Social Safeguard of the World Bank

The World Bank's environmental assessment policy and recommended processing are described in Operational Policy (OP)/Bank Procedure (BP) Environmental Assessment. This policy is considered to be the umbrella policy for the Bank's environmental 'safeguard policies.

Alternative Considerations

Alternatives are generally identified and analyzed to determine the most viable method of achieving the project objectives. During the recent years, environmental and social concerns related to the developmental activities, are gaining significant momentum all over the world. Therefore, besides the technical and financial considerations, it is also required to recognize the environmental and social consequences of developmental projects.

Alternatives considered in this EIA include following:

- No project option;
- Alternate technologies for Economical Zone;
- Site Alternatives, their Selection and Rejection Criteria
- Design/technology alternatives, their selection and rejection criteria
- Environmental Alternatives, their selection and rejection criteria
- Economic Alternatives, their selection and rejection criteria

General Topography of the Area

General Topography of the area is almost flat with no noticeable variation in the surface elevation. Approximately the area will be under industrial plots and remaining area will be dedicated for roads, infrastructure, amenities, utilities, commercial area, etc. Overall

distribution/utilization is based on international standards and need assessment surveys.

Major Impacts

The development of the proposed project will have both positive and negative impacts during construction and operational phases; appropriate mitigation measures are proposed for negative impacts. Following are the major concerns and potential impacts

- Ambient air quality can get deteriorated both during pre-construction (site clearing) and construction phases of the proposed industrial state. The major contributing factors will be generation, suspension and deposition of particulate matter and gaseous emission due to vehicular movement.
- Noise levels can rise around the project site due to operation of machinery and equipment and transportation of construction materials etc.
- Construction waste, if not managed properly, can have negative impacts on the site and surrounding area
- Poor maintenance if vehicles, machinery and generator can cause increased noise levels as well as gaseous emissions
- Wastewater, if disposed of without any prior treatment, can cause surface and groundwater contamination.
- Oil spillages from construction machinery can result into soil and water contamination
- There will always be the possibility regarding hazard to health and safety of workers to occur during construction and operational phases of the proposed project
- Local residents will be preferred for employment in the proposed industrial state and thus it will have a positive impact on the local economy and regional

Recommendations for Mitigation Measures

All the potential impacts of the proposed project should be prevented through appropriate measures and if happen, they should be properly mitigated. Appropriate mitigation measures have been suggested after this EIA study and a comprehensive Environmental Management and Monitoring Plan (EMMP) has been formulated and given in this EIA study. The execution of EMP will help to reduce the adverse impacts of the proposed project. Thus, the project should be made environment friendly by implementing this Environmental Management & Monitoring Plan (EMMP) with fidelity.

Proposed Monitoring

The environmental performance of the proposed project should be overseen through proper monitoring during its construction and operational phases. The Environmental Monitoring Plan should be enforced during the project lifecycle to ensure effective surveillance of the environmental parameters at various stages of the project development and compliances with NEQS and legal obligations. Following parameters should be monitored;

- Ambient air quality should be monitored as per EPA NEQS Rules 2001
- Monitoring for noise level should be conducted as per EPA NEQS Rules 2001

- Monitoring for waste water & drinking water quality should be conducted as per EPA NEQS Rules 2001

The proponent shall be responsible for environmental monitoring and reporting throughout project life and assure proper implementation of mitigation measures, where needed, through adequate monitoring.

Conclusions and Recommendations

The development of the proposed industrial zone in the region will contribute towards the economy of the country to a greater extent. Also, industrialization generates employment opportunities, provides educational opportunities, encourages advancement and innovation, and better utilizes resources. All of these benefits and more make industrial development extremely valuable to a population and the local economy.

Apart from the beneficial impacts of the project, the proposed project can also have adverse environmental impacts during all phases. Most of the impacts during construction are of a temporary nature. These potential impacts can be avoided or mitigated by adopting suitable mitigation or remedial measures as mentioned in this EIA Report.

Following are the recommendations based upon this EIA Study:

- Proposed mitigation measures for potential environmental impacts should be implemented to avoid/ minimize those impacts
- Tree plantation plan should be followed
- Proper implementation of EMMP should be ensured during all three phases of the proposed project.
- Training programs should be arranged and all working personnel and contractors should be given appropriate training prior to construction to ensure they are aware of the onsite responsibilities in respect of all environmental and social issues.
- EMMP should be made a part of contract document of Contractor and executed properly.

Environmental and Social Impact and Mitigation Measures

Potential impacts described in this EIA are primarily caused by changes to the existing socioeconomic and bio physical environment brought on by the proposed project and thus should be interpreted in conjunction with the sections of the report addressing these biophysical and socio-economic dimensions. Potential impacts along with their mitigation are detailed in Table.

Table: Environmental and Social Impacts of the Proposed Project

Subject Area		Potential Impacts During Construction	Potential Impacts During Operation	Mitigation
Physical Environment	Air Quality	• Dust from construction activities. • Traffic-related air quality impacts.	• Effects of stacks emissions on ambient air quality. • Traffic-related air quality impacts. • Green House Gas emissions	• Watering of the material stockpiles, access roads and bare soils on an as required basis to minimize dust. • Increase the watering frequency during periods of high risk (e.g. high winds). • Stored materials such as gravel and sand should be covered and confined • Vehicles with appropriate exhaust systems will be used. • Maintenance of all vehicles on regular basis. • Establish and implement vehicle speed limits to minimize dust generation • Cover haul vehicles transporting dusty materials (cement, borrow and quarry) moving outside the construction site • Use of specified haulage routes and reduce vehicle speed where required.
	Water Resources	• Control and management of site drainage. • Wastewater discharge, Sewage disposal and foul drainage	• Water requirements for power plant operation • Discharge of process and wastewater.	• Stockpiles of potential water pollutants (i.e. oils, construction materials, fuel, etc.) shall be placed so as to minimize the potential of contaminants to enter local watercourses or storm-water drainage.

		• Effects on groundwater quality.	• Operation of drainage systems on site. • Discharge of storm water, sewage and drainage	• Preparation of Emergency Spills Contingency Plan. • Storm-water runoff from all fuel and oil storage areas, workshop, and vehicle parking areas is to be directed into an oil and water separator before being discharged to any watercourse
	Soils, Geology and Topography	• Effects on soils and topographic features. • Soil contamination	• Soil contamination during site activities	• Ensure the topography of the final surface of all raised lands are favorable to enhance natural draining of rainwater / flood water • Restore the natural landscape of the construction sites after completion of work
	Land Use, Landscape and Visual Issues	• Impacts on existing land use on site. • Impacts on existing land use in the surrounding area. • Effects of construction activities on landscape character. • Visual impact of construction activities.	• Impacts on existing land use on site. • Impacts on existing land use in the surrounding area. • Effects on landscape character. • Visual impact of operating facilities.	• Stop work and inform the site manager immediately if, during construction, an archaeological or burial site is discovered. • It is an offence to restart work in the vicinity of the site until approval to continue is awarded by the plant management. • Resolve landscape change issue in consultation with local leaders and supervision consultants.

Ecological Environment	Flora	Loss of natural vegetation and crops	• Impacts on flora due to altered drainage and runoff patterns	• Removal of trees should be limited to the development footprint • Construction activities shall reduce the loss or disturbance of vegetation • Use clear areas to avoid cutting of trees • A procedure shall be prepared to manage vegetation removal, clearance and reuse • Inform the plant management before clearing trees
	Fauna	• Losses of habitat or species due to land lake. • Disturbance or damage to adjacent habitat of species	• Disturbance or damage to adjacent habitat • Effects on birds migration routes	• Project should ensure the safety of various animals at power plant in construction and operation camp area.
	Economy Related Impacts	• Impacts on local skilled and un-skilled labor and • businesses.	• Impacts on local labor and businesses	• The increased government revenue could be used to meet objective by improving infrastructure and services in areas local to the project.
	Social Settings and Services	• Demographic changes due to influx of people. • Pressure on existing infrastructure, utilities and services.	• Small scale demographic and cultural changes.	• Safe, reliable water supply, Sufficient housing for all. • Treatment facilities for sewerage of toilet and domestic wastes • In-house-community entertainment facilities.

	Related Impacts			
	Public Health Related Impacts	• Traffic congestions and disruption to road users • Health impacts due to • construction related dust and • air emissions and • wastewater/effluents release • Traffic-related air quality. • Traffic-related noise	• Health impacts due to air emissions and power plant noise and effluents released. • Traffic-related air quality impacts. • Traffic-related noise impacts.	• Implement proper safety standards. • Provide personal protection equipment (PPE) for staff, such as safety shoes, helmets, masks, gloves, protective clothing, goggles, full--face eye shields, and ear protection. • Maintain the PPE under a regular checking and replacement program. • Provide safe and healthy work environment to workers, taking into account inherent risks in its particular construction activity and specific classes of hazards in the work areas.
	Occupational Health safety	• Accidents. • Effects on health of workforce Safety at work.	• Accidents. • Effects on health of workforce. • Safety at work.	• A traffic management plan will be developed by the construction contractor to prevent incidents of accidents which may occur due to transportation of machinery and equipment to the project site. • Undertake a full project community risk assessment followed by the development of a community emergency preparedness and response plan appropriate to its findings

	National and Regional Impacts	• Human resources development. • Economic development at regional and national level	• Industrial development in Punjab and Pakistan • National and regional (Punjab) power cities • Impacts on regional and national a quality	• The increased government revenue could be us to meet development objective by improvi infrastructure and services in areas local to t project
	Global impacts	• Purchase of power plant equipment and machinery from global markets • Hiring the international contractors and consultants	• Green-house gas emission and climate change • Impacts on global air quality and global warming	• Maintenance of all construction machinery on regular basis • Use of machinery with appropriate exhaust system • In order to control the particle emission all stages filtering system, duct collectors or humidification or other techniques(as applicable) to the concrete batching and mixing plant will be provided.

1. INTRODUCTION

1.1 Purpose of the Report

This EIA of the proposed project has been conducted in accordance with national and provincial environmental regulations and guidelines. In addition, other relevant international environmental laws and regulations (such as those of the World Bank (WB), International Finance Corporation (IFC) and Asian Development Bank (ADB)) have also been considered. At the current time, only the national and provincial environmental regulations are applicable to proposed Project. However, other relevant international environmental laws and regulations (such as those of the WB, IFC and ADB) have been considered as they may be required in the event that the proposed Project goes for lending from any international agency identification of the Project and Proponent.

The purpose of the EIA study is to identify the possible beneficial and adverse environmental impacts of the project as presently envisaged and propose the applicable mitigation measures to be implemented during the construction and operational stages of the project in order to minimize the negative impacts and preparation of Environmental Management Plan (EMP) to obtain No Objection Certificate (NOC) from Punjab-EPA.

Under the CPEC special economic zone initiative a number of SEZs are being planned. However, most of these schemes will serve large scale industries, which can be located away from the population centres. The present proposal is for serving the needs of small and medium size enterprises and located near Lahore and almost adjacent to Sundar Industrial Estate. Since the Sundar Industrial Estate has no more capacity to entertain new units, therefore, this SEZ will serve those industries desirous of shifting their units outside the city but still remaining closed to city and the new industries planned to be set up near Lahore. Being closed to Lahore will facilitate the workers and communities to approach their workplace on daily basis without much of difficulty and being closed to industrial hub will facilitate the enterprises in acquisition of trained labour and raw material.

This EIA report provides an assessment of anticipated positive and negative environmental and social impacts of the proposed Project, along with the appropriate measures further enhance the beneficial impacts and to mitigate any adverse impacts.

This Chapter provides:

- A brief introduction of the proposed Project and its background;
- The need and justification for the proposed Project with supporting information related to existing power sector and power crises, both in Pakistan and in Punjab Province;
- The approach and methodology adopted to carry the EIA study.

1.2 Details of the Proponent

The affairs of the company are controlled by Muhammad Nauman Khan who is the representative of the company.

Table 1-1 Details of the Proponent

Proponent/ Developer Name	Din Properties Pvt. Ltd.
Representative	Muhammad Nouman Khan
Address	Din Industries, 1.0 Km Defence Road, Bobhtian Chowk off Rewind Road Lahore
Contact No.	+92 321 9047487 & +92 333 4518560

1.3 Details of Consultant

Hi-Tech Environmental Services (Pvt.) Ltd. is a business entity managed by geoscientists and environmental experts. The company has the expertise of highly diversified experience and has completed a total of more than 200 environmental studies across Punjab. The consultant has a range of expertise available in following areas:

l) Economic Geology
m) Determination of geological exploratory techniques and mine design
n) Preparation of feasibility reports, IEE report, EIA reports, Development Schemes & Prospecting Scheme.
o) Preparation of Environment Management Plans
p) Preparation of reports on HRD /Mines Rescue &Recovery.
q) Assessment of Impact of mining on environment and mitigating measures.
r) Mine surveying & interpretation of boundary disputes.
s) Legal opinion on mine regulatory regime.
t) Energy fuels and selection of choice fuels for specific energy
u) Drilling and blasting for underground and surface mining techniques.
v) Safety measures for mines operation.

Table 1-2 Details of the Consultant

Contact Details	
Consultant Company	Hi-Tech Environmental Services (Pvt.) Ltd.
Address	26-B, Zahoor Elahi Road, Gulberg-II, Lahore.
Representative	Engr. Harris Naeem
Contact	(+92) 304 0444440
e-Mail	harris.naeem@hitechma.com

The team carrying out the research project is presented in the Table 1-3.

Table 1-3 Project Team

Sr.	Name	Qualifications & Brief Experience	Roles Assigned
1.	Engr. Harris Naeem	M.Sc. Mining Engineering	• Director operation • Mining Techniques
2.	Ch. Awais Ahmad	LLM (London)	• Site Visits • Legal Reviews • Coordination with Locals
3.	Razi Allah	BS Hon. Environmental Sciences	• Environmental Compliance Officer • MBA, FCCU & Cranfield UK • BS (Hons). Environmental Science & Geography (GIS), FCCU Lahore (TQM | ISO 14001
4.	Attiqa Hameed	Environmental Scientist PhD Scholar	• Preparation of Environmental Management Plan (EMP) • Preparation of Environmental Monitoring Plan (EMP) • Author of EIA Report
5.	Engr. Maryam Nazir	Mining Engineer and GIS Management B.Sc. Mining Engineering	• Development of Maps • Secondary data collection • Compilation of report • Coordination with the team

1.4 Brief Description of the Project

Din Properties Pvt. Ltd intends to develop an industrial estate titled as "United Business Park Special Economic Zone", Lahore over an area of 258.70 acres. The objective is also industrial development in an organized manner where the industries are facilitated to have an efficient production which can compete the international as well as domestic market, where issues of industrialists are handled and problems solved through 'One Window' operation. We expect to introduce a mix of industrial companies in United Business Park Special Economic Zone. It is estimated that this sector will create up to 800,000 jobs for the local population, earn foreign exchange through exports and save foreign exchange through import substitution.

The fiscal benefits under the SEZ law include a one-time exemption from custom duties and taxes for all capital goods imported into Pakistan for the development, operations and maintenance of a SEZ (both for the developer as well as for the zone enterprise) and exemption from all taxes on income for a period of ten years.

United Business Park SEZ is ideally located near Sundar Industrial Estate, the project is linked with all major cities, sea ports and dry ports of the country through a network of national Highways and Motorways. The closest bigger town is Raiwind. It is around 25 Km from Thokar Niaz Beg and around 25 Km from Gajju-Matta Ferozpur Road. It is well linked with the main roads as well. Distance from the proposed SEZ to Multan Road (Sundar) is around 7 Km.

The master plan of United Business Park Special Economic Zone, Lahore is given in Figure 1-1 and attached as **appendix IX.**

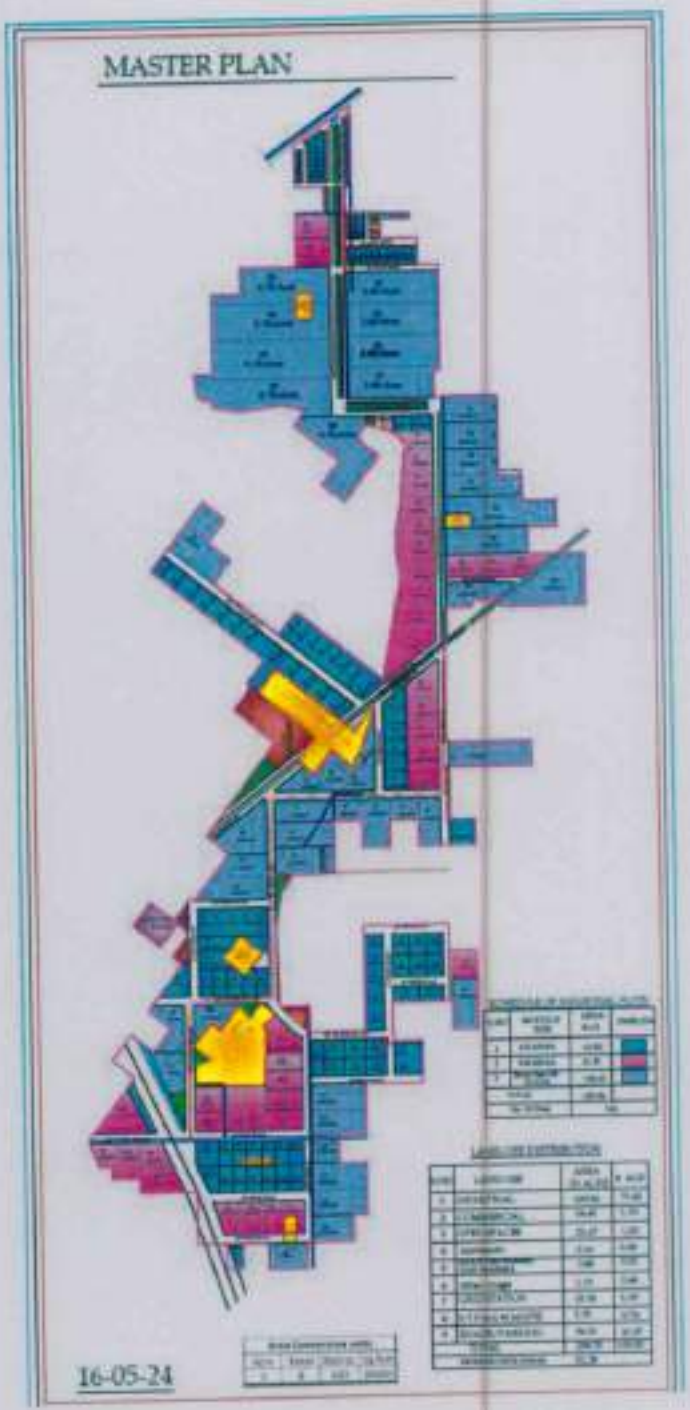


Figure 1-1 Layout/Master Plan of the Project

The proposed area will be covered under:

- Industrial plots
- Roads, infrastructure, amenities, utilities,
- commercial area, etc.

Overall distribution/utilization is based on international standards and need assessment surveys.

1.5 TYPES OF INDUSTRIES High Potential Sector for following Industries in Lahore SEZ

- Manufacturing Services
- Warehousing
- Information Technology
- Textile
- Light Engineering
- Auto parts
- Plastic Industry
- Pharmaceuticals
- Chemicals
- Electronics
- Food & Beverages
- Mobile Manufacturing

1.6 Alternative Considerations

Alternatives are generally identified and analyzed to determine the most viable method of achieving the project objectives. During the recent years, environmental and social concerns related to the developmental activities, are gaining significant momentum all over the world. Therefore, besides the technical and financial considerations, it is also required to recognize the environmental and social consequences of developmental projects.

Alternatives considered in this EIA include following:

- No project option;
- Alternate technologies for Economical Zone;
- Site Alternatives, their Selection and Rejection Criteria
- Design/technology alternatives, their selection and rejection criteria
- Environmental Alternatives, their selection and rejection criteria
- Economic Alternatives, their selection and rejection criteria

2. ENVIRONMENTAL LEGISLATIVE, REGULATORY AND INSTITUTIONAL FRAMEWORK

This Chapter presents information on the national and provincial (Punjab) legislation, regulation and guidelines applicable to the proposed Project. In addition, this Chapter also provides information on other relevant international environmental laws, regulations and guidelines (such as those of the WB, IFC and ADB).

At the current time, only the national and provincial environmental regulations are applicable to proposed Project. However, other relevant international environmental laws and regulations (such as those of the WB, IFC and ADB) have been considered as they may be required in the event that the proposed Project goes for lending from any international agency

2.1. National Requirements

2.11. Background

Pakistan's Environmental Policy is based on participatory approach to achieving objectives of sustainable development through legally, administratively and technically sound institutions. In 1975, the Federal Environment Ministry was established in Pakistan as follow up to Stockholm declaration of 1972. The Ministry is responsible for promulgation of the **Environmental Protection Ordinance of Pakistan, 1983**. This was the first comprehensive legislation prepared in the country. The main objective of Ordinance was to establish institutions (i.e. to establish Federal and Provincial Environmental Protection Agencies (EPAs) and Pakistan Environmental Protection Council (PEPC)).

In 1992 Pakistan attended the Earth Summit in state of Brazil (Rio-De Janeiro) and thereafter became party to various international conventions and protocols. This political commitment augmented the environmental process in the country. In the same year, Pakistan prepared the **National Conservation Strategy (NCS)** which provides a broad framework for addressing environmental concerns in the country.

In 1993 National Environmental Quality Standards (NEQS) were designed.

In December 1997, the Pakistan Environmental Protection Act (PEPA) was enacted, repealing the Environmental Protection Ordinance of Pakistan, 1983.

Further discussion is provided below regarding national environmental laws, regulations and guidelines applicable to proposed Project.

2.1.2. Pakistan Environmental Protection Act (PEPA), 1997

The Pakistan Environmental Protection Act (PEPA) is the supreme environmental legislation in the country. PEPA provides for:

- The establishment of Pakistan Environmental Protection Council (PEPC);
- The framework for implementation of NCS;
- The establishment of Federal and Provincial Environmental Protection Agencies;
- The establishment of Provincial sustainable development funds;

- The protection and conservation of species;
- The conservation of renewable resources;
- The establishment of environmental tribunals and appointment of Environmental Magistrates; and,
- Initial Environmental Examination15 and Environmental Impact Assessment

Following sections and sub-sections of PEPA deal with the IEE and EIA:

- **Section 12** provides the requirement for environmental assessment. Section 12 provides that no proponent of a project shall commence construction or operation unless he has filed with the Federal Agency for an Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA) and has obtained approval from Environmental Protection Agency (EPA).
- **Section 17(1)** provides the penalties for non-compliance to section 12 and other sections of the PEPA.
- **Section 22** provides for the appeals to environmental tribunals against any order of federal or provincial EPA.
- **Section 26** provides the delegation of powers by federal agency to any provincial government, provincial agency, local council or local authority.
- **Section 33(2)(f)** provides for the regulations to categorize the projects for IEE and EIA.
- **Section 33(2)(g)** provides that federal agency may issue guidelines for preparations of IEEs and EIAs, and development of procedures for filing and review of IEEs and EIAs.
- **Section 33** provides to make regulations by notification in official gazette and with approval from federal government.

2.1.3. *Pak-EPA, Policy and Procedures for Filing, Review and Approval of Environmental Assessment*

Purpose of Pak-EPA, Policy and Procedures for Filing, Review and Approval of Environmental Assessment is to establish a policy context and administrative procedures for environmental assessment in Pakistan.

According to this policy, federal EPA has jurisdiction to IEE and EIA for the following types of projects:

- Projects on federal land;
- Military projects;
- Projects with trans-country impacts;
- Projects with trans-province impacts and;
- Projects for which there is some agreement between federal and provincial EPAs.

Provincial EPAs are responsible authorities for all other projects under their respective provincial jurisdictions.

In 2010, through the 18th Amendment to the Constitution of the Islamic Republic of Pakistan, 1973, environment became a provincial subject, empowering each province to make its own law (except for the Islamabad Capital Territory (ICT) or areas in the federation not included in any province).

In 2012, Punjab adopted the PEPA with minor amendments, calling it The Punjab Environmental Protection Act, 1997. Punjab EPA is the responsible authority for proposed Project.

2.1.3. *Pak-EPA, Guidelines for Preparation and Review of Environmental Reports*

The scope of Pak-EPA, Guidelines for Preparation and Review of Environmental Reports is confined to general aspects of the environmental reports. For the specific environmental issues, sector specific guidelines are issued time to time by Pak-EPA. This guideline specifically provides, in terms of the general aspects:

- Process of commencing environmental assessment including major steps of environmental assessment and format of the IEE / EIA;
- Process and procedures of impact assessment;
- Mitigation and management for identified impacts;
- Reporting;
- Reviewing of environmental reports and decision making;
- Monitoring and auditing by EPA; and,
- Project Management.

The **Appendix A** of the guidelines provides the global, cross-sectoral and cultural issues related to IEE and EIA.

2.1.4. *Pak-EPA, Guidelines for Public Consultation during IEE / EIA*

Pak-EPA, Guidelines for Public Consultation during IEE / EIA, provide:

- Stakeholder identification and objectives of stakeholder involvement in IEE / EIA process;
- The methods and techniques of effective public participation during IEE / EIA process;
- Consensus building and dispute resolution among project proponent and affected communities and other stakeholders; and,
- Facilitation for stakeholder involvement.

The IEE /EIA decision making process in Pakistan is shown in Figure 2-1.

IEE/EIA Decision Making Process in Pakistan

IEE/EIA Decision Making Process in Pakistan

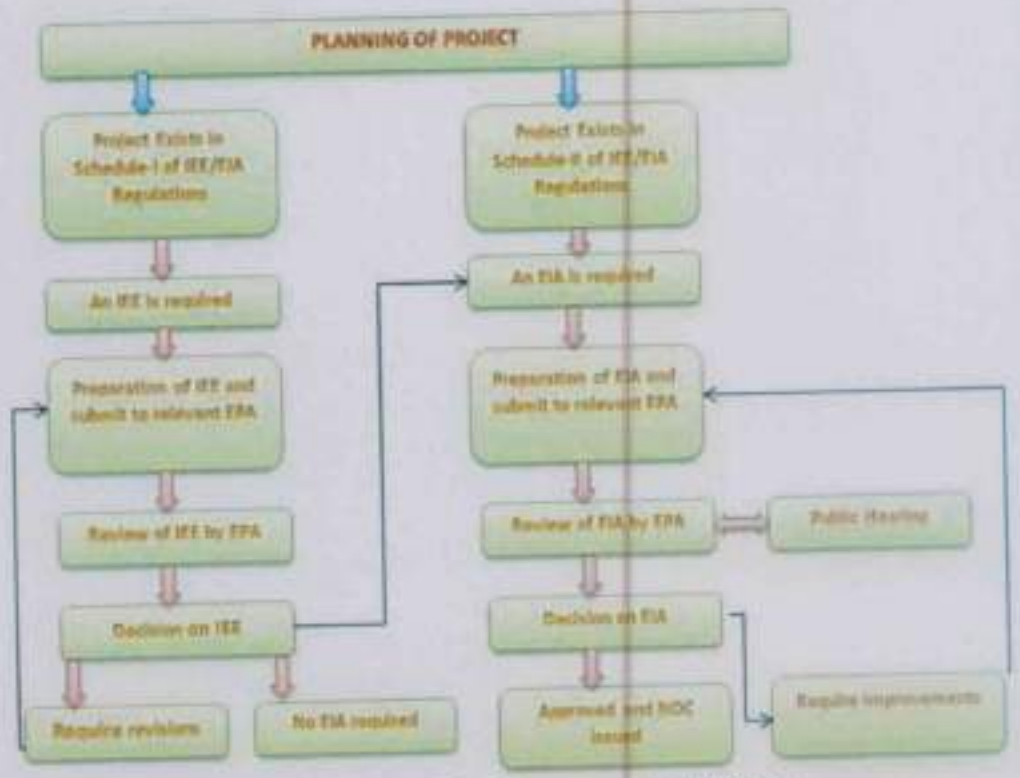


Figure 2-1: Electricity Consumers in Pakistan

2.1.5. National Environmental Quality Standards

The National Environmental Quality Standards (NEQS) have been promulgated under the PEPA. The ones relevant to the proposed Project are provided in the following Exhibits:

- **Exhibit 2-1:** NEQS for Municipal and Liquid Industrial Effluents.
- **Exhibit 2-2:** National Environmental Quality Standards for Gaseous Emissions.
- **Exhibit 2-3:** Standards for Motor Vehicle Exhaust and Noise.
- **Exhibit 2-4:** Standards for Ambient Air Quality.
- **Exhibit 2-5:** Standards for Ambient Noise.
- **Exhibit 2-6:** Standards for Drinking Water.

At the current time, only the national and provincial environmental regulations (i.e. the NEQS) are applicable to proposed Project. However, other relevant international environmental laws and regulations (such as those of the WB, IFC and ADB) have been considered as they may be required in the event that the proposed Project goes for lending from any international agency.

2.1.6. National Environmental Institutions in Pakistan

A brief account of environmental institutions in Pakistan is provided in this section

2.2.1. *Federal Ministry of Climate Change*

The Federal Ministry of Climate Change is the apex level institution in Pakistan dealing with matters of environment and climate change. The Ministry comprises five wings / sections:

- Administration Wing;
- Development Wing;
- Forestry Wing;
- International Cooperation Wing; and,
- Environment Wing

The Environment Wing deals with national and international environmental matters. The Pak-EPA is closely linked with the Federal Ministry of Climate Change.

2.2.2. *Pakistan Environmental Protection Council (PEPC)*

The Pakistan Environmental Protection Council (PEPC) was constituted in 1984 under Section 3 of the Environmental Protection Ordinance of Pakistan, 1983. The PEPC is headed by the Prime Minister of Pakistan and contains representatives from: trade and industry; leading NGOs; educational intuitions; expert journalists; and, and concerned ministries.

The key function of the PEPC is to co-ordinate and supervises the enforcement of PEPA. Other functions include:

- Approval of national environmental policies, and ensuring their implementation;
- Approval of the National Environmental Quality Standards (NEQS);
- Provision of guidelines for the protection and conservation of species, habitats and biodiversity in general, and for the conservation of renewable and non-renewable resources; and
- Co-ordination of the integration of the principles and concerns of sustainable development into national development plans and policies.

2.2.3. *Pakistan Environmental Protection Agency (Pak-EPA)*

Pakistan Environmental Protection Agency (Pak-EPA) was established under Section (5) of PEPA. The basic function of Pak-EPA is the implementation of the PEPA and development of associated regulations and guidelines.

Other functions of Pak-EPA are as follows:

- Review of IEE and EIA reports of relevant projects and environmental approvals granted;

- Issue of certificates for establishment of environment labs in the Islamabad Capital Territory;
- Preparation (or revision) and establishment of provincial Environmental Quality Standard (EQS) with approval of Pakistan Environmental Protection Council (PEPC);
- Promotion of research and the development of science and technology which may contribute to the prevention of pollution, protection of the environment, and sustainable development; and,
- Identification of the needs for, and initiation of, legislation in various sectors of the environment.

2.2.4. *18th Amendment to the Constitution of the Islamic Republic of Pakistan*

In 2010, through the 18th Amendment to the Constitution of the Islamic Republic of Pakistan, 1973, environment became a provincial subject, empowering each province to make its own law (except for the Islamabad Capital Territory (ICT) or areas in the federation not included in any province).

2.2.5. *Status of PEPA after 18th Amendment*

In the light of provisions of 18th Amendment:

- PEPA can be repealed or amended to make it applicable to a particular province, through a Provincial Act enacted by the Provincial Assembly concerned; and,
- PEPA shall continue to remain in force until repealed or amended by the competent authority, which is now the Provincial Assembly in respect of each Province and Parliament in respect of the ICT / areas in the federation not included in any province.

At present, under the provisions of 18th Amendment, almost all provinces of Pakistan have enacted their own Provincial Environmental Protection Act by making appropriate amendments to PEPA.

2.2.6. *Status of Pak-EPA Rules and Regulations after 18th Amendment*

According to the 18th Amendment, powers to make rules and regulations have been delegated to the provinces.

2.2.7. *Pak-EPA, Review of IEE and EIA Regulations, 2000*

Powers relating to review of IEE and EIAs have been delegated to the Provinces except for the:

- Military projects;
- Projects with trans-country impacts; and,

- Projects with trans-province impacts.

2.2.8. *Environmental Quality Standards*

Under the 18th Amendment, the power to prepare, establish and revise the Environmental Quality Standards (EQS), have been delegated to provincial EPAs. Now provincial EPAs can prepare, establish and implement the EQS with approval from Provincial Environmental Protection Council.

As mentioned earlier, Punjab EPA is the responsible authority for proposed Project.

2.2.9. *Provincial Environmental Setup in Punjab*

On 31 December 1983, under the Environmental Protection Ordinance of Pakistan, 1983, a provision was made for the establishment of a Provincial Environmental Protection Agency.

In 1985, the Federal Government was requested to delegate powers of the Agency to the Housing Physical and Environmental Planning (HP&EP) Department. On 1 July 1987, the Punjab EPA was formed.

On 31 December 1996, a separate administrative unit, Environment Protection Department (EPD) was formed under the Government of the Punjab. EPA Punjab was then detached from the HP&EP Department and now works as functional unit under the EPD.

Punjab EPA enacted the Provincial Environmental Protection Act in April 2012 by making appropriate amendment to the PEPA. The Punjab EPA now undertakes functions as delegated under the Punjab Environmental Protection Act 1997.

EIA related functions are performed through Environmental Approval Section of the Punjab EPA. The main functions of Environmental Approval Section are

- To review the IEE / EIA reports;
- To conduct the public hearing in EIA cases;
- To issue the environmental approvals;
- To monitor the conditions of the environmental approvals; and,
- To initiate the required actions against the proponents in case of non- compliance of conditions of the environmental approvals.

2.3. Other National and Provincial Legislation Applicable to the Proposed Project

Besides the environmental laws and regulations of Pakistan and Punjab province, proposed Project also has certain obligations under various national and provincial laws and regulations. These are discussed in this section.

2.3.1. Land Acquisition Act, 1894

The Land Acquisition Act (LAA) of 1894, which has been amended from time to time, has been the de-facto policy governing land acquisition and compensation issues in the country. The LAA is the most commonly used law for land acquisition and other properties for development projects. It comprises of 55 Sections pertaining to: area notifications and surveys; acquisition; compensation and distribution of awards; and, disputes resolution, penalties and exemptions.

Any land acquisition for the proposed Project will follow the procedures defined in the LAA. If required, certain additional procedures (as defined by the international best practice, such as WB Operational Policy on Resettlement – OP 4.12) will also be followed.

2.3.2. Canal and Drainage Act 1873

The Canal and Drainage Act 1873 entitles the government to use and control water of all rivers, streams and canals for public purposes. The Act also provides rates for irrigation water supply.

Provincial governments in Pakistan have adopted Part II (Application of Water for Public Purpose) of the Canal and Drainage Act 1873 by making appropriate amendments. The Irrigation Department Muzaffargarh will entitle the water supply for proposed Project under this Act.

2.3.3. Punjab Wildlife Act, 1974

This Act aims to protect the province's wildlife resources directly and other natural resources indirectly. It classifies wildlife by degree of protection (i.e. animals that may be hunted on a permit or special license, and species that are protected and cannot be hunted under any circumstances). The Act specifies restrictions on hunting and trade in animals, trophies, or meat. The Act also defines various categories of wildlife protected areas (i.e. national parks, wildlife sanctuaries and game reserves). Provisions in this Act will be applicable throughout the design, construction, operation and maintenance, and decommissioning phases of the proposed Project

2.3.4. Punjab Forest Act 2010

The Punjab Government enacted the Punjab Forest Act in 2010 by making amendments to the Forest Act 1927. The Forest Act deals with the matters related with protection and conservation of natural vegetation / habitats. The Act empowers the concerned agency to declare protected and reserved forest areas and maintain these forests. In spite of the fact that Act recognizes the right of people for access to the natural resources for their household use, it prohibits unlawful cutting of trees and other vegetation.

According to the provisions of Punjab Forest Act, cutting of any trees during the construction of proposed Project will require prior permission from the Punjab Forest Department.

2.3.5. *Antiquities Act, 1975*

The Antiquities Act of 1975 ensures the protection of historical and archaeological resources in Pakistan. The Act is designed to protect 'antiquities' from destruction, theft, negligence, unlawful excavation, trade and export. Antiquities have been defined in the Act as ancient products of human activity, historical sites, or sites of anthropological or cultural interest and national monuments etc. The Act prohibits new construction in the proximity of a protected antiquity and empowers the Government of Pakistan to prohibit excavation in any area that may contain articles of archaeological significance.

Under this Act, the project proponents are obligated to:

- Ensure that no activity is undertaken in the proximity of a protected antiquity; and,

If, during the course of the project, an archaeological discovery is made, it should be protected and reported to the Department of Archaeology, Government of Pakistan, for further action.

2.3.6. *Punjab Factories Act 1934 (Amended 1940)*

The clauses relevant to the proposed Project are those addressing the health, safety and welfare of the workers, disposal of solid waste and effluents, as well as damage to private and public property. The Act also provides regulations for handling and disposing toxic and hazardous substances.

The PEPA supersedes parts of this Act pertaining to environment and environmental degradation

2.3.7. *Explosives Act 1884*

The Explosives Act 1884 provides regulation for the manufacture, possession, use, sale, transport, import and export of explosives. Under this Act, project developers (and contractors) are bound on safe handling, transportation and using explosives during construction of proposed Project.

2.3.8. *Employment of Child Act 1991*

The Employment of Child Act 1991 disallows the use of child labor in the country. The Act defines a child as a person who has not completed his / her fourteenth year of age. The Act states that no child shall be employed or permitted to work in any of the occupation set forth in the Act (such as transport sector, railways, construction, and ports) or in any workshop wherein any of the processes defined in the Act are undertaken. Under this Act, project developers (and contractors) are not permitted to allow any child labor during the construction and operation of proposed Project.

2.3.9. *Pakistan Penal Code 1860*

Pakistan Penal Code 1860 deals with the offences where public or private property or human lives are affected due to intentional or accidental misconduct of an individual or

organization. The Code also addresses control of noise, noxious emissions and disposal of effluents. Most of the environmental aspects of the Code have been superseded by the PEPA.

2.3.10. *Punjab Power Policy 2009*

Salient features of Punjab Power Policy, 2009 are as below:

- Punjab Power Policy is applicable for the development of all types of technologies such as coal, biomass, hydro, solar and wind;
- Concessions in duties / tax regime announced by Government of Pakistan are applicable for projects developed under the Policy;
- Standard format of Power Purchase Agreement (PPA), Implementation Agreement (IA) and Water Usage Agreement (WUA) are available in Policy;
- Dispersal of power is allowed in 3 modes: (i) Sale to utility company (WAPDA / DISCO); (ii) Sale to local area by establishing distribution network; and, (iii) Sale to dedicated industry (Self Utilization);
- Use of Government land is allowed in two modes: (i) Lease; and, (ii) Equivalent Equity participation;
- Projects may be developed in private Sector / JV mode; and,
- Mode of investment for thermal is normally "*Build, Own and Operate*" basis (BOO) with concession period of 30 years.

2.4. International Environmental Requirements

This section discusses other relevant international environmental laws, regulations and guidelines (such as those of the WB, IFC and ADB). As mentioned earlier, international environmental laws and regulations (such as those of the WB, IFC and ADB) have been considered as they may be required in the event that the proposed Project goes for lending from any international agency.

2.4.1. *Environmental and Social Requirements of the World Bank*

Environmental Assessment is one of the 10 environmental, social, and legal Safeguard Policies of the World Bank. Environmental Assessment is used in the World Bank to identify, avoid, and mitigate the potential negative environmental impacts associated with Bank lending operations. In World Bank operations, the purpose of Environmental Assessment is to improve decision making, to ensure that project options under consideration are sound and sustainable, and that potentially affected people have been properly consulted.

The World Bank's environmental assessment policy and recommended processing are described in Operational Policy (OP) / Bank Procedure (BP) 4.01: Environmental Assessment. This policy is considered to be the umbrella policy for the Bank's environmental 'safeguard policies.

2.4.2. *Environmental and Social Requirements of IFC*

The following section provides a brief summary of the environmental and social requirements of the IFC.

2.4.3. *IFC Sustainability Framework*

IFC's Sustainability Framework is aimed to ensure the IFC commitment to sustainable development and reflects the Corporation's approach to risk management. The Sustainability Framework comprises IFC's Policy and Performance Standards on Environmental and Social Sustainability, and IFC's access to Information Policy. The Policy on Environmental and Social Sustainability describes IFC's commitments, roles, and responsibilities related to environmental and social sustainability

2.4.4. *IFC Performance Standards on Environmental and Social Sustainability*

IFC's Performance Standards on Environmental and Social Sustainability define the responsibilities of IFC clients for managing their environmental and social risks. The Performance Standards are:

- **Performance Standard 1:** Assessment and Management of Environmental and Social Risks and Impacts.
- **Performance Standard 2:** Labor and Working Conditions.
- **Performance Standard 3:** Resource Efficiency and Pollution Prevention.
- **Performance Standard 4:** Community Health, Safety, and Security.
- **Performance Standard 5:** Land Acquisition and Involuntary Resettlement.
- **Performance Standard 6:** Biodiversity Conservation and Sustainable Management of Living Natural Resources.
- **Performance Standard 7**: Indigenous Peoples.
- **Performance Standard 8**: Cultural Heritage.

Performance Standard 1 applies to all projects that have environmental and social risks and impacts.

2.4.5. *IFC Environment, Health and Safety (EHS) Guidelines*

The IFC EHS Guideline are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP), as defined in IFC's Performance Standard 3 on Pollution Prevention and Abatement. These Guidelines are used as a technical source of information during project appraisal activities.

2.4.6. *IFC Environmental and Social Review Procedures*

IFC investment timing in relation to a client's business activities and project implementation varies from project to project. IFC does not control the timing of its entry into a project, however IFC's engagement, more often than not, occurs after the project is conceived, with the site selected and development started.

Therefore, IFC's approach is, whenever possible, to take full advantage of assessment work undertaken by the client before IFC's entry into the transaction and where necessary strengthening environmental assessment (EA) analysis without replicating processing requirements. Of particular importance is the adequacy of the client's Environmental and Social Management System.

Whenever IFC makes an investment in a project, following environmental and social review procedures are adopted:

- Conduct due diligence of the proposed investment activity;
- Assist the client in developing measures to avoid, minimize, mitigate, or compensate for environmental and social impacts;
- Categorize the project to specify IFC's institutional requirements;
- Identify opportunities to improve environmental and social outcomes;
- Monitor and document the client's environmental and social performance throughout the life of IFC's investment; and,
- Disclose information about its institutional and investment activities in accordance with the Policy on Disclosure of Information

All environmental and social studies, EA documentation, records and associated information are stored in Desk. Desk is an electronic workspace that provides secure access to several corporate applications and serves as a one-stop-shop for project processing in IFC.

2.4.7. *Environmental and Social Requirements of ADB*

ADB Environmental Assessment Guidelines describe how to fulfill the requirements outlined in ADB's Environment Policy and Operations Manual on Environmental Considerations in ADB Operations. Information on ADB's policies and procedures for conducting and reporting on the environmental assessment is also provided for all types of projects.

Strategic tools such as country environmental analysis and strategic environmental assessment are also included in guidelines.

3. CONSIDERATION OF ALTERNATIVES

Alternatives are generally identified and analysed to determine the most viable method of achieving the project objectives. During the recent years, environmental and social concerns are gaining significant momentum all over the world. Therefore; besides the technical and financial considerations, it is also required to recognize the environmental and social consequences of developmental activities. Alternatives considered in this Chapter include:

- No project option;
- Site Alternatives, their Selection and Rejection Criteria
- Environmental Alternatives, their selection and rejection criteria
- Economic Alternatives, their selection and rejection criteria

3.2. No Project Option

A "no project option" (or "no development") simply implies no harm to environment and society. However, almost all types of economic development have some social and environmental benefits associated with it. The ultimate objective of this EIA is to look into the options (measures) which can be adopted to maximize the positive effects and minimize the adverse effects of the proposed Project on environment and society.

Under the current crisis in Pakistan, a "no project option" is considered to be the least viable option. The proposed Project can be considered as one of the pioneer industrial state in Pakistan. It is likely to address many issues related to industrial zone in the country. This is also likely to reduce the risk for future investment and will attract more investors to invest in industries in Pakistan. In the absence of the proposed Project, this process is likely to be delayed.

3.3. Site alternatives, their Selection and Rejection Criteria

Selection of the site for the proposed industrial plant 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 business unit.

The sites were considered for the establishment of proposed industria state in and around the Lahore as it has become an industrial hub of the country. 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 install the plant and to expand it 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, dispatch of finished products and for the use of the employees.
- **Market:** Size of the local market and the cost of transporting to central markets vis-a-vis the extent of demand.

3.4. Environmental Alternatives, their Selection and Rejection Criteria

Every development project causes alteration in the existing environment inevitably that can be positive as well as negative. The negative environmental impacts of the proposed industry can be gaseous emission, increased noise levels, excessive water usage, groundwater contamination, and surface water contamination etc. The ' no-go' alternative, also referred as the 'no-action' alternative or 'zero-alternative', can be a consideration in this case. It assumes that the activity does not go ahead, implying a continuation of the current situation or the status quo. It is basically a consideration of the original and undisturbed environment without any development. This option is considered to ensure that all possibilities have been taken into consideration before deciding on a final course of action and also to provide a baseline situation against which the other suggested alternatives can be measured.

In a situation where negative environmental impacts have high significance, the ' no-go' alternative takes on particular importance. In some cases, the ' no-go' alternative may be the only realistic alternative and then it has a critical role to play. It is not true to assume that the ' no-go' alternative is necessarily the best from an environmental perspective. In many cases, expansions and upgrades of existing industries (the 'go' alternative) permit the implementation of technological improvements such as the replacement of outdated equipment that leads to reduced emissions to the air or water, in addition to the primary aim of increased production capacity.

The ' no-go' alternative provides the means to compare the impacts of project alternatives with the scenario of a project not going ahead. In evaluating the ' no-go' alternative here; the benefits of the proposed project are more valued for the country.

3.5. Economic Alternatives, their Selection and Rejection Criteria

Economic alternatives were considered taking into consideration the capital and operational costs for the proposed unit. Land cost, infrastructure cost and machinery cost were taken into account as the deciding economic factor. Also, state of the art machinery will be employed considering it as one-time investment and thus minimizing the maintenance cost during the operational phase. Additionally, it will contribute towards uninterrupted production during operational phase.

3.6. Analysis of Alternatives

The No Project Option for (his project is feasible because-:

- Land is owned by the family of Directors of Industrial Parks Pakistan Limited who have authorized IPPL to manage and dispose of the property as per its business plan, without any limitations
- Location is prime, which has direct and closest connectivity with the Motorways and main communication arteries such as Multan Road, Ferozpur Road, Raiwind Road etc.
- Non availability of Industrial plots in Quaid Azam Industrial Estate Kot Lakhpat and Sundar Industrial Estate has directed the focus of the investors towards new industrial estates, which could provide them developed plots with all the amenities and one stop shop for the facilities which are required for an enterprise.
- Establishment of proposed SEZ in an area where a public sector Industrial Estate already exists will attract the target industries being a lucrative location in the close vicinity of Lahore City as well as in close proximity of the industrial hub.
- Based on the strengths of the connected districts and resource pool, this economic zone has predominant investment feasibility for industries in SMES like fruit & food packaging, textile, and agro-based industries.
- The SEZ also very feasible for local investors of this region specially for Lahore & Sheikhupura to start new production units with special connectivity and other advantages

4. DESCRIPTION OF THE PROJECT

This section of the study concentrates on details of the project and its salient features; such as location, site layout, objectives, cost and magnitude of operation and various phases. Inputs and discharges relevant to different phases of the project, such as electricity & materials, etc. have also been examined as a response to possible environmental concerns.

Punjab Environmental Protection Act, 2012 (PEPA, 2012) stipulates that an EIA/IEE is mandatory for Development Projects. Therefore, an IEE/EIA is required for projects for policy procedure, filing, review and approval of environmental assessment. The proposed project is to develop United Business Park Special Economic Zone to international standards. *This project is enlisted in EIA/ IEE regulation 2000 Schedule- II of subsection H under list 5 Industrial Estate (Industrial Export Processing Zone) of IEE/EIA Regulation 2000 and thus requires Environmental Impact Assessment- EIA.*

4.2. Objectives of the Project

- The main objective of the project is to develop Special Economic Zone to achieve industrial development and management orientation objectives under the umbrella of Government of Pakistan's vision for industrialization, job creation and economic growth.
- We expect to introduce a mix of industrial companies in United Business Park Special Economic Zone proposed by Din Properties Pvt. Ltd that would contribute to the Economy by generating employment of 800,000 persons.
- The fiscal benefits under the SEZ law include a one-time exemption from custom duties and taxes for all capital goods imported into Pakistan for the development, operations and maintenance of a SEZ (both for the developer as well as for the zone enterprise) and exemption from all taxes on income for a period of ten years.

4.3. Nature, Location and Site Layout of the Project

United Business Park SEZ is ideally located near Sundar Industrial Estate, United Business Park SEZ is ideally located near Sundar Industrial Estate, the project is linked with all major cities, sea ports and dry ports of the country through a network of national Highways and Motorways. The closest bigger town is Raiwind. It is around 25 Km from Thokar Niaz Beg and around 25 Km from Gajju-Matta Ferozpur Road. It is well linked with the main roads as well. Distance from the proposed SEZ to Multan Road (Sundar) is around 7 Km. The project location is represented in Figure No. 4-1.

The development works envisage provisioning of the following facilities:

- Construction of road

- Provision of Sewerage System
- Provision of Water Supplies
- Construction of Religious Facility (Mosque)
- Provision of Drainage Land.
- Construction of Disposal Station
- Provision of Fire Fighting System
- Provision of Green area

Figure 4-1 Location of the Project

4.4. Land Use on the Site

The area is present in the Industrial area adhacent to the Sundar Industrial Estate.

4.5. Road Access

The project site is easily accessible from Manga Raiwind, Sundar Raiwind Road and Talib Sarai Road, Lahore.

4.6. Cost and the Magnitude of Operation

The cost and its breakup is presented in Table 4-1

Table 4-1 Cost of the Project

No.	Description	Price (Million PKR)
1.	Cost of land	8,408
	Development Cost i.e. Infrastructure Works etc	7,114
	Miscellaneous	1,035
Total Price		16,557
Contingencies @ 5%		**828**
Grand Total		17,385

- Detailed site survey, planning and demarcation of the various regions in the project area
- Site suitability assessment
- Process of designing
- Purchase and delivery of equipment
- Development of industries
- Testing and commissioning
- Plantation of various ecologically important species on the designated green space

4.7. Schedule of Implementation

4.7.1 Planning

The proposed project is at its feasibility study stage. This EIA study is a basic and necessary part of the overall planning for the project and will be integrated into the feasibility study.

4.7.2. Design

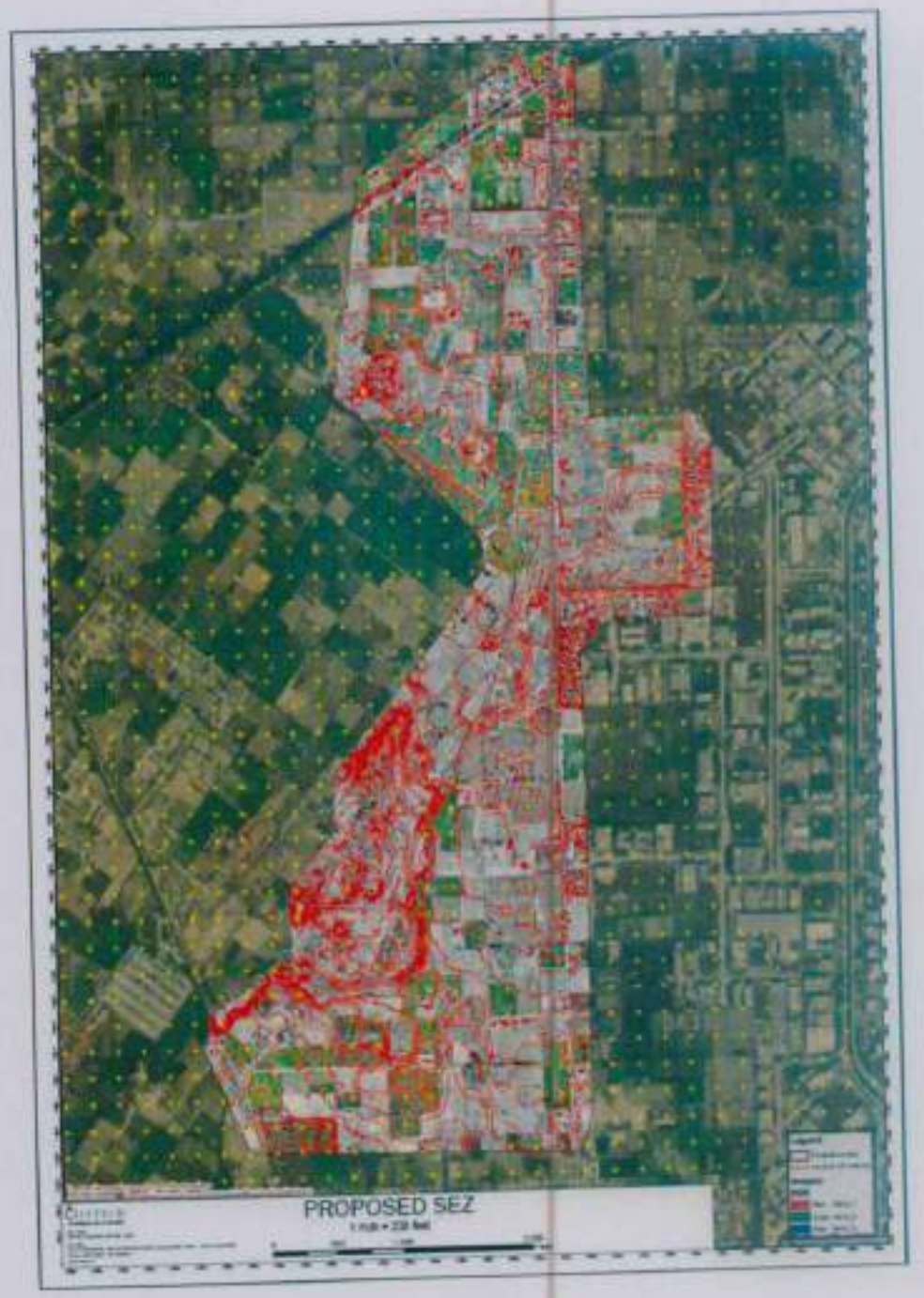
The construction contractor and fabrication contractor will be hired based on the cost. The technology adopted for the proposed project establishment will be up to date. Tentative project implementation schedule is presented below in Table 4-2.

Table 4-2 Time Schedule for the Project Development

Sr.	Description	Months
1	Soil Report	2
2	Civil Design	4
3	Process and Electrical Design	8
4	Equipment Manufacturing and Delivery	12
5	Civil Construction	10
6	Mechanical and Electrical Erection	10
7	Testing & Commissioning	3
Total Months		**49**

4.8.1. Topographic Survey Plan

The project site is approximately 1.0 m to 2.5 m lower than the Motorway-1 level. The topography of the project area is generally plane. The roads are approximately 1-meter high. Topographical map of the proposed site is shown below in Figure 4-3 and attached as ***appendix X.***



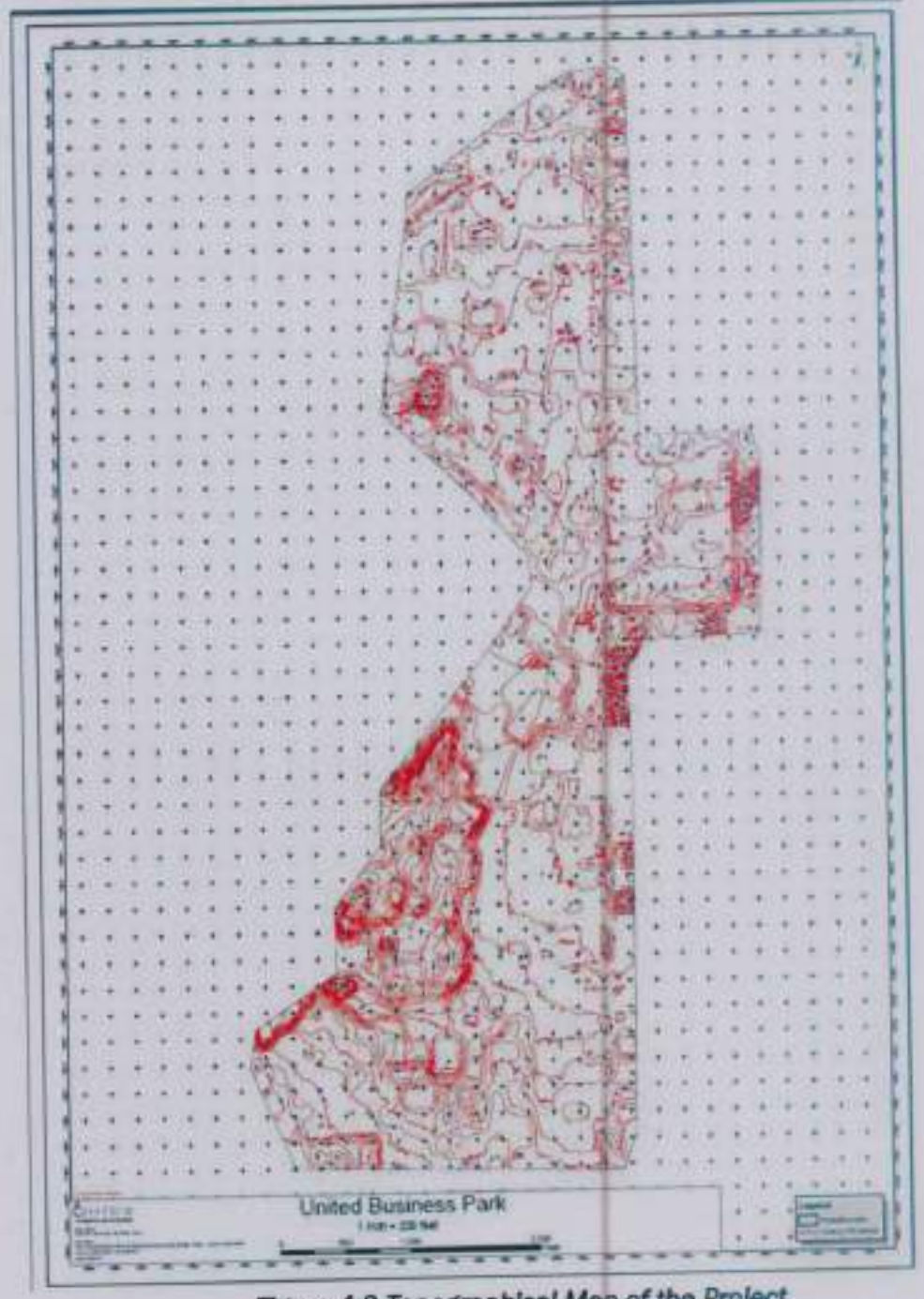


Figure 4-3 Topographical Map of the Project

4.8. TYPES OF INDUSTRIES

High Potential Sector for following industries in Lahore SEZ

- Manufacturing Services
- Warehousing
- Information Technology
- Textile
- Light Engineering
- Auto parts
- Plastic Industry
- Pharmaceuticals
- Chemicals
- Electronics
- Food & Beverages
- Mobile Manufacturing

4.9.1. Services

i. Jamia Mosque
ii. Hospital
iii. Central Weigh Station
iv. Security Office
v. Labor Club
vi. Ladies Club
vii. Commercial area

4.9.2. CONNECTIVITY

Table 4-3 List of Areas Nearby the Project

Airport	34 KM
Railway Station	64KM
Dry Port	27KM-NLC Dry Port Lahore
Lahore City	23KM

4.9. Commercial Buildings

To meet the daily requirements of the project. Some commercial and public buildings have also been proposed which include:

- Post office
- Clinics
- Banks
- Canteens
- Hotels

- General Shops

4.10. Waste Water Treatment Plant and Solid Waste Management System

The proposed industrial estate will feature waste water treatment plant. Keeping in view the slope of the project area, the plant is planned on the eastern side of the site.

The solid waste site will be designed after clarification of type of the industries. In case of proposed industrial estate, two types of solid waste will be generated. i.e. industrial waste and municipal waste. Collection of both types of wastes will be done via centralized collection system. However, in case of industrial waste collection, collection task will be assigned to contractor after legitimate licensing process. Both contractor and industrial estate will be responsible for the proper collection of the industrial wastes. In case of municipal waste, door to door collection will be carried out. Both types of collected wastes will be further categorized depending upon their nature. The recyclable wastes will be recycled and rest of the collected waste will be taken to proper disposal site present in the nearby vicinity of Lahore District.

4.11. Fire Fighting System

A well-equipped and pressurized water distribution system which will comprises of pipes, hydrants, gate valve etc. will be provided. The system shall be operated automatically in case the pressure is dropped in the system by operating any fire hydrant.

5. DESCRIPTION OF THE ENVIRONMENT

5.2. GENERAL

An environmental baseline study is intended to establish a data base against which potential impacts can be predicted and managed subsequently. The IEE of the proposed project covers a comprehensive description of the project area, including regional resources which are expected to be affected by the project, as well as, those which are not expected to be directly affected by the operation of the project.

A site visit was conducted to survey the field area for collection of relevant data. Interviews were conducted with the general public and stakeholders of the project area in order to seek the public opinion on the implementation of the proposed project. The environmental impacts of any activity or process will be assessed on the basis of deviation from the baseline or normal situation. The following components form part of the baseline study:

- Physical Environment
- Ecological Environment
- Socioeconomic Environment.

5.3. PHYSICAL ENVIRONMENT

5.2.1. Physical Features around the Project Area

Lahore is a city in the Pakistan province of Punjab. Lahore is the country's second-most populous city after Karachi and is one of Pakistan's wealthiest cities with an estimated GDP of $58.14 billion as of 2015. Lahore is the largest city, and historic cultural centre of the Punjab region, and one of Pakistan's most socially liberal, progressive, and cosmopolitan cities. It is in the west of the Punjab province.

5.2.2. Geography

The district is located between 31° 25′ 0″ N, 74° 20′ 0″ E. Lahore is bounded on the north and west by the Sheikhupura District, on the east by Wagah, and on the south by Kasur District. The Ravi River flows on the northern side of Lahore. Lahore city covers a total land area of 1,772 km2 (684 sq mi) and is still growing. Under the Local Government Act of Punjab, 2013, Lahore District has been declared a Metropolitan Area and divided into nine zones which are as follows:

- Ravi Zone
- Shalimar Zone
- Aziz Bhatti Zone
- Data Gunj Bakhsh Zone
- Samanabad Zone
- Gulberg Zone
- Wahga Zone
- Allama Iqbal Zone
- Nishtar Zone

The location of Lahore within Punjab is shown in Figure 5-1.

Figure 5-1 Location of District Lahore

5.2.3. Seismic Zone

According to seismic zoning of Pakistan the project area lies in seismic zone 2A and represents minor damage. Seismic zoning map of Pakistan is given in Figure 5-2.

Figure 5-2 Seismic Zoning Map of Pakistan

5.2.4. Climate

Lahore's climate is a local steppe climate. During the year there is little rainfall. According to Köppen and Geiger, this climate is classified as BSh. The temperature here averages 24.1°C. The average annual rainfall is 607 mm. Precipitation is the lowest in November, with an average of 4 mm. Most of the precipitation here falls in July, averaging 189 mm.

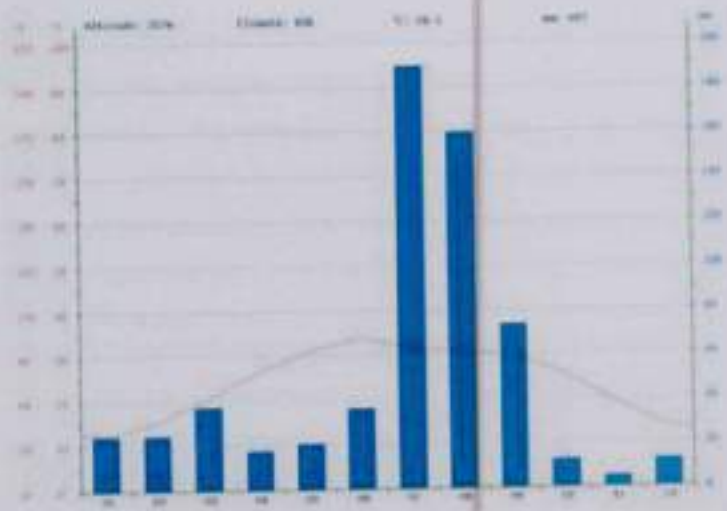
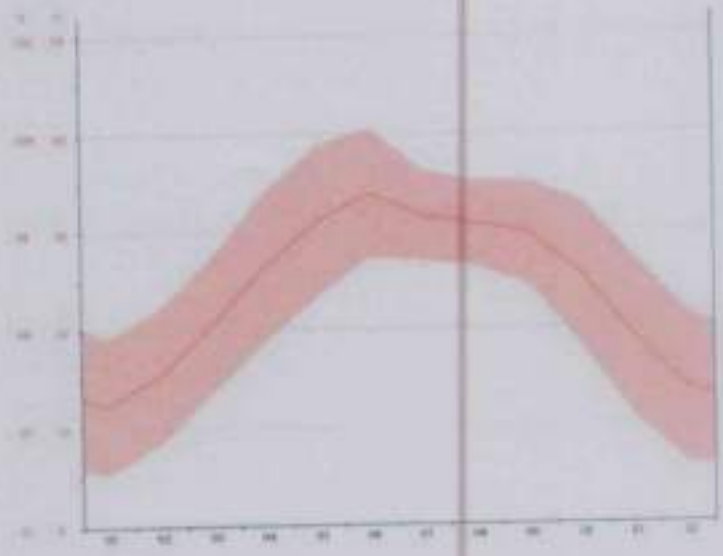


Figure 5-3Graphical Representation of Climate

5.2.5. Temperature

At an average temperature of 33.9°C, June is the hottest month of the year. January is the coldest month, with temperatures averaging 12.3°C. Between the driest and wettest months, the difference in precipitation is 185 mm. Throughout the year, temperatures vary by 21.6°C.



	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	12.3	15.4	20.8	26.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	25.3	18.9	13.7
Min. Temperature (°C)	8.3	9.4	13.8	18.8	23.4	27.1	28.4	28.3	24.3	18	12.7	8
Max. Temperature (°C)	19.3	22.4	27.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	27.1	21.4
Avg. Temperature (°F)	54.1	59.7	69.1	79.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	77.5	66.0	56.7
Min. Temperature (°F)	41.8	47.1	56.5	65.8	74.1	81.1	[illegible]	79.3	75.1	64.4	51.2	42.8
Max. Temperature (°F)	66.7	72.3	81.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	81.0	72.8
Precipitation / Rainfall (mm)	24	24	27	17	20	38	[illegible]	[illegible]	73	12	4	12

Figure 5-4 Temperature Variations during Different Months

5.2.6. Water Resources

Water constitutes an important section of the physical environment of an IEE Study to define its magnitude, quality and occurrence throughout the entire project corridor. Water resources of the area are discussed under two broad headings, surface water resources and groundwater resources.

i. Surface Water

Surface waters resources are usually exposed to the surface of earth in the form of mobile and immobile situation which includes snow-clad mountains, rivers, non-river streams, rain, sleet, wetlands and oceans. Surface resourced waters are highly susceptible to natural and anthropogenic derived contamination in terms of Chemical and Biological contamination and thus are not used for sensitive applications such as drinking directly, unless it is pre-treated. There is no surface water body found near the vacinity of the project area.

ii. Ground Water

Ground water resources are found hidden and camouflaged into the surface of earth in the form of mobile and immobile state and exist as shallow and deep wells, confined and un-confined aquifers, springs and watersheds. Ground resourced waters are not easily susceptible to natural and anthropogenic derived contamination caused by Chemical/Biological pollution and thus is directly used for sensitive applications such as drinking even it is un-treated. As per data available the water levels are generally shallow – within 20 feet as shown in Figure 5-5.

Figure 5-5 Graphical Representation of Groundwater Level Trends

5.4. Ecological Environment

Ecological Environment includes:

- Flora
- Fauna
- Endangered Species

The wildlife of the Lahore District of Pakistan includes a diverse range of natural and cultivated flora and fauna. The introduced flora of the city of Lahore comes from its cultural heritage as the regional capital of various Indian kingdoms from the 11th century to the early 20th century. Much of the Indian flora was introduced during the reign of Akbar, the third Mughal emperor.

5.3.1. Flora

Common trees of Lahore include:

- Alstonia scholaris - locally termed **ditabark** - native to South Asia
- Bombax malabaricum- locally termed **sunbal** or **silk cotton tree** - native to the Himalayas
- Callistemon citrinus - locally termed **bottle brush** - native to Australia
- Dalbergia sissoo - locally termed **shisham** - native to South Asia
- Delonix regia - locally termed **gulmohar** - native to Madagascar
- Erythrina suberosa - locally termed **coral** or **gul nister** - native to Burma
- Ficus benghalensis - locally termed **banyan** - native to Bangladesh
- Ficus religiosa - locally termed **pipal** - native to South Asia
- Ficus retusa - locally termed **bobari** - native to Malaysia

- Kigelia pinnata - locally termed **gul-e-fanoos** or **sausage** - native to Africa
- Livistona chinensis - locally termed **bottle palm** - native to China
- Mangifera indica - locally termed **aam** - native to South Asia
- Mimusops elengi - locally termed **molsery** - native to South Asia
- Pongamia pinnata - locally termed **such chayn** or **Indian beech** - native to Himalayas
- Syzygium cumini - locally termed **jamu** - native to South Asia
- Ziziphus zizyphus - locally termed **jujube** - native to Himalayas

5.3.2. Fauna

The Changa Manga forest near Lahore is a hotspot for wildlife in Punjab. Wildlife within the borders of the plantation includes small remnant populations of nilgai, hog deer, wild boar and possibly axis deer. Jackal and Asiatic wild cat can be found there as well. It also serves as a wildlife breeding center. Changa Manga plantation is an important place for restocking projects of Asiatic vultures in Pakistan. A *Gyps Vulture Restoration Program* was started in 2006 by WWF-Pakistan to conserve and breed endangered species of *Gyps*, especially the white-rumped vulture.

5.3.3. Endangered Species

There are no floral or faunal species inhibiting in the project area that are included in RED Data Book of IUCN.

5.5. Socioeconomic Environment

Socio-economic and other relevant information revealed from Multiple Indicator Cluster Survey (MICS) 2007-08. One of the main objectives of Multiple Indicator Cluster Survey (MICS) was to establish credible baseline for socio-economic status at each District and Tehsil Level.

Table 5-1Summary of Socio-Economic Indicators

Socio-economic Indicators	District Lahore
Number of Households	7,755
Number of Under-5 Children	615
Solid Fuel Used	16.2%
Improved Source of Drinking Water	98.6%
Water Treatment Used in the Household	24.3%
Percentage of Population Using Sanitary Means of Excreta Disposal.	95.4%
Proper Disposal of Solid Waste	56.9%
Literacy Rate	74.1%
Percentage of Children for Primary School Entry	25.4%
Total Child Labor	3.3%
Had cough for more than Last Three Weeks	1.6%

Diagnosed with Tuberculosis during Last One Year	0.4%
Diagnosed with Hepatitis during Last One Year	1.2%
Employed	93.6%
Unemployed and Seeking Job	6.4%
Household Utilities	
Electricity	99.6%
Gas	79.7%
Radio	56.3%
TV	90.9%
Cable TV	69.2%
Telephone	36.3%
Mobile	87.2%
Socio-economic Development	
Livestock	11.7%
Population	11126285 persons
Average Annual Growth Rate (1998-2017)	3.00
Mean Household Size	6.4
Govt. Hospitals	14.8%

5.6. Quality of Life Values

5.5.1. Religious, Ethnic Groups and Languages

Of the people in Lahore, 87% of them speak Punjabi; however, this language can be broken down into many different dialects which make for a diverse speaking population. Other languages spoken include Urdu–the national language, English-which is spoken and understood by a large number of people; especially those from an educated background.

The main religions in Lahore are Muslim–mostly Sunni or Shia- which makes up 94% of the population. The remaining 6% are nearly all Christians. There are also a small number of minority religions such as Sikh and Hindu. The Lahoris are a cultural bunch of people celebrating many festivals around in the year–some religious, some historical and some are combinations of ancient and modern even western celebrations.

5.5.2. Social Infrastructure and Facilities

Overall the social and physical infrastructure is up to the mark in the project area. A brief account of the education, health, infrastructure and markets of the area is as follows:

5.5.3. Educational Institutions

There are a number of educational institutions found in Lahore. The educational status is up to the mark in the district. A list of some of the educational institutions is given below.

- Grand Charter School
- St. Anthony's High School
- Government College of Science
- Forman Christian College

- University of Engineering and Technology, Lahore
- COMSATS Institute of Information Technology

5.5.4. Health Facilities

There are different Basic Health Units (BHUs), Rural Health Centers (RHCs), Tehsil Headquarter Hospitals (THQs) and District Headquarter Hospitals (DHQs) in the district. List of some of them have been given below.

- DHQ Govt M.M.Munshi Hospital,Lahore
- DHQ Govt Kot Kawaja Saeed Hospital, Lahore
- BHU Manawan
- BHU Narwar
- RHC Raiwind
- RHC Manga Mandi
- THQ Govt. Mozang Hospital, Lahore
- THQ Govt Said Mitha Hospital, Lahore

The total number of health facilities in the district is given in Table 5-2.

Table 5-2 Health Facilities in Lahore

Sr. No.	Hospitals	Number
1	DHQ Hospitals	01
2	THQ Hospitals	03
3	RHCs	05
4	BHUs	40
5	Govt. Rural Dispensaries	25
6	MCH Centre	02
7	Sub Health Center	13
Total		**89**

5.5.6. Economy of the Area

As of 2008, the city's gross domestic product (GDP) by purchasing power parity (PPP) was estimated at $40 billion with a projected average growth rate of 5.6%. This is at par with Pakistan's economic hub, Karachi, with Lahore (having half the population) fostering an economy that is 51% of the size of Karachi's ($78 billion in 2008). The contribution of Lahore to the national economy is estimated to be 11.5% and 19% to the provincial economy of Punjab. As a whole, Punjab has $115 billion economy making it first and to date only Pakistani Subdivision of economy more than $100 billion at the rank 144. Lahore's GDP is projected to be $102 billion by the year 2025, with a slightly higher growth rate of 5.6% per annum, as compared to Karachi's 5.5%.

A major industrial agglomeration with about 9,000 industrial units, Lahore has shifted in recent decades from manufacturing to service industries. Some 42% of its work force is employed in finance, banking, real estate, community, cultural, and social services. The city is Pakistan's largest software & hardware producing centre and hosts a growing

computer-assembly industry. The city has always been a centre for publications where 80% of Pakistan's books are published, and it remains the foremost centre of literary, educational and cultural activity in Pakistan.

The Lahore Expo Centre is one of the biggest projects in the history of the city and was inaugurated on 22 May 2010. Defense Raya Golf Resort, also under establishment, will be Pakistan's and Asia's largest golf course. The rapid development of large projects such as these in the city is expected to boost the economy of the country. Ferozepur Road of the Central business districts of Lahore contains high-rises and skyscrapers including Kayre International Hotel and Arfa Software Technology Park. Here are some of pictures that can show the economy of Lahore.

Figure 5-6 Pictorial View of Economy of Lahore

5.5.7. Agriculture

Main Crops: Wheat, Rice, Maize, Millet and Barley.

Main Fruits: Citrus, Mango, Guava, Date Palm and Jamun.

Main Vegetables: Garlic, Onion, Radish, Potato, Carrot, Spinach and Cauliflower.

5.5.8. Livestock

The major livestock includes Mules, Horses, Donkeys, Camels, Bullocks, Buffaloes and Cows. The statistics of these animals are given in Table 5-3.

Table 5-3: Statistics of Livestock in Lahore

Livestock	Number

Mules	4207
Horses	8599
Donkeys	71364
Camels	112
Bullocks	40069
Buffaloes	3067
Cows	458
Total	**127876**

5.5.9. Archeological and Cultural Sites

Lahore is famous as being the cultural center of Pakistan, every nook and corner of Lahore has a rich history and cultural importance. However following historic sites and buildings are must if one visits Lahore.

- Badshahi Masjid
- Lahore Fort (Sheesh Mahal, or Palace of Mirrors)
- Azeri Bagh
- Mausoleum of Muhammad Iqbal
- Data Sahib (Data Darbar)
- Shahi Mohalla
- Mina-e-Pakistan
- Anarkali
- Chauburji
- Lahore Museum
- Gawal Mandi
- Ichhra
- Shalimar Gardens
- Shahdara
- Shimla Pahari

However, there were no archaeological sites near the project area although nearest chaks do have mosques, graveyards and darbars.

5.7. Environmental Baseline Monitoring

To assess the baseline conditions of the project area, following environmental components were monitored:

- Ambient Air Quality
- Drinking Water Quality
- Noise Levels

The lab reports of environmental analysis of the above mentioned parameters are attached in ***Annexure VII***.

5.8. Suitability of the Site

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

6. ENVIRONMENTAL IMPACTS ASSESSMENT

This section provides the analysis of the potential impacts during different stages of the proposed project on the physical, biological and socio-economic environment of the project area.

6.2. What is the Problem?

The problem is the environmental impacts resulting from project activities related to Industrial estate. The project is based on Development of industrial estate located in District Lahore. The environmental impacts resulting from project operations on each environmental setting including physical, ecological and socio-economic environment.

6.3. When Problem Will Occur and When It Should Be Addressed?

The impacts may occur during different stages of the project activity. The impacts should be addressed at every stage of project operations. The environmental impacts should be addressed at installation and operational stage of project activities.

6.4. Where Problem should be addressed?

The problem as mentioned above should be addressed at project location where project activities are being carried out. All the impacts resulting from project location should be addressed, if any.

6.5. How the Problem should be addressed?

The problem should be addressed using specified criteria and methods as specified in Guidelines/Checklist. The impacts should be addressed using one or more methods as specified in the Checklist provided by EPA, Punjab.

6.6. Ways of Achieving Mitigation Measures

6.5.1. Changing in Planning and Design

The mitigation measures as specified in the EIA Report will be achieved by the implementation of Environmental Management and Monitoring Plan. Any significant changing in planning and design or EMMP will be made based on requirements in future. It may be communicated to EPA, Punjab in case of significant changes.

6.5.2. Improved Monitoring and Management Practices

Improved monitoring and management practices will be adopted to ensure the implementation of mitigation measures as suggested in the EIA Report. Improved monitoring and management practices may include the followings:

- Monitoring of all management measures as suggested in EMMP.
- Monitoring of Environmental parameters as suggested by EPA, Punjab.
- Monitoring of worker's health and safety.
- Monitoring of implementation of potential environmental enhancement measures.

6.5.3. Compensation in Money Terms

Compensation in terms of money is only required in case of any relocation or replacement of community/settlement due to project activities.

6.7. Impacts on Physical Environment

This section provides the potential adverse impacts of the proposed Project on physical environmental resources of the area (land, water and air), the notable impacts discussed below.

6.6.1. Impacts on Land Resources

This section explains how the proposed project will affect the land use, soil erosion and contamination, and describes mitigation measures to manage these impacts

6.6.2. Land Productivity and Use

Following are the major impact on land productivity and use.

- Most significant impact will be the conversion of some agricultural land into industrial land. It is worth to mention here that land in the project area is mostly water lodged and hence low in productivity.
- Due to proposed project construction and operation, other industrial activities may start in the vicinity of area, where at present there is no such type of activity. This may cause negative impact on the existing environment;
- Borrow pits and other landscape depressions if left open, may prove hazardous to human beings, livestock and wildlife;
- Open pits containing water are potential sources of mosquito breeding if left stagnant, and can create health problems;
- Surface run-off from the impervious surface of the proposed carriageway can further aggravate the flooding of embankment sides during the operation stage;
- Induction of infrastructural development works may change the local drainage pattern of the area. This can cause pounding in the vicinity of the project area in rainy season, which ultimately affect the current use of land patterns.

Construction activity may cause dust and smoke emission may be injurious to the residents of adjacent settlements

6.6.3. Soil Erosion and Land Sliding

Soil erosion may occur in the workshop areas as a result of improper runoff drawn from the equipment washing-yards and improper management of construction activities. Due to development of proposed area. Velocity of runoff will be increased which will ultimately enhance the soil erosion.

Once the proposed and existing roads (after rehabilitation) return to normal operation, it will be subject to a natural depreciation as high embankments become increasingly prone to soil erosion.

6.6.4. Soil Contamination

Soil project area may get contaminated due to the following reasons

- A farce quantity of solid waste will be generated by the Project during construction stage. If this solid waste was not properly disposed of, it will contaminate the soil resources especially during monsoon season.
- Some chemicals used in laying of water supply pipe joints, sheathing on electric wires and cables are hazardous and toxic in nature. All the carbon based compounds are toxic to varying degrees. Hydrocarbon group of chemicals are toxic and fuel, petrol, diesel and all the lubricants are too toxic in nature. In case proper care is not taken for handling, storing and transportation of these toxic substances may cause damage to the health of the workers as well as their spills will contaminate the soil.

6.6.5.Mitigation Measures

The mitigation measures, which will be carried out in design stage, construction as operation stages for land resources are as under:

6.6.6. Land Productivity and Use

The following practices will be adopted to minimize the damages to land productivity and use:

- Damage to the land due to implementation of the Project will be a permanent loss and it is expected that due to increase income of the local people and availability of more job resources due to the Project, yield of adjoining agricultural land will be increased which will compensate to this loss up to Greater extent.
- The expected mushroom industrial growth around the Industrial Estate should
- be properly controlled by formulating and enforcing tho law.
- As far as possible, waste/barren land and natural areas with a high elevation
- will be used for borrow material and setting up project facilities.
- Where the use of adjacent agricultural land is unavoidable for borrow of earth material, the top 30 cm of the plough layer will be stripped and stockpiled for redressing the land after the required borrow material has been removed.
- The excavation of earth fill will be limited to an approximate depth of 50 cm. This practice will be applied uniformly across the entire extent of the farmland unit acquired for borrowing earth material.
- Where deep ditching is to be carried out, the top lm layer of the ditching area will be stripped and stockpiled. The ditch will initially be filled with scrap material from

construction and then levelled with the stockpiled topsoil to make it even with the rest of the area. It shall be ensured that the scarp does not contain any material, which may produce leachates or contaminate the soil.

- Ditches or borrow pits that cannot be fully rehabilitated will be landscaped/converted into fishponds to minimize erosion and to avoid creating hazards for people and livestock.
- The Project works have been designed in line with natural drainage to ensure that local drainage pattern should not be disturbed,
- Side drains will be constructed to prevent flooding on the carriageways. In development areas, side drains will be constructed along the road sides; in open areas, a drain will be constructed along the embankment.
- Proper storage place of each type of material to be used during the construction to avoid any hindrance to natural slope. Contractor will be made responsible for the clearing of left over material at the site. In this regard prior to the start of work, contractor should submit the site restoration plan. Site restoration plan should be as pragmatic as possible.

6.6.7. Soil Erosion and Land Sliding

- Good engineering practices will help control soil erosion both at construction sites and in peripheral areas, particularly in borrow areas and along transportation tracks. These will include the following measures:
- Low road embankments will be protected from erosion by planting indigenous grasses and low height trees that can flourish under project site conditions

6.8. Impacts on Biological Environment

The biological environment manly includes flora and fauna. Impact on flora and fauna and corresponding mitigation measures are described in the following paragraphs;

6.7.1. Impacts on Flora

Following impacts will be on the flora of the area;

6.7.2. Trees to be planted

There is no proper tree growth at the project site as the area is water logged. However, some subsistence farming and self-grown dwarfed trees are there on the edges. Cutting of these trees will not have any significance impact. The proponent will plant 25000 trees to be grown at the project site and 15% of the scheme will be kept green which include parks and green corridors. These trees will be planted in green corridors to act as buffers along roads. As these scattered trees are small in number, their replacement will be made good by planting new trees on both sides of the main, lateral and minor roads.

Keeping in view the saline and water logged conditions in the project area a number of trees might be planted as a part of the project on the boundary of industrial estate. Saline

areas, which are lying unutilized by the communities, could be rehabilitated following proper soil amendments, preparation and choice of suitable species.

Trees showing successful growth include the following

- Shesham
- Eucalyptus
- Guava

Main species proposed in the project area:

- Conocarpus eractus (buttonwood),
- Dalbergia sissoo (shisham),
- Tamarix aphylla (Athel tree),
- Morus alba (Mulberry),

To facilitate the widening and expansion of plantation there will be need of growing more trees at the boundary of project site along the sides of pedestrian corridors inside the parks of three different community cores. For each tree to be cut, two trees to be planted to conserve the biodiversity.

The selected area has scattered shrubs and no significant impacts are envisaged dur, to removal of shrubs.

6.7.3. Impacts on Fauna

Following are the specific classes of fauna which are expected to be affected due to the project implementation.

6.7.4. Mammals and Reptiles

During the construction phase, there will be negative impacts on the mammals and reptiles of the area. Mammals, such as squirrel, jackal etc. will avoid these areas for fear of being hunted. Same will be the case with reptiles; some reptiles might be killed during the digging and dragging operations.

6.7.5. Birds

Birds will try to find shelter and food somewhere else and will tend to move away from the Project site for fear of being hunted/trapped.

6.7.6. Mitigation Measures

The following mitigation measures will be adopted to alleviate the adverse impacts on the vegetation growth of the area.

- A tree plantation program will be incorporated into the detailed design not only to compensate the loss of trees but also to enhance the aesthetic view as well as to reduce the air and noise problems.

- Existing access tracks will be used for borrow of construction material and new paths will be constructed only in case when no existing path is available to avoid damage to the existing trees and bushes.
- While making paths for carriage of construction materials to the site care will be taken that minimum land is utilized and minimum area is disturbed. Cutting of trees should be avoided by making diversions.
- The camps and workshop facilities will be established on barren land; however, if such type of land is not available, it will be ensured that minimum clearing of the vegetation occurs and minimum damage to trees and undergrowth is ensured.
- The Contractor's staff and labour will be strictly directed not to damage any vegetation such as trees or bushes in the nearby areas.
- Contractor will provide the fuel wood/gas cylinders at the camps for cooking purposes and cutting the trees/bushes for fuel will not be allowed.

The following mitigation measures will be adopted to reduce the impacts of project and protect fauna.

6.7.7. Mammals and Reptiles

Mammals and reptiles will be protected by following practices:

- Hunting and harassing of wild animals shall be strictly prohibited and Contractors will warn their labor.
- Lights used in the camps, during construction activities will be kept to the minimum requirement. In the wildlife sensitive areas, upward scattering lights will preferably be used.
- Vehicle speed will be controlled to avoid incidental mortality of small mammals and reptiles.
- Periphery of the camps will be fenced and gated to check the entrance of the wildlife into the construction camps. Camp wastes harmful to wildlife should be properly disposed of/dumped.

6.7.8. Impacts on socioeconomic and cultural Environment

The section describes the impact of the proposed project on local communities, construction workers, indigenous and vulnerable people as well as on structures or sites of cultural and religious significance.

6.7.9. Impacts on Local Communities/ Workforce

The area surrounding communities will be affected during the construction and operation phases as follows:

- During the construction phase the general mobility of the local residents and their livestock in and around the project area is likely to be hindered.

- Community will have to face the noise and dust problems during the construction phase and air and noise omissions during operation stage.
- Induction of outside workers in the Contractor labor may cause cultural issues with the local community.

6.7.10. Generation of Income

Local people will find business activities duo to Implementation of the Project particularly persons settled in the vicinity of project area, Approximately hundreds of thousands Jobs will be generated by the implementation of project which subsequently enhance the living standards of community.

6.7.11. Gender Issues

As the project area lies close to the rural areas and rural community, women activities in the field may become affected due to the construction activities. The rural women normally use the open field latrines and their privacy may suffer due to the project activities,

The Induction of outside labor may create social and gender issues due to the unawareness by them of local customs and norms. It will also cause hindrance to the mobility of local women.

6.7.12. Indigenous, Vulnerable and Women Headed Households

During the social field survey of the project, no Indigenous group of people was identified. So, no Impact on the Indigenous people is envisaged due to the Implementation of the project.

Income of vulnerable people i.e. squatters settled on Government land may be affected due to the implementation of the Project, like relocation of their infrastructure, loss of land, crops, trees, etc. The owners of the affected structures identified during the field visits are also falling below the poverty line. No women headed household was identified during the social survey of the Project.

6.7.13. Mitigation Measures

- The Project will plan to prioritize the recruitment of people living, or originating from, the project affected communities during Project operation. Irrespective of origin, the Project is designed to accommodate all construction and operation workers within a camp inside the Project location. Coordinate recruitment efforts related to non-skilled labor, including for non-skilled labor positions
- required by contractors.
- Local recruitment commitment will be clearly defined and extended to the employees of contractors and to the construction phase of the Project and the geographic scope of local recruitment will be based on prioritization by proximity to the Project.

- The commitments will be articulated as a clearly defined policy supported by procedures and quantified targets. To specifically help reduce significant potential social and demographic impacts for more vulnerable or marginalized sectors of the host communities, the Project employment opportunities for women and senior citizens will be promoted wherever feasible and culturally appropriate.
- The vulnerable people of the communities located in the vicinity of the power plant will be given priority in provision of jobs, donations and scholarships. Through its CSR activities, a special focus will keep on the vulnerable people and their socioeconomic status will be regularly monitored.
- A grievance redress mechanism will be especially designed for the vulnerable people of the community. Their complaints will be addressed on priority basis and a liaison officer will be designated to accommodate them and address them grievances.
- Feedback consultations will be held with the vulnerable people to record the efficiency and effectiveness with which their complaints are addressed. Their views and feedback will be registered and if required, improvements in the
- grievance redress mechanism will be made.
- The Project labor will be sensitized on local cultural and social values as part of the induction program who originates from other parts of the country or from abroad.

6.9. Methodology for Impacts Identification

Environmental sensitivity of the project area is described through a thorough review of the project activities and the evaluation of significance of impacts is carried out through Environmental Checklists and GIS and computer expert system. In checklists, the impacts have been given magnitude based on their severity. A detailed map of the project area is developed on GIS to study the impacts on nearby environmental settings. This chapter then suggests effective mitigation strategies to help combat the adverse nature of these impacts and delivers a monitoring scheme to manage them.

6.10. Impacts Analysis and Prediction

The impacts on different environmental settings were analyzed by conducting different consultation sessions with environmental experts and individuals. Their views were recorded and incorporated in the report. The list of stakeholders and individuals consulted will be provided in the chapter of Stakeholder's Consultation.

6.11. Characterization of Impacts

Impacts were characterized based on the following parameters:

Nature	Duration
Magnitude	Spatial Boundaries
Extent	Reversibility

The impacts characterization has been given in Table 6-1.

Table 6-1 Characterization of Impacts

Environmental Component	Impacts		Nature of Impact		Duration			Spatial Boundaries			Likelihood			Reversibility	
	Positive	Negative	Direct	Indirect	Short Term	Intermediate	Long term	Local	National	Global	Low	Moderate	High	Reversible	Irreversible
Water Resources	Nil														
Land Resources	■		■				■	■				■			■
Air Quality		■	■		■			■			■			■	
Noise		■	■		■			■			■			■	
Solid waste		■	■		■			■			■			■	
Wastewater	Nil														
Flora & Fauna	■		■				■	■				■			■
Community Amenity		■		■	■			■			■			■	
Afforestation	■		■				■	■				■			■
Local Economy, Community Development and Employment	■		■			■		■				■		■	
Resettlement	Nil														
Health & Safety		■	■			■		■				■			■

6.12. Impact's Significance

After the evaluation of all the potential impacts, the impacts significance is to be given using Impact matrix. The impacts significance of Physical importance, Ecological importance, Social importance is given using the matrix approach. The impacts significance is given based on the characterization of impacts. From the Table 6-2 which is showing the characterization of each impact, the following significance is given to each physical, biological and socio-economic impact.

Table 6-2 Significance of Environmental Impacts

Environmental Parameter	Significance
Water Resources	None
Land Resources	None
Air Quality	Require mitigation
Noise	Require mitigation

Solid waste	Require mitigation
Wastewater	None
Flora & Fauna	Acceptable
Community Amenity	Acceptable
Afforestation	Acceptable
Local Economy, Community Development and Employment	Acceptable
Health & Safety	Require mitigation

7. SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

7.2. Project location:

The project would pose aesthetic and noise impacts on the nearby areas. Dust would however have impacts on the areas bit far away. There is no water body found near the vicnity of the project site. Hence, there will be no impact on water quality due to project activities. The mitigation measures for dust and noise problems are discussed below.

7.3. Mitigation Measures

Following are the steps that may be adopted to control noise and dust problems at site.

- Use of PPEs (noise suppression equipment-ear mufflers etc.) will be ensured by the workers where noise levels are higher than 85 (dBA).
- Project activities will be ensured at daytime when background noise levels are high.
- Vehicles speed limit will be maintained to avoid excessive vibrations.
- Regular maintenance of machinery will be ensured.
- Controlled water sprinkling will be ensured to reduce dust/PM_{10}.
- Maintain appropriate buffers between the site and receptors if practical.
- Use of PPEs (face masks etc.) will be ensured by the workers and staff.

7.4. Anticipated Environmental Impacts Related to Project Design

The project may have high blowing off rates and dust emissions. Better design can resist such impacts. Thus, barriers shall be developed by extensive vegetation and trees on the boundaries of the project.

7.5. Environmental Impacts during Installation Stage

The summary of the positive and the negative impacts observed on the environment by the cement production on the project area has been summarized in Table 7-1. The impacts have been given magnitude based on the scaling given below.

Scale Range	0 to 5
Major Impact	5
Moderate	4
Intermediate	3
Minor	2
Low	1
No Impact	0

(+) sign is used for positive impacts and (-) sign for negative impacts. The mitigation measures will be explained after a short while.

Table 7-1 Identification of Impacts during Installation Stage of the Project

Sr. No.	Component	Environmental Issue	Impacts	
			Positive	Negative
1	Physical Environment			
	Water	Channel Water Quality		0
		Channel Water Discharge.		0
		Groundwater Quality		0
		Groundwater Level		0
		Surface Run-Off		0
		Flooding		0
		Drainage		0
	Land	Soil Salinity		0
		Soil Erosion		0
		Land Utility / Productivity	+3	
	Solid Waste	Land Pollution Breeding of flies and rodents Odor		0
	Climate	Micro-climate changes.		0
	Atmosphere	Dust		-3
		Noise		-2
	Sub-Total		+3	-5
2	Biological Environment			
	Flora	Forests /Trees	+2	
		Other Terrestrial Vegetation		0
	Fauna	Mammal Communities /Habitat		0
		Reptile Communities /Habitat		0
	Sub-Total		+2	0
3	Socio-economic Environment			
	Social	Population	+1	
		Land Ownership	+1	
		Land Lease	+2	
		Worker's Health and Safety		-2
		Security		0
		Social Cohesion/ Attitude	+1	

		Food/ Nutrition	+1	
		Health		0
		Education	+1	
	Economic	Income Levels	+1	
		Employment	+2	
		Land Value	+2	
	Institutional	Institutional Activities/Effectiveness	+2	
	Human Use	Cultivation	+1	
		Livestock	+1	
		Afforestation	+2	
		Infrastructure		0
		Domestic Water Supply		0
		Community Development	+2	
	Resettlement	Land		0
		Dislocation of Population		0
		Loss of Property		0
		Loss of Infrastructure		0
		Resettlement of Affected		0
Sub-Total			**+20**	**-2**
Grand Total			**+25**	**-7**

The potential environmental impacts resulting during installation phase of the project and their possible mitigation measures are given in Table 7-2.

Table 7-2 Environmental and Social Impacts of the Proposed Project

Subject Area		Potential Impacts During Construction	Potential Impacts During Operation	Mitigation
Physical Environment	Air Quality	• Dust from construction activities. • Traffic-related air quality impacts.	• Effects of stacks emissions on ambient air quality. • Traffic-related air quality impacts. • Green House Gas emissions	• Watering of the material stockpiles, access roads and bare soils on an as required basis to minimize dust. • Increase the watering frequency during periods of high risk (e.g. high winds). • Stored materials such as gravel and sand should be covered and confined • Vehicles with appropriate exhaust systems will be used. • Maintenance of all vehicles on regular basis. • Establish and implement vehicle speed limits to minimize dust generation • Cover haul vehicles transporting dusty materials (cement, borrow and quarry) moving outside the construction site • Use of specified haulage routes and reduce vehicle speed where required.
	Water Resources	• Control and management of site drainage. • Wastewater discharge, Sewage disposal and foul drainage	• Water requirements for power plant operation • Discharge of process and wastewater.	• Stockpiles of potential water pollutants (i.e. oils, construction materials, fuel, etc.) shall be placed so as to minimize the potential of contaminants to enter local watercourses or storm-water drainage.

		• Effects on groundwater quality.	• Operation of drainage systems on site. • Discharge of storm water, sewage and drainage	• Preparation of Emergency Spills Contingency Plan. • Storm-water runoff from all fuel and oil storage areas, workshop, and vehicle parking areas is to be directed into an oil and water separator before being discharged to any watercourse
	Soils, Geology and Topography	• Effects on soils and topographic features. • Soil contamination	• Soil contamination during site activities	• Ensure the topography of the final surface of all raised lands are favorable to enhance natural draining of rainwater / flood water • Restore the natural landscape of the construction sites after completion of work
	Land Use, Landscape and Visual Issues	• Impacts on existing land use on site. • Impacts on existing land use in the surrounding area. • Effects of construction • activities on landscape character. • Visual impact of construction activities.	• Impacts on existing land use on site. • Impacts on existing land use in the surrounding area. • Effects on landscape character. • Visual impact of operating facilities.	• Stop work and inform the site manager Immediately if, during construction, an archaeological or burial site is discovered. • It is an offence to restart work in the vicinity of the site until approval to continue is awarded by the plant management. • Resolve landscape change issue in consultation with local leaders and supervision consultants.

Ecological Environment	Flora	Loss of natural vegetation and crops	• Impacts on flora due to altered drainage and runoff patterns	• Removal of trees should be limited to the development footprint • Construction activities shall reduce the loss or disturbance of vegetation • Use clear areas to avoid cutting of trees • A procedure shall be prepared to manage vegetation removal, clearance and reuse • Inform the plant management before clearing trees
	Fauna	• Losses of habitat or species due to land lake. • Disturbance or damage to adjacent habitat of species	• Disturbance or damage to adjacent habitat • Effects on birds migration routes	• Project should ensure the safety of various animals at power plant in construction and operation camp area.
	Economy Related Impacts	• Impacts on local skilled and un-skilled labor and • businesses.	• Impacts on local labor and businesses	• The increased government revenue could be used to meet objective by improving infrastructure and services in areas local to the project.

	Social Settings and Services Related Impacts	• Demographic changes due to influx of people. • Pressure on existing infrastructure, utilities and services.	• Small scale demographic and cultural changes.	• Safe, reliable water supply, Sufficient housing for all. • Treatment facilities for sewerage of toilet and domestic wastes • In-house-community entertainment facilities.
	Public Health Related Impacts	• Traffic congestions and disruption to road users • Health impacts due to • construction related dust and • air emissions and • wastewater/effluents release • Traffic-related air quality. • Traffic-related noise	• Health impacts due to air emissions and power plant noise and effluents released. • Traffic-related air quality impacts. • Traffic-related noise impacts.	• Implement proper safety standards. • Provide personal protection equipment (PPE) for staff, such as safety shoes, helmets, masks, gloves, protective clothing, goggles, full–face eye shields, and ear protection. • Maintain the PPE under a regular checking and replacement program. • Provide safe and healthy work environment to workers, taking into account inherent risks in its particular construction activity and specific classes of hazards in the work areas.

	Occupational Health safety	• Accidents. • Effects on health of workforce Safety at work.	• Accidents. • Effects on health of workforce. • Safety at work.	• A traffic management plan will be developed by the construction contractor to prevent incidents of accidents which may occur due to transportation of machinery and equipment to the project site. • Undertake a full project community risk assessment followed by the development of a community emergency preparedness and response plan appropriate to its findings
	National and Regional Impacts	• Human resources development. • Economic development at regional and national level	• Industrial development in Punjab ar Pakistan • National and regional (Punjab) powe cities • Impacts on regional and national ai quality	• The increased government revenue could be us to meet development objective by improvi infrastructure and services in areas local to t project
	Global impacts	• Purchase of power plant equipment and machinery fro global markets • Hiring the international contractors and consultants	• Green-house gas emission and climate change • Impacts on global air quality and global warming	• Maintenance of all construction machinery on regular basis • Use of machinery with appropriate exhaust system • In order to control the particle emission all stages filtering system, duct collectors or humidification or other techniques(as applicable) to the concrete batching and mixing plant will be provided.

8. ENVIRONMENTAL MANAGEMENT & MONITORING PLAN

8.2. Introduction

This section presents the environmental management plan (EMP) for the proposed project. The EMP specifies the mitigation and management measures which the Proponent will undertake and shows how the Project will mobilize organizational capacity and resources to implement these measures.

The EMP covers information on the management and mitigation measures that will be taken into consideration to address impacts in respect of the operational phase of project.

8.3. Objectives

The objective of the Environmental Management and Monitoring Plan (EMMP) is to address all the major environmental issues and provide framework for the implementation of the proposed mitigation measures during the operational phase of the project. The proper implementation of the EMP will ensure that all the adverse environmental impacts identified in the EIA report are adequately mitigated, either totally prevented or minimized to an acceptable level and required actions to achieve those objectives are successfully adopted by the concerned institutions or regulatory agencies.

The EMMP provides a delivery mechanism to address potential impacts of the project activities, to enhance project benefits and to introduce standards of good practice to be adopted for all project works. The EMMP has been prepared with the objectives of:

- Defining roles and responsibilities of the project Proponent for the implementation of EMMP and identifying areas where these roles and responsibilities can be shared with other parties involved in the execution and monitoring of the project.
- Outlining mitigation measures required for avoiding or minimizing potential impacts assessed in the EIA report.
- Developing a monitoring mechanism and identifying requisite monitoring parameters to confirm effectiveness of the mitigation measures recommended in the EIA report.
- Defining the requirements for communication, documentation, training, monitoring, management, and implementation of the mitigation measures.

8.4. Implementation of EMMP

The implementation of EMMP should be carefully coordinated with the design and operational program of the project. This will ensure the implementation of relevant mitigation measures at the appropriate project stages. It will also ensure that adequate resources are properly allocated to achieve the desired results. This EMMP has been prepared to satisfy the requirement of "IEE and EIA Regulations, 2000".

8.5. Management Approach and Responsibilities

- The organizational roles of the key players are;
- The Developer will undertake overall responsibility for compliance with the EMMP.
- The developer will carry out regular monitoring to ensure that the contractors are effectively implementing their environmental and social requirements.
- Construction Contractor/s: The contractor/s will implement the majority of environmental and social mitigation and monitoring measures as required by their contract with the developer. The construction contractor/s is subject to certain liabilities under the environmental laws of the country, and under their contracts with the project developer

The separate responsibilities of the developer and the contractor are:

8.4.1. Primary Responsibilities:

- Developer will coordinate with the concerned government departments and
- Respective highest-ranking officers of developer and the construction contractor will assume the primary responsibilities for environmental performance of the proposed Project.

8.4.2. Project Management and Quality Control:

- Developer's representative will be responsible for the overall environmental soundness of all field operations; and
- The construction contractor's Site Manager will be responsible for carrying out the construction activities in an environmentally sound manner

Specific roles and responsibilities for monitoring are provided in Table 8-1.

Table 8-1 Roles and Responsibilities for Environmental Monitoring

Aspect	Project Developer	Contractor	Relevant Documentation
Contracting	Ensuring that monitoring and mitigation requirements are included in the contract between the developer and the construction contractor/s.	Understanding the requirements and estimating the required resources	Contractbetween the FIEDMC and the construction contractor/s.
Monitoring Plan	Ensuring finalization of Monitoring Plan before commencement of project construction.	Preparea Construction Management Plan.	Finalized Monitoring Plan and Construction Management Plan.
Resources	Ensuring availability of resources required for environmental monitoring.	Ensuring availability Of resources Required for environmental	Project budgets

		management and monitoring	
Environmental Staff	Designating an Environmental Manager for the Proposed Project	Designating an Environmental Manager for they Proposed Project (may be combined with health and safety)	Job Description
Monitoring Surveys and Inspections	Undertaking regular inspections Contactor's environmental performance and carrying out further measurements when necessary.	Undertaking regular inspections Contactor's environmental performance and carrying out Survey	Inspections and Survey Reports
Environmental Audit	Conducting periodic Audits of the construction site.	Conducting periodic internal audits.	Audit reports
Reporting	Ensuring that periodic environmental monitoring reports are received from the construction contractor/s	Producing environmental monitoring periodically distributing among the developer's management and appropriate staff members.	Environmental Monitoring Reports.
Corrective Actions	Verifying that activities carried out comply with the EIA/EMMP and identifying corrective actions if needed	Carrying out corrective actions as required.	Corrective actions record.
Maintenance of Records	Maintaining monitoring data and recording all incidents of environmental significance and related corrective measures.	Maintaining monitoring data and recording all incident of environmental significance and related corrective measures	Environmental Database

8.6. Mitigation Plan

The Mitigation Plan is a key component of the EMMP. The Mitigation Plan lists all of the mitigation measures identified in the EIA. Based on the EIA for the proposed Project, the mitigation measures for the construction phase are provided in Table 8-2 and for the operational / maintenance phase in Table 8-3.

Table 8-2 Mitigation Plan for Design & Construction Phase

Sr. No	Environmental or Social Aspects	Measure	Responsibility
1.	**Design Stage Environmental Aspects**	• Choice of appropriate land i.e. not major agriculture land • Choice of environmental friendly technologies	Developer & Design Consultant

		• Provision of combined effluent treatment plant • Provision of treatment facilities like recovery and recycling units etc. • Proper sewerage and solid waste management system provision • Adequate roads, sewerage, drainage, electricity etc. in the design • Proper raising of road level to mitigate flood disaster	
2.	Construction Noise Control Plan	Periodic noise level surveys will be conducted for construction equipment's, operational machinery and vehicles.	Construction Contractor
		All high noise generating activities will be planned during the day time	Construction Contractor
		Use of horns will be banned and construction traffic will be kept to a minimum during night time	Construction Contractor
3.	Ambient Air Dust Control Plan	Frequency of sprinkling will be kept such that the dust remains under control.	Construction Contractor
		Water will be sprinkled on all open surfaces to control emission of dust	Construction Contractor
		Dust Emission from aggregate storage stockpiles and soil piles will be reduced by keeping the material moist by sprinkling of water at appropriate frequency or erecting windshield walls around the piles or covering the pile to reduce dust emission.	Construction Contractor
4.	Soil Erosion	Construction site will be appropriately marked	Construction Contractor
		The machinery movement will be restricted only to the construction area	
		Measures for soil erosion control (e.g. silt fences, rip rap) will be carried out where necessary during construction	
		The construction sites will be restored as close as possible to their natural (pre-project) conditions after completion of construction activities. For this purpose, a	

		Site Restoration Plan will be prepared that may include the following: Removal of remains, extra construction material, equipment parts cable, or timber Disposal of extra soil Filling of all trenches and pits Repair to damaged or blocked drainage Soil erosion control measures where necessary	
5.	**Water Management**	Potable Water Supply: The provision of drinkable water and safe drinking utensils at various points on the site.	Construction Contractor
		Water Conservation: a) To create awareness and boost the construction workforce to use water carefully and there is no water wastage. b) Negotiate the use of water for any purpose with the appropriate authorities and obtain written approval. c) The contractor will not collect/make use of water from any other source than those designated to them as suitable for use	
6.	**Waste Water Management**	The Contractor will submit a site design of wastewater management system as part of the environmental management plan for prior approval	Construction Contractor
		Water discharged from the works including effluent from sewage treatment, wash water and storm-water from workshops and refueling areas, as well as all runoff from areas with pollution potential will comply with Provincial effluent standards.	
		Plan the layout of batching areas, wash areas, and workshops with the following rules in mind:	

		Improve the layout to lessen disturbance to the environment and to neighbors Concrete slabs need slope towards a conservancy tank so that run-off water can be collected. These tanks must be emptied, at least once in a week or when they are 60% full.	
7.	**Solid Waste Management**	Construction wastes on site must be reused or recycled when possible. The Contractor must familiarize themselves with the definitions of waste and the Construction handling, storage and transport as suggested in the applicable environmental Contractor legislation On site integrated waste management will be carried out by applying, in preference Construction order of waste avoidance, reuse, recycling and disposal. Burning of waste material will not be allowed except under special conditions and with Construction earlier approval of the Site Manager. The appropriate facilities must be provided and maintained for waste collection (e.g. Construction bins) at specific locations around the site camp such as the office, garage, parking, Contractor housing facilities and locations where food is consumed.	Construction Contractor
8.	**Storage and Handling of Hazardous Substances**	Any spills will be rendered harmless and arrangements made for appropriate collection and disposal including cleaning materials, absorbents and contaminated soils To ensure that spill kits are available on site to clean the leaks and spills. To obtain storage and disposal permits / approvals necessary and comply with the conditions attached.	Construction Contractor

		To ensure that only nominated areas are used for the handling/storage of construction materials.	
		The Contractor will be accountable for the training and education of all staff on site who must be handling the material about its proper use, handling and disposal as well as spill response.	
		A contingency procedure will be developed for dealing of spills	
		Hazardous chemicals used in construction must be kept in secondary containers. The relevant Material Safety Data Sheets (MSDS) must be provided on site.	
		Appropriate and approved facilities for the storage and recycling of used oil and contaminated hydrocarbons must be provided.	

Table 8-3Mitigation Plan for Operation Phase

Sr. No.	Environmental or Social Aspects	Measure	Responsibility
1.	**Air Pollution Management**	The Din Properties Pvt. Ltd Industrial Estate (IE) must be designed so as to Proponent ambient air quality will fall within the levels acceptable for regulatory bodies (i.e. within PEQS and where PEQS are not provided NEQS, international standards must be complied with).	Proponent
		Din Properties Pvt. Ltd Industrial Estate (IE) must be provided with the appropriate NOx control equipment to minimize the production of NOx.	Proponent
		Dust control mechanisms must be utilized including the following: Electrostatic Precipitators will be installed in the units where necessary for the control of Dust.	Proponent's Environment Manager

2.	**Ground Water Management**	Inspection of Ground water quality must be carried out periodically to check any adverse effect on ground water quality.	Proponent's Environment Manager
		All chemical usage areas and zone areas must be cemented.	
3.	**Waste Water Management**	The Waste Water Treatment Plant must be installed for wastewater treatment.	Proponent's Environment Manager
		Water discharged from the works including wash water, effluents from sewage treatment and storm-water from workshops and refueling areas, and areas of run off with potential of pollution will comply with Punjab Environmental Quality Standards.	
		On regular basis chemical analysis of crops cultivated on treated wastewater will be done once in every crop season to ensure there will be no contamination of food from treated wastewater	
4.	**Operational Noise Control**	Permissible limits, final design of Din Properties Pvt. Ltd Industrial Estate (IE) ensure the level of noise from the operation must be within the level suggested by the manufacturers	Proponent's Environment Manager
		Noise from activities at the zone site during the operation must be within acceptable limits (according to the standards discussed previously), taking into consideration that maintenance activities nay be required at the outside of working hours, for example, in the case of emergencies.	
5.	**Fauna and Flora**	Implementation of Site restoration plan and area ecology up-gradation plan.	Proponent's Environment Manager
		Use of indigenous plants in the premises and provision of green belt in the Din Properties Pvt. Ltd Industrial Estate (IE). Fragrance producing trees plantation to evade odor issue (if any).	

		The worker may not harm/kill any wildlife during the operation and maintenance of the Din Properties Pvt. Ltd.	
6.	**Solid Waste Management**	Solid wastes generated in Din Properties Pvt. Ltd Industrial Estate (IE) must be reused or recycled up to maximum extent.	Proponent's Environment Manager
		Din Properties Pvt. Ltd Industrial Estate (IE) Integrated waste management will be done by applying in preference order of, waste avoidance, reuse, recycling and disposal.	
		The appropriate facilities must be provided and maintained for waste collection (e.g. Bins, containers) at specified areas within Din Properties Pvt. Ltd	
		Sorting of waste will be carried out at source (i.e. the separation of glass, tins, paper etc.). Recycled waste of this sort will be collected by a local licensed contractor.	
		Every industry Din Properties Pvt. Ltd Industrial Estate (IE) would be the accountable for the supply of waste bins/skips throughout the site at areas where construction staff are working. These waste bins must be provided with lids and an external closing system to prevent fillings from blowing out, and must be scavenger proof to prevent animals appealed to waste.	
7.	**Storage and Handling of Hazardous Substances**	Any spills will be rendered harmless and arrangements made for appropriate collection and disposal including cleaning materials, absorbents and contaminated soil.	Proponent's OHS Manager
		The OHS Manager will also be accountable for the necessary training, awareness and education of all staff regarding the safe handling and disposal as well as spill response.	
		An emergency procedure for the control of spills must be formulated	

		Hazardous chemicals must be stored in designated containers made up of appropriate material, clearly marked and labelled with appropriate safety sign. The relevant Material Safety Data Sheets (MSDS) must be provided on site.	
8.	**Occupational Health & Safety Management**	A Health and Safety Management Plan will be established to ensure worker safety.	Proponent's OHS Manager
		OHS manager must adhere to the guidelines of the appropriate health and safety legislation & standards.	
		Communication of suitable and obligatory safety measures relating work procedure/instruction of site to all aspects of the operation to workers.	
		The use of PPEs on operation of is mandatory for all personnel while entering in the operational areas of Din Properties Pvt. Ltd.	
		Specific firefighting system must be installed to deal with fire hazard and equipment's must be positioned on sites easily accessible and visible.	
		Speed limits must be followed in all areas of the Din Properties Pvt. Ltd (IE)., including public roads and private property to avoid potential hazard of accident.	
9.	**Hindrance in aviation traffic**	Same of Environmental Management Plan as suggested for construction phase of Din Properties Pvt. Ltd.	

8.7. Waste Management

The Construction contractor/s will be responsible for preparing a waste management A summary is provided in Table 8-4.

Table 8-4Waste Management Plan Summary

No.	Material Waste	Final Disposal Method	Associated Risk	Recommended Procedure
1.	Iron	• Material returned • To store as un-useable • Scrap Store • Recycling	Equipment and parts may be contaminated with oil or other liquids. This may pose hazards during recycling and/or melting.	Separate contaminated parts and ensure disposal contractor cleans and removes contaminations before recycling equipment.
2.	Copper	• Recycling • Scrap Store	Copper wires and tubes may be covered with insulation and may pose hazard if melted	Separate insulated copper from rest and ensure disposal contractor removes it before recycling.
3	Wood, Cotton, Plastic, Waste and Packing Materials	• Recycling • Landfill	Burning of wood, paper, plastic and other materials may cause air pollution Littering due to improper disposal	Ensure waste contractor disposes all non--recyclable plastic wastes and other non--recyclable materials at land disposal.
4.	Electronics	• Material returned to store as un-useable	Some electronic equipment may contain toxic materials and pose a health risk if opened or dismantled.	Ensure contractor disposes equipment properly and equipment is opened only under guidance of qualified professional.
5.	Insulation	Material Re-used Landfill	Burning may cause air pollution. Littering due to improper disposal	Ensure contractor disposes insulation

				properly at landfill site.
6.	Oil	Recycling Contractors	May cause contamination of soil or waterways	Ensure properly certified recycling contractors are used.
7.	Concrete	Landfill or reuse for filling	None	Ensure safe storage till Disposal

8.8. Monitoring Plan

Environmental monitoring is a vital component of an EMMP. It is the mechanism through which the effectiveness of the EMMP is evaluated. Furthermore, the feedback provided by environmental monitoring is instrumental in identifying any problems and planning corrective actions.

Objective of Monitoring

The main objectives of environmental monitoring during the construction phase of the proposed Project will be to:

- To provide a mechanism to determine whether tho project construction contractor/s and the developer are carrying out the project in conformity with the EIA and EMMP;
- To identify areas where the impacts of the proposed project are exceeding the criteria of significance and, therefore, require corrective actions.
- To document the actual impacts if the proposed project on physical, biological, and socio-economic/ cultural receptors, quantitatively where possible, in order to design better and more effective mitigation measures; and;
- To provide data for preparing the monitoring report to be submitted to the Punjab-EPA in accordance with the provincial and national legal requirement.

Performance Indicators

Environmental parameters that may be qualitatively and quantitatively measured and compared are selected as 'performance indicators' and recommended for monitoring. These performance indicators will be monitored to ensure compliance with the national or other applicable standards and comparison with the baseline conditions established. A summary of performance indicators, and their applicable standards to ensure compliance, include:

- **Construction Phase:**
    1. Noise levels: PEQS

2. Wastewater quality: PEQS

- **Operation Phase:**
  1. Ambient air quality (NO2, SO2, PM10 and PM2 5): PEQS
  2. Noise levels: PEQS
  3. Wastewater quality: PEQS

8.9. Environmental Records

The following environmental records will be maintained:

- Periodic inspection reports of Contractor's Environmental Officer;
- Incident record of all moderate and major spills. The record will include:
  - Location of spill;
  - Estimated quantity;
  - Spilled material;
  - Restoration measures;
  - Photographs;
  - Description of any damage to vegetation, water resource;
  - Corrective measures taken, if any; and,
  - Corrective measures taken, if any.
- Waste Tracking Register that will records of all waste generated during the construction and operations: period. This will include quantities of waste disposed, recycled, or reused;
- Survey reports, in particular, the following:
  - Soil erosion: Baseline survey, including photographs (or video), will be conducted to document pre-construction condition of the construction site,
  - Vehicle and equipment noise; and,
  - Ambient noise survey reports.

8.10. Environmental Training

Environmental training will help to ensure that the requirements of the EIA and EMMP are clearly understood and followed by all project personnel in the course of the project. The contractor will be primarily responsible for providing training to all project personnel. An environmental and social training program is provided in Table 8.5. This training program will be finalized before the commencement of the proposed Project.

Table 8-5 Framework for the Environmental and Social Training Program

Types of Training	Training Description	Training By	Personnel to be Trained	Period	Duration
Occupational Health and Safety	Training should be provided to aware staff to conform to safety	External Sources	OHS Manager	Before starting of project activities	Full day (8 hours session)

Occupational Health and Safety	Health, safety and hygiene proper usage of personnel protective equipment precautions to be taken for working in confined areas.	OHS Manager	Workers Staff	Before starting of project activities During Project activities	Full day (8 hours session)
Health, Safety and Environmental Auditing	Procedures to carry out Health, Safety and Environmental Audits Reporting requirements	External Sources	Staff responsible for inspection/ audits	Before starting of project activities	Full day (8 hours session)
Waste Disposal and Handling	Segregation, identification of hazardous waste, use of PPEs, waste handling	External Sources	Relevant workers Relevant Staff	Before starting of project activities	Full day (8 hours session)
Social & Environmental Laws & Regulations, norms, procedures and guidelines of Government	Environmental standards and their compliance Govt. regulations	External Sources	OHS staff managers & supervisor	Before starting of project activities	Full day (8 hours session)
Implementation of environmental management and monitoring plan	Concepts of environmental management and monitoring plan	External Sources	OHS staff managers & supervisor	Once in 3 months during the entire construction period.	Full day (8 hours session)

8.11. Construction and Operation Management Plan

The construction contractor will develop a specific construction management plan (CMP) based on the CMP included in Table 8-6. The CMP will be submitted to Developer for approval. The CMP will clearly identify all areas that will be utilized during construction for various purposes, including:

- Areas used for camp;
- Storage areas for raw material and equipment;
- Waste yard;
- Location of any potentially hazardous material such as oil;
- Parking area; and loading or unloading of Material

Table 8-6 Impacts and Mitigation Measures during Construction & Operation Phase

Subject Area		Potential Impacts During Construction	Potential Impacts During Operation	Mitigation
Physical Environment	Air Quality	• Dust from construction activities. • Traffic-related air quality impacts.	• Effects of stacks emissions on ambient air quality. • Traffic-related air quality impacts. • Green House Gas emissions	• Watering of the material stockpiles, access roads and bare soils on an as required basis to minimize dust. • Increase the watering frequency during periods of high risk (e.g. high winds). • Stored materials such as gravel and sand should be covered and confined • Vehicles with appropriate exhaust systems will be used. • Maintenance of all vehicles on regular basis. • Establish and implement vehicle speed limits to minimize dust generation • Cover haul vehicles transporting dusty materials (cement, borrow and quarry) moving outside the construction site • Use of specified haulage routes and reduce vehicle speed where required.
	Water Resources	• Control and management of site drainage. • Wastewater discharge. Sewage disposal and foul drainage	• Water requirements for power plant operation • Discharge of process and wastewater.	• Stockpiles of potential water pollutants (i.e. oils, construction materials, fuel, etc.) shall be placed so as to minimize the potential of contaminants to enter local watercourses or storm-water drainage

Subject Area		Potential Impacts During Construction	Potential Impacts During Operation	Mitigation
Physical Environment		• Effects on groundwater quality.	• Operation of drainage systems on site. • Discharge of storm water, sewage and drainage	• Preparation of Emergency Spills Contingency Plan. • Storm-water runoff from all fuel and oil storage areas, workshop, and vehicle parking areas is to be directed into an oil and water separator before being discharged to any watercourse
	Soils, Geology and Topography	• Effects on soils and topographic features. • Soil contamination	• Soil contamination during site activities	• Ensure the topography of the final surface of all raised lands are favorable to enhance natural draining of rainwater / flood water • Restore the natural landscape of the construction sites after completion of work
	Land Use, Landscape and Visual Issues	• Impacts on existing land use on site. • Impacts on existing land use in the surrounding area. • Effects of construction • activities on landscape character. • Visual impact of construction activities.	• Impacts on existing land use on site. • Impacts on existing land use in the surrounding area. • Effects on landscape character. • Visual impact of operating facilities.	• Stop work and inform the site manager Immediately if, during construction, an archaeological or burial site is discovered. • It is an offence to restart work in the vicinity of the site until approval to continue is awarded by the plant management. • Resolve landscape change issue in consultation with local leaders and supervision consultants.

Subject Area		Potential Impacts During Construction	Potential Impacts During Operation	Mitigation
Ecological Environment	Flora	• Loss of natural vegetation and crops	• Impacts on flora due to altered drainage and runoff patterns	• Removal of trees should be limited to the development footprint • Construction activities shall reduce the loss or disturbance of vegetation • Use clear areas to avoid cutting of trees • A procedure shall be prepared to manage vegetation removal, clearance and reuse • Inform the plant management before clearing trees
	Fauna	• Losses of habitat or species due to land lake. • Disturbance or damage to adjacent habitat of species	• Disturbance or damage to adjacent habitat • Effects on birds migration routes	• Project should ensure the safety of various animals at power plant in construction and operation camp area.
	Economy Related Impacts	• Impacts on local skilled and un-skilled labor and • businesses.	• Impacts on local labor and businesses	• The increased government revenue could be used to meet objective by improving infrastructure and services in areas local to the project.
	Social Settings and Services Related Impacts	• Demographic changes due to influx of people. • Pressure on existing infrastructure, utilities and services.	• Small scale demographic and cultural changes.	• Safe, reliable water supply, Sufficient housing for all. • Treatment facilities for sewerage of toilet and domestic wastes • In-house-community entertainment facilities.

Subject Area		Potential Impacts During Construction	Potential Impacts During Operation	Mitigation
	Public Health Related Impacts	• Traffic congestions and disruption to road users • Health impacts due to • construction related dust and • air emissions and • wastewater/effluents release • Traffic-related air quality. • Traffic-related noise	• Health impacts due to air emissions and power plant noise and effluents released. • Traffic-related air quality impacts. • Traffic-related noise impacts.	• Implement proper safety standards. • Provide personal protection equipment (PPE) for staff, such as safety shoes, helmets, masks, gloves, protective clothing, goggles, full–face eye shields, and ear protection. • Maintain the PPE under a regular checking and replacement program. • Provide safe and healthy work environment to workers, taking into account inherent risks in its particular construction activity and specific classes of hazards in the work areas.
	Occupational Health safety	• Accidents. • Effects on health of workforce. Safety at work.	• Accidents. • Effects on health of workforce. • Safety at work.	• A traffic management plan will be developed by the construction contractor to prevent incidents of accidents which may occur due to transportation of machinery and equipment to the project site. • Undertake a full project community risk assessment followed by the development of a community emergency preparedness and response plan appropriate to its findings
Subject Area		Potential Impacts During Construction	Potential Impacts During Operation	Mitigation

	National and Regional Impacts	• Human resources development. • Economic development at regional and national level	• Industrial development in Punjab and Pakistan • National and regional (Punjab) power cities • Impacts on regional and national air quality	• The increased government revenue could be used to meet development objective by improving infrastructure and services in areas local to the project
	Global impacts	• Purchase of power plant equipment and machinery from global markets • Hiring the international contractors and consultants	• Green-house gas emission and climate change • Impacts on global air quality and global warming	• Maintenance of all construction machinery on regular basis • Use of machinery with appropriate exhaust system • In order to control the particle emission all stages filtering system, duct collectors or humidification or other techniques(as applicable) to the concrete batching and mixing plant will be provided.

8.12. Environment Management Team

Following functionaries will be involved in the implementation of EMMP:

- The project Proponent as owners of the EMMP.
- Project contractor(s) as executors of the EMMP during installation and operational phase of the project.

Operational & Maintenance (O&M) and the Health, Safety and Environment team of the project as an executor of the EMMP during the installation and operational phase of the project.

Table 8-7 List of Individuals and their Responsibilities

Sr.	Designation	Responsibilities
1	Sr. Manager HSE	HSE Supervision
2	Manager HSE	Ensure EMP implementation
3	Assistant Manager	Operational management and control
4	Dy. Manager	Supervision and monitoring

9. INVOLVEMENT OF STAKEHOLDER'S / PUBLIC CONSULTATION

9.2. Introduction

Stakeholder's consultation 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. This practice initiates a need assessment and identifies areas of concern for all the parties that maybe affected by the project activities.

Stakeholders by definition are all those people and institutions who have an interest in the successful design, implementation and sustainability of the project. This includes those positively and negatively affected by the project.

9.3. Principles of stakeholders Consultation

For this EIA, the stakeholder's consultation activities were executed based on the following principles:

- Transparency;
- Openness;
- Accessibility; and,
- Inclusion.

9.4. Benefits and Objectives of Stakeholder's Consultation

Consultation with stakeholders leads to an overall better understanding of the project on the part of the communities and gives the Proponent a clearer understanding of the stakeholders' perspective. Effective public consultation can add substantial value to the EIA study process. The information gained through public consultation on the stakeholders' concerns, interests, and their ability to influence decision-making helps identify key cause of environmental problems.

This can be used to evaluate direct and indirect environmental impacts and assess short term and long-term resource use implications. The input from local communities and NGOs can help evaluate alternatives and strengthen the management planning by incorporating local input and know-how.

An informed public will better understand the tradeoffs between project benefits and disadvantages; be able to contribute meaningfully to the project design; and have greater trust with the project Proponent and support for the project, says the Asian Development Bank. These factors contribute towards improved project implementation sensitized to the human environment of the area. The objectives of stakeholders' consultation are to:

- Promote better understanding of the proposed operation through explaining its objectives and its potential positive and negative impacts.
- Identify and address concerns of all interested and affected stakeholders.
- Provide a mechanism to resolve issues identified by communities, before project plans are finalized and development begins, thereby, avoiding public outcry and resentment.
- Instill trust between various stakeholders and the Proponent to promote cooperation.

9.5. Identification and Classification of Stakeholders

During the field survey, significant efforts were made to identify the possible categories of stakeholders and their stakes. Identification of stakeholders is important for the sustainability of a developmental project and helps to evaluate and envisage the role of stakeholders. The influence or impact of the project on stakeholders can be elaborated in the form of a matrix and the mitigation measures are proposed accordingly. All the stakeholders had different types of stakes according to their professions.

9.6. Methodology for Consultation

Stakeholder consultation is a two-way flow of information and dialogue between the project Proponent and stakeholders, specifically aimed at developing ideas that can help shape project design, resolve conflicts at an early stage assist in implementing solutions and monitor ongoing activities.

Various techniques are used worldwide to carry out the stakeholder consultation that includes discussions, meetings and field visits. A series of scoping sessions and formal focus group discussions were carried out with environmental experts and individuals. The meetings were held at various locations.

9.7. Key Consulted Stakeholders

The stakeholders consulted in this case are public as well as environmental experts and individuals working in profession of environment.

9.6.1. Responsible Authority

The proponent is the responsible authority to take all measures prior to the site activity.

9.6.2. Other departments and agencies

For the impact analysis detailed meetings of local community, education institutes, health institutes, hospital and NGOs were held with the management. Issues were discussed that may affect the environment and also the implementation of proposed project. All possible mitigation measures were considered and incorporated in the Environmental Management Plan. Scoping sessions, focused group discussion and way side consultations were held with

the relevant stakeholders in the area. The purpose of such consultations is to obtain the feedback from the relevant persons.

9.6.3. Environmental Practitioners and Experts Team

Experts of M/s Hi-Tech Environmental Services (Pvt.) Ltd. visited the project site, had discussions with stakeholders and consulted with the local people of nearby and other villages to evaluate the project socio-economic impacts. People of the area belong to different professions like mostly belong to employment, own businesses, doctors, some in abroad, in Army, teaching, in agriculture, etc. Women were also consulted for their point of view regarding the betterment of the area by this project, some of them communicated but according to social value of the area they mostly hesitate to communicate comfortably and get pictured. People provide the massive information about the project and have positive remarks regarding the project development.

9.6.4. Affected & Wider Community

There is no affected community present in the radius of our study area. The surrounding area is Industrial.

9.6.5. Summary of Concerns of Consulted Stakeholders

The summary of stakes of consulted stakeholders is given below.

- The activities of the project must be studied in detail to assess all the impacts resulting from the project.
- All the environmental parameters i.e. ambient air quality, noise levels and water quality must be kept within permissible limits of PEQS.
- Project specific mitigation measures must be implemented during project's lifecycle.
- A proper Environmental Management and Monitoring Plan should be prepared to reduce adverse environmental impacts.
- Waste management must be taken into consideration (if generated during project activities).
- Management practices suggested in EMMP for solid waste should be implemented during operation of the project.
- The findings of the EIA report must be incorporated into the design and planning phase of the project.
- The EIA report should be compiled appropriately according to reporting style as suggested in Guidelines/Checklist.
- The project holds a good economic circulation. The advantages of the project seem

more than its disadvantages. Therefore, the project should be operational as soon as possible.

10. CONCLUSIONS AND RECOMMENDATIONS

Based on master plan, preliminary design, environmental and social field surveys, and impact assessment of the proposed project, it may be concluded that although there are some significant negative impacts but would be of short term during the construction stage. However, there are few negative impacts that would be expected during the operational stage but their intensity can be reduced by taking appropriate measures. Environmental issues related to the project activities are summarized as under

- Physical impacts like soil erosion, soil contamination, water contamination, air pollution, high noise level, etc. are s; temporary nature during the construction stages.
- However, during the operational stage by adopting abatement technologies such as combined effluent treatment plant (activated sludge system), air bags, electrostatic precipitators, development of buffer zones and green areas the intensity of negative impacts could be minimized to acceptable thresholds. Detailed Impacts and mitigation measures have been discussed in the Environmental Management plan.
- During operational stages the disposal of waste will become a problem. Therefore, a proper mitigation has been adopted in the preliminary design including wastewater treatment plant, safe and environmental friendly disposal of solid waste and control of gaseous emissions at source. The standards to be followed both for wastewater treatment and gaseous emissions ben discussed and reported.
- Social issues like safety of general public and workers, security problems, community accessibility issue, women accessibility to fields for their daily routine life etc. will be of temporary nature and proper mitigations have been provided in EMP. A comprehensive EMMP has been developed identifying the impacts, mitigation measures, agencies responsible for implementation, monitoring and auditing of the proposed measures.
- Mitigation measures have been suggested for each negative impact resulting from plant activities.
- Proper mitigations may be adopted in the preliminary design including safe and environmentally friendly disposal of solid waste.
- Physical impacts like soil contamination, water contamination, air pollution, high noise level, etc. are of temporary nature. However, during the operational stage by adopting abatement technologies and development of buffer zones and green areas, intensity of negative impacts can be minimized.
- All the baseline environmental parameters including ambient air and noise are well within the permissible limits of NEQS.

- The other social issues like safety of public and workers, security problems, community accessibility issue, women accessibility to fields for their daily routine life etc. will be of temporary nature.
- Fire extinguishers or firefighting equipment will be provided at well notified points to cope with fire events.
- Good housekeeping will be ensured by the management.
- First aid medical facility will be provided at the project site.
- Environmental monitoring will be carried out by the company as suggested and communicated by EPA, Punjab.
- It may be concluded that if proper mitigation measures as given in this report be implemented, the Industrial Estate will cause the least effects on the area's existing environmental and social setting. On the other hand, it is expected that Project will generate large number of employment opportunities to the residents of the area.

APPENDICES

Appendices-I: Glossary

Act means the Pakistan Environmental Protection Act, 1997.

Contaminationis introduction of impurities in the environment.

Environment means (a) air, water and land; (b) all layers of the atmosphere; (c) all organic and inorganic matter and living organisms; (d) the ecosystem and ecological relationships; (e) buildings, structures, roads, facilities and works; (f) all social and economic conditions affecting community life; and (g) the inter-relationships between any of the factors in sub-clause (a) to (f).

Environmental Assessment a technique and a process by which information about the environmental effects of a project is collected, both by the developer and from other sources, and taken into account by the planning authority in forming their judgments on whether the development should go ahead.

Environmental Management to carry out the developmental activities in sustainable manner.

Impact on Environment means any effect on land, water, air or any other component of the environment, as well as on wildlife harvesting, and includes any effect on the social and cultural environment or on heritage resources.

Mitigation Measures means the measures for the control, reduction or elimination of an adverse impact of a development on the environment, including a restorative measure.

Project Proponent is a person, company, NGO or any agency that sponsors and promotes a project.

Regulations means the Pakistan Environmental Protection Agency Review of Initial Environmental Examination and Environment Impact Assessment Regulations, 2000.

Pollution means the presence in the environment or the introduction into it, of substances that have harmful or unpleasant effects.

Social Cohesion is defined as the willingness of members of a society to cooperate with each other in order to survive and prosper.

Screening is the first step of IEE/EIA study. It helps in determining whether a project requires an IEE or EIA.

Sensitive Receptors include, but are not limited to, hospitals, schools, daycare facilities, elderly housing and convalescent facilities. These are areas where the occupants are more susceptible to the adverse effects of exposure to toxic chemicals, pesticides, and other pollutants.

Afforestation is the planting of trees on land which was formerly used for land uses other than forestry is called afforestation.

Special Economic Zone (SEZ) is an area in a country that is designed to generate positive economic growth. An SEZ is normally subject to different and more favorable economic regulations compared to other regions in the same country, including tax incentives and the opportunity to pay lower tariffs.

Appendices-II: List of Abbreviations

NCS	National Conservation Strategy
NOC	No Objection Certificate
EA	Environmental Approval
OHS	Occupational Health and Safety
MICS	Multiple Indicator Cluster Survey
mm	Millimeters
EPA	Environmental Protection Agency
IEE	Initial Environmental Examination
NEQS	National Environmental Quality Standards
EMP	Environmental Management Plan
EMP	Environmental Monitoring Plan
GOP	Government of Pakistan
km	Kilometer
m	Meters
NGO	Non-Governmental Organization
BDL	Below Detection Limit
SWM	Solid Waste Management
TMA	Tehsil Municipal Authority
PPC	Pakistan Penal Code
PEPA	Pakistan Environmental Protection Act
NDWQS	National Drinking Water Quality Standards
LAA	Land Acquisition Act
sq ml	Square Miles
PPE	Personal Protective Equipment
CSR	Corporate Social Responsibility
SKP	Lahore
M. Tons	Metric Tons
in	Inches
GLS	Ground Level Surface
MTa	Metric Tons Annually
TPD	Tons Per Day
HSE	Health Safety and Environment

Appendices-III: Area Description Map

Appendices-IV: References

- https://www.researchgate.net/publication/318209792_A_study_of_drinking_water_of_industrial_area_of_Lahore_with_special_concern_to_arsenic_manganese_and_chromium
- https://en.wikipedia.org/wiki/Quaid-e-Azam_Business_Park_Lahore
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- Multiple Indicator Cluster Survey(MICS)2007-08
- The IUCN Red List-A Key Conservation Tool
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- (Khawaja, Saima Amin and Nusrat Jahan Nabeela. 2014), "Review of Pakistan Environmental Protection Agency Regulations, 2000", Published by: IUCN Pakistan (National Impact Assessment Programme),pp.7,11&13).
- National Mineral policy 2013, Government of Pakistan, Ministry of Petroleum and Natural Resources, Islamabad, Pakistan February 2013.
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- Pollution Prevention and Abatement Handbook, The World Bank, 1998.

- The Pakistan National Conservation Strategy, Environment and Urban Affairs 'Division (Presently-Ministry of Environment, Urban Affairs and Wild Life), Government of Pakistan, Islamabad.
- Punjab Environmental Quality Standards for Drinking Water.
- PunjabEnvironmentalQualityStandardsforMotorVehicleExhaustandNoise.
- Punjab Environmental Quality Standards for Ambient Air.
- STANDARD HANDBOOK OF ENVIRONMENTAL ENGINEERING, BY Robert A.Corbitt, 1989, McGraw-HILL, INC.; New York, USA.
- Topographical Maps of Punjab.
- Punjab Environmental Quality Standards for Noise.
- The Canal and Drainage Act, 1873.
- The Punjab Plantation and Maintenance of Trees Act, 1974.
- The Punjab Wildlife (Protection, Preservation, Conservation and Management) Act and Rules, 1974.
- Information and data provided by the project proponent.
- Technical design data related to the project.
- Information gathered through discussions with the project related persons of the project proponent.
- 29."Guidelines for Self-Monitoring and Reporting by the Industry (SMART)," Final Report, March 1998, approved by PEPC, August 1999
- https://mnm.punjab.gov.pk/important_minerals_occurring_in_punjab#14
- https://en.wikipedia.org/wiki/Marl

Appendices-V: Terms of Reference of Environmental Reports

TERMS OF REFERENCE FOR EIA REPORT

The agreement hereinafter called Agreement, is made between M/s Hi-Tech Environmental Services (Pvt.) Ltd. (Consultancy Firm/Consultant) and Din Properties (Pvt.) Ltd. (Client) to prepare and carry out follow up of Environmental Study Report for obtaining Environmental approval under Section 12 of Punjab Environment Protection Act 1997 (Amended 2012) for proposed project of "**DEVELOPMENT OF UNITED BUSINESS PARK SPECIAL ECONOMIC ZONE BY DIN PROPERTIES PVT LTD NEAR SUNDAR INDUSTRIAL ESTATE, LAHORE**".

The client has requested the consultancy firm to provide consultancy service to prepare and follow up of EIA Report and so that client may obtain Environmental Approval from EPA, Punjab under the Section 12 of PEPA 1997 (As Amended 2012) so mutually agreed terms and conditions are as under:

NOW THEREFORE, the parties here to hereby agree as follow:

- The client shall provide assistance and access to the information contained in the layout plan and other project relevant documents as and when required by the consultancy firm/consultant for performance of his obligations.
- The client shall provide all available data, maps, reports, etc. about the project including but not limited to layout plan of the project.
- The client will provide to the consultancy firm with the letter of introduction and authorization and other documents as may be needed to enable consultancy firm consultant to perform the service.
- Responsible to pay all the dues of the consultants as per the agreed terms and conditions.
- The consultancy firm/consultant shall carry out the services in accordance with the provisions of the agreement including;
- Shall file and follow up the EIA/EIA Report and other file required with due diligence necessary/required for obtaining its approval from EPA Punjab under the statutory requirements of PEPA 1997 (amended in 2012).
- Shall give the consultancy for the preparation of the detailed Environmental Management & Monitoring Plan for enhancing the environmental conditions during installation and operational phases such as mitigation measures for wastewater, solid waste, air emissions, plantation, management of surface runoff, mitigation of socially adverse impact, if any.
- Will evaluate all the activities during the installation and operational phases and recommend suggestions/actions to comply with PEQS.
- Will follow up the EIA/EIA Report and file documents considering information/documents

provided by the client.

- Shall examine the entire activities and list of the details of activities likely to cause adverse impacts during and after installation phase.
- Shall suggest mitigation measures for all such activities which may cause adverse impacts.

For and Behalf of

M/s Hi-Tech Environmental Services (Pvt.) Ltd.
(Consultancy Firm/Consultants)

For and Behalf of

Din Properties Pvt. Ltd.
(Proponent)

Appendices-VI: Consultant Team

Hi-Tech Environmental Services (Pvt.) Ltd. is a business entity managed by geoscientists and environmental experts. The company has the expertise of highly diversified experience and has completed a total of more than 200 environmental studies across Punjab. The consultant has a range of expertise available in following areas:

w) Economic Geology
x) Determination of geological exploratory techniques and mine design
y) Preparation of feasibility reports, IEE report, EIA reports, Development Schemes & Prospecting Scheme.
z) Preparation of Environment Management Plans
aa) Preparation of reports on HRD /Mines Rescue &Recovery.
bb) Assessment of Impact of mining on environment and mitigating measures.
cc) Mine surveying & interpretation of boundary disputes.
dd) Legal opinion on mine regulatory regime.
ee) Energy fuels and selection of choice fuels for specific energy
ff) Drilling and blasting for underground and surface mining techniques.
gg) Safety measures for mines operation.

Contact Details	
Consultant Company	Hi-Tech Environmental Services (Pvt.) Ltd.
Address	26-B, Zahoor Elahi Road, Gulberg-II, Lahore.
Representative	Engr. Harris Naeem
Contact	(+92) 304 0444440
e-Mail	harris.naeem@hitecha.com

The team carrying out the research project is presented in the Table:

Sr.	Name	Qualifications & Brief Experience	Roles Assigned
1	Engr. Harris Naeem	M.Sc. Mining Engineering	• Director operations • Mining Techniques
2	Ch. Awais Ahmad	LLM (London)	• Site Visits • Legal Reviews • Coordination with Locals
3	Razi Allah	BS Hon. Environmental Sciences	• Environmental Compliance Officer • MBA, FCCU & Cranfield UK • BS (Hons). Environmental Science & Geography (GIS), FCCU Lahore (TQM | ISO 14001
4	Attiqa Hameed	Environmental Scientist PhD Scholar	• Preparation of Environmental Management Plan (EMP) • Preparation of Environmental Monitoring Plan (EMP) • Author of EIA Report
5	Engr. Maryam Nazir	Mining Engineer and GIS Management B.Sc. Mining Engineering	• Development of Maps • Secondary data collection • Compilation of report • Coordination with the team

Appendices-VII: Lab Reports

ENVIRONMENTAL PROTECTION AGENCY
GOVERNMENT OF THE PUNJAB
National Hockey Stadium, Gate No. 08
Gaddafi Stadium Complex, Lahore

Validation no. 987-B Dated: 30-04-2024

Validation for Wastewater & Drinking Water

Facility /Project Name & Address Please	United Business Park	Sampling Point: Ground Water Motor Pump
	Located at Near Sundar Industrial Estate, District Lahore	

Waste Water (WW) Treatment facility: Primary / Secondary / Tertiary / NA — Drinking Water (W) Treatment Facility

Total WW collected Sample: ... NA — Total Collected Drinking water samples: ...

Sample Tag for testing parameter is assigned on sample container	Yes✓	NO	NA
Sample is preserved properly for each testing parameter	Yes✓	NO	NA
Sample size is adequate for testing the target parameters	Yes✓	NO	NA
Wastewater flow Measurement performed to ensure sample representativeness	Yes	No✓	NA

No. of Waste Water outlets	Waste Water Flow m^3/hr from each outlet (Optional)	Water intake m^3/hr (Optional)	Water Mass balance compiled during sampling (Optional)	Sample Type
	NA	NA	Yes No	Grab✓ Composite

Parameter	Matrix W	Matrix W-E	Container	Sample Size	Preservation	Yes	NO	NA
Coliform, Total or Fecal			Sterile Container	100 mL	Refrigerate 4 C			
Coliform, Total or Fecal, Chlorinated Water	✓		Sterile Container	100 mL	0.008% Thiosulphate & cooled 4 C	✓		
Color, Turbidity	✓		P.G	500 mL	Cool 4 C	✓		
Hardness, Total	✓		P.G	500ml	HNO3 to pH<2	✓		
Nitrogen, Nitrate + Nitrite, Phenolic Compounds, Oil & Grease, COD, BOD			P.G	2000 mL	H2SO4 to pH < 2, Cool 4C			
Metals, General			P.G Rinsed 1:1 HNO3	500 mL	HNO3 to pH < 2			
Cyanide, Total			P.G	500 mL	NaOH to pH > 12, Cool 4C			
Pesticides, General			Glass	1 Liter	Cool 4 C			

Field Parameters*

Field parameter		pH meter, Model Make	Measurement Method	Calibrated in Field: Yes✓ NO	Measured Value
pH		AS 218	APHA 4500 B	Yes✓ NO	
Temp					
O					

* Field testing parameters only be validated by RAs, RDs, DD (Labs)

Remarks for Sample Quality (If Any):

Signature

Name of EPA Officer with office Address

Inspectors /RAs / RDs or ADs /DDs

M Waseem - Pak Green Lab
Dated: 26-04-2024
Signature:

Name of Assistant /Deputy Analyst, Analyst

with Name of Private Lab along with Address

GOVERNMENT OF THE PUNJAB
National Hockey Stadium, Gate No. 09
Gaddafi Stadium Complex, Lahore

Validation No 989-A Dated 26-04-2024

Validation for Stack & Ambient Monitoring / Sampling

Emission Monitoring under CEM-34 or CEM-39			
Facility Name & Address Phone	United Business Park	Ambient Air & Boundary Wall Noise	
	Located at Near Sundar Industrial Estate, District Lahore		
Industry Category	Baseline		
Analyzer Model & Make :			
Average stack emission Values of CO, NOx (in mg/Nm3)			
Excess Air / Excess Oxygen (%age) :			
Analyzer exposed for Ramp Up phase to the sample gas for 5 minutes	Yes	NO	N/A ✓
Analyzer flow rate and EC temperature monitored during calibration and testing	Yes	No	N/A ✓
Test Data Phase of sample gas recorded with 15 second interval	Yes	No	N/A ✓
All key requirements to ensure QA/QC complied for said EPA approved Method	Yes	No	N/A ✓
Particulate Matter (PM) Monitoring / Sampling under USEPA Method 5 / 17			
Model & Make of Iso-kinetic PM Assembly			
The PM sampling train is complete as per Method 5 & 17	Yes	No	N/A ✓
Leak Test performed prior to sampling	Yes	No	N/A ✓
Field data Sheet for PM Sampling filled during PM sampling	Yes	No	N/A ✓
Data for determining of "K" factor & BGM "B" Factor filled during sampling	Yes	No	N/A ✓
All method key requirements during sampling were complied to ensure QA/QC	Yes	No	N/A ✓
Filter of Particulate matter is suitable for metal Testing	Yes	No	N/A ✓
SOx sampling as per Method 8 (Thorin Indicator Method)			
The right absorbent solution are available for SOx Sampling	Yes	No	N/A ✓
The equipment is capable to maintain flow rate @ 2 LPM or as per method 8 requirement	Yes	No	N/A ✓
Sampling for SOx is performed as per method	Yes	No	N/A ✓
Ambient Air Quality Monitoring by Automatic Monitors for CO, O3, SO2, NOx, PM2.5 & PM10			
In case of continuous monitoring at a site, One Point QC Check Single analyzer & Zero/span check is performed every 14 days.	Yes	N/A ✓	N/A
The CE of NOx analyzer is ensured to be maintained within 96% - 104.1%	Yes	N/A ✓	N/A
Zero/span check is performed prior to starting ambient monitoring	Yes	N/A ✓	N/A
All key requirements for Critical & Operational Criteria for ambient air monitoring by automatic monitors were complied during monitoring	Yes ✓	No	N/A
The measuring techniques of monitors comply PEQS	Yes ✓	No	N/A
Ambient Air Sampling of SPM, PM10, Pb by High Volume Sampler			
In case of Sampling for SPM through samplers, the flow rate of sampler comply PEQS (1.1m3/min)	Yes ✓	No	N/A
Calibration of Sampler performed prior to sampling	Yes	No	N/A
Vehicular Emissions & Noise Measurement			
Sampling of Vehicle emissions and noise measurement have been performed as per method and SOPs	Yes ✓	No	N/A

Remarks (If Any):-

Signature
Name of EPA Officer with office Address
RAs / ROs /DD(Labs)

M Waseem - Pak Green Lab
Dated: 26-04-2024
Signature
Name of Assistant / Deputy Analyst, Analyst with Name of Private Lab along with Address

PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.
ISO/IEC 17025:2017 Accredited Testing Lab, ISO 9001:2015, ISO 14001:2015, ISO 45001:2018
Head Office: 46-M, Gulberg III, Lahore-Pakistan. Ph: +9242-35441444 Cell: 0300-4442134
EPA Certified

PGG/INN/FF/083	Rev #02	Rev date 01.08.23

TEST REPORT

Ref #: PGG/LAB/2024-4906/AA

Issue date: 03-May-24

Name of Industry/Client:	United Business Park
Address of monitoring site:	Sundar Industrial Estate, District Lahore
Nature of Monitoring:	Ambient Air
Monitoring Instrument:	AQMS
Monitoring Date:	26-Apr-24 to 27-Apr-24
Validated by EPA Representative:	Muhammad Nadeem, RO EPA(Lab), Lahore

Results:

Parameters	CO	NO	NO_2	SO_2	PM_{10}	$PM_{2.5}$
	mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
Methodology	Non-Dispersive Infrared Absorption (NDIR)	Reduced Pressure Chemiluminescence (CLD)	Reduced Pressure Chemiluminescence (CLD)	UV Fluorescence (UVF)	Integrated Sampling Technique	Integrated Sampling Technique
Results	1.25	23.67	46.96	12.68	[illegible]	[illegible]
PEQS for Ambient Air	05 8-Hrs	40 24-Hrs	80 24-Hrs	120 24-Hrs	150 24-Hrs	35 24-Hrs

End of Report

PEQS: Punjab Environmental Quality Standards
Remarks: Parameters with * exceeding PEQS Limit
Terms & Conditions:

- Analysis was conducted on the request of project proponent for IEE/EIA Baseline study.
- Report cannot be used regarding compliance of any complaint, EPO or any other court case.
- This report should be reproduced as a whole and not in parts.
- The responsibility of the ethical use of the results reported in this report lies with the client. Consequently, the laboratory is absolved of its responsibility for any claim that may result through the use by the client or others of the results appearing in this report.
- The left-over sample (if so available) shall be retained for fifteen days after the issuance of the report unless otherwise negotiated between the client and the laboratory.
- The report is not valid for any negotiations.

Field Analyst	Chief Analyst	Laboratory Incharge
(signature)	(signature)	(signature)

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PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.

ISO/IEC 17025:2017 Accredited Testing Lab, ISO 9001:2015, ISO 14001:2015, ISO 45001:2018

Head Office: 46-M, Gulberg III, Lahore-Pakistan. Ph: +9242-35441444 Cell: 0303-4442334

EPA Certified

PGL/TMS/FF/159	Rev #00	Rev date 04-09-23

TEST REPORT

Ref #: PGL/LAB/2024-4708/GW

Issue date: [illegible]

Name of Industry/Client:	United Business Park
Address of monitoring site:	Sundar Industrial Estate, District Lahore
Nature of Sample:	Ground Water
Sampling By:	Pak Green Laboratories
Sample Source:	Motor Pump
Sample Code:	GW-02
Date of sampling:	26-Apr-24
Sample Receiving Date:	26-Apr-24
Testing Facility:	Pak Green Laboratories
Testing Date:	26-Apr-24 to 03-May-24
Validated by EPA Representative:	Muhammad Nadeem, RO EPA (Lab) Lahore

Results:

Sr. No.	Parameters	Unit	WHO	PEQS	Method/ Technique	Results
1.	Taste	-	≤ 15	≤ 15	APHA-2160 C	Non-Objectionable
2.	Odor	-	Non-Objectionable / Acceptable	Non-Objectionable / Acceptable	APHA-2150 B	Non-Objectionable
3.	Color	TCU	Non-Objectionable / Acceptable	Non-Objectionable / Acceptable	APHA-2120 C	[illegible]
4.	Turbidity	NTU	< 5	< 5	APHA-2130 B	[illegible]
5.	Total Hardness*	mg/L	-	< 500	APHA-2340 C	75
6.	Total Dissolved Solids*	mg/L	< 1000	< 1000	APHA-2540 C	750
7.	pH*	-	6.5-8.5	6.5-8.5	APHA-4500-H⁺ B	[illegible]
8.	Chloride (Cl^-) *	mg/L	250	< 250	APHA-4500-Cl⁻ B	28
9.	Electrical Conductivity (EC)*	µS/cm	-	-	APHA-2510 B	[illegible]
10.	Sodium (Na^+)*	mg/L	-	-	APHA-3111 B	[illegible]

End of Report

PEQS: Punjab Environmental Quality Standards **WHO:** World Health Organization * PNAC Accredited

Remarks: All Parameters are not in compliance with the PEQS Limit.

Terms & Conditions:

- Analysis was conducted on the request of project proponent for IEE/EIA baseline study.
- Report cannot be used to comply with any complaint, EPO, or other court case.
- This report should be reproduced as a whole and not in parts.
- The values represent the sample conditions when sampling/monitoring was carried out.
- The Environmental Conditions while performing testing activities are (Temp=[illegible] and [illegible]).
- The Sampling was done as per the sampling and preservation protocol method APHA 1060-B&C.
- The responsibility of the ethical use of the results reported in this report lies with the client.
- The leftover sample (if so available) shall be retained for fifteen days after the issuance of the report unless otherwise negotiated between the client and the laboratory.
- The report is not valid for any negotiations.
- Duly calibrated instruments were used during monitoring and testing activities.

Lab. Analyst	Chief Analyst	Laboratory Incharge
[signature]	[signature]	[signature]

PAK GREEN ENVIRO-ENGINEERING (Pvt.) Ltd.

ISO/IEC 17025:2017 Accredited Testing Lab. ISO 9001:2015, ISO 14001:2015, ISO 45001:2018

Head Office: 46-M, Gulberg III, Lahore-Pakistan. Ph: +9242-35441444 Cell: 0303-4442514

EPA Certified

TEST REPORT

Ref #: PGL/LAB/2024-4807/NL

Issue date: 30-May-24

Name of Industry/Client:	United Business Park
Address of monitoring site:	Sundar Industrial Estate, District Lahore
Nature of Monitoring:	Noise Level
Monitoring Time:	Real Time
Monitoring Instrument:	Land TEK SL 1868-P
Monitoring Date:	26-Apr-24
Validated by EPA Representative:	Muhammad Nadeem, BO EP(A)Lab), Lahore

Results:

Sr. No.	Locations	Equivalent Noise Level dB (A)
1	Point-01: East Side	60.6
2	Point-02: West Side	62.1
3	Point-03: North Side	64.9
4	Point-04: South Side	64.3
PEQS (Day Time Commercial Area)		65 dB(A)

End of Report

PEQS: Punjab Environmental Quality Standards
Remarks: Noise level at all points are in compliance with PEQs Limit.
Terms & Conditions:

- Analysis was conducted on the request of project proponent for IEE/EIA Baseline study.
- Report cannot be used regarding compliance of any complaint, EPO or any other court case.
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- The report is not valid for any negotiations.

Field Analyst	Chief Analyst	Laboratory Incharge

Appendices-VIII: Plantation Estimates

The development of green belts serves not only as foreground and background landscape features, resulting in harmonization by amalgamating the physical structures of the project site with the surrounding environment, but also functions as a pollution sink.

- **Objectives**

It is necessary to develop green belt in and around the project site with suitable plant species to achieve following objectives:

- To combat the air pollution effectively.
- To improve the quality of local as well as regional air.
- To avoid problems of soil erosion, noise and dust etc.

There will be no tree cutting at site due to project operations. Hence, there will be no disturbance to vegetation. In addition, the proponent will do plantation as a potential environmental enhancement measure.

Following plantation plan will be followed during project's lifecycle.

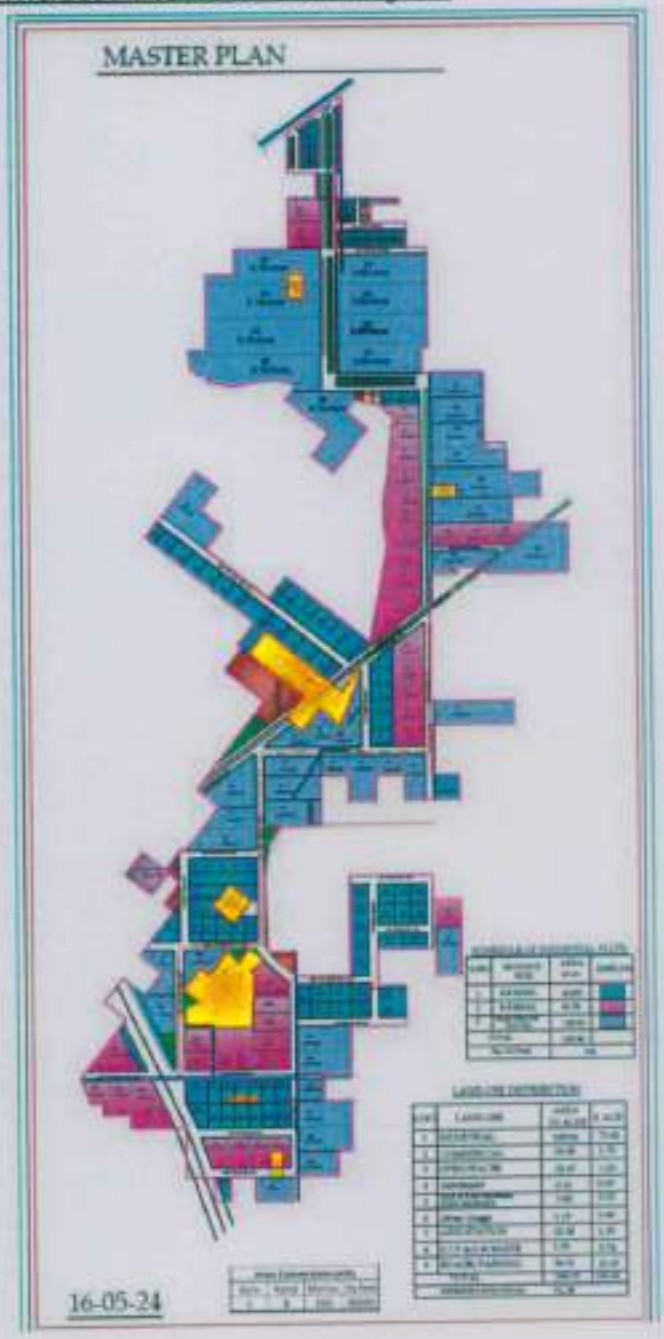
Item	Description
Spacing between two plants	2.0m×2.0m
Total plantation duration	Till Project Tenure
Total no. of samplings planted	100/- No.s.
Species of plants may be planted	Ornamental Plants/Indigenous Species

Noted that the plantation will start from first year and will only be carried out till project period subjected to the agreement between proponent and consultant and consent of the landowner.

- **Criteria for Selection of Plants Species**

The plant species will be planted based on their ease of availability in the local market and their suitability of growth in the project area. Mostly indigenous species will be preferred.

Appendices-IX: Master Plant of the Project



Appendices-X Topographical Map of the Project