MSI Engineering Services (Pvt) Ltd.
Electrical, Instrument, Switchgear, Automation

641 Ruda Industrial Zone, Phase-I,
Mehmood Booti, Lahore, Pakistan.

+92 308 4174283
+92 307 2766601

msiengineering@outlook.com

www.msiengineering.com

Ref: MSI/84/24
Aug 23, 2024

Director General
Punjab Environmental Protection Agency
Mall Road, near Bank Alfalah
Lahore-Punjab.

Subject: **Request of Review and Approval of Environmental Impact Assessment (EIA) for MSI Engineering Services (Pvt.) Ltd located at Mouza Lakho Dair, Mehmood Booti, Tehsil Shalimar and District Lahore" under jurisdiction of Existing Industrial Phase-I of RUDA Industrial Zone, Lahore-Punjab, Pakistan.**

Dear Sir,

A proposed industry referred as MSI Engineering Services (Pvt.) Ltd is required to be constructed at 2.5 km away from Lahore Ring Road Toll Plaza Mehmood Booti, in the jurisdiction of Existing Industrial Phase-I of RUDA Industrial Zone, Mouza Lakho Dair, Tehsil Shalimar and District Lahore. The area of proposed factory has a small parcel of land (i.e. 5 kanals), which has already been acquired.

2. There are no protected areas located in the surroundings of the proposed factory such as forests, wildlife park and other sensitive sites like wetlands, historical buildings etc.

3. In accordance with the Government of Pakistan PEP Act, Schedule-II (Regulation 4) B (20) "auto mobile manufacturing and assembling units" for which filing of an EIA is required as referred in Regulations, 2022 of Punjab Environmental Protection Act, 1997 (Amended, 2012 & 2017). Accordingly, an EIA has been prepared and is being submitted for approval.

An early action on the request will be gratefully acknowledged.

With kind regards,

Yours sincerely,

MSI ENGINEERING SERVICES (PVT) LTD

Mirza Amir Baig
Chief Executive Officer
MSI Engineering Services (Pvt.) Ltd.
Contact #. 0300-8407414.

CC:
1. Director Environment, RUDA, Lahore
2. Office Copy

MSI ENGINEERING SERVICES (PVT.) LTD.

(Electrical, Mechanical, Switchgear & Automation)

Existing Industrial Phase-I of RUDA Industrial Zone, Mahmood Booti, Lahore-Punjab, Pakistan

CONSULTING SERVICES FOR PREPARATION OF ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

International Development Consultants (IDC)
Suite # 3, 11-Civic Centre, C-Block, Faisal Town, Lahore.
Ph: +92-42-3517-4997, Fax: +92-42-3516-8449
E-mail: idcpk@hotmail.com; Website: www. idcpk.org

July, 2024

MSI ENGINEERING SERVICES (PVT) LTD
(Electrical, Mechanical, Switchgear & Automation)

Existing Industrial Phase-I of RUDA Industrial Zone, Mehmood Booti, Lahore-Punjab, Pakistan

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July, 2024

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ABBREVIATIONS

AI	Artificial Intelligence
EA	Environmental Approval
EIA	Environmental Impact Assessment
EMMP	Environmental Management and Monitoring Plan
EMP	Environment Management Plan
EPA	Environmental Protection Agency
EPD	Environmental Protection Department
ERP	Emergency Response Plan
EUAD	Environment and Urban Affairs Division
FGDs	Focus Group Discussions
HSE	Health, Safety and Environment
IDC	International Development Consultants
IEE	Initial Environmental Examination
LAA	Land Acquisition Act
LAC	Land Acquisition Collector
loT	Internet of Things
Ltd	Limited
NCS	National Conservation Strategy
NEQS	National Environmental Quality Standards
NGO	Non-Governmental Organization
NOC	No Objection Certificate
PEPA	Pakistan Environmental Protection Act
PEQS	Punjab Environmental Quality Standards
PM	Particulate Matter
PP	Project Proponent
PPE	Personal Protective Equipment
PTCL	Pakistan Telecommunication Company Limited
RUDA	Ravi Urban Development Authority
UCA	Unemployment Compensation Amendments
UNESCO	United Nations Educational, Scientific and Cultural Organization
WAPDA	Water and Power Development Authority
WHO	World Health Organization

Guidelines for the Preparation of Environmental Impact Assessment Report

Clause No.	Requirement for Preparation and Review of Environmental Reports	IEE/ EIA Report		
		Present (Tick)	Lacking	Page No. (if present)
2	Commencing Environmental Assessment	✓	-	1
2.3	Contents of Report	✓	-	ii
2.3 (A)	Executive Summary	✓	-	xv
	1. Title and location of project	✓	-	xv
	2. Name of the proponent	✓	-	xv
	3. Name of organization prepared the report	✓	-	xv
	4. A brief outline of proposal	✓	-	xv
	5. Major impacts	✓	-	xv
	6. Recommendations for mitigation measures	✓	-	xvi
	7. Proposed monitoring	✓	-	xvii
1	Introduction	✓	-	1
2.3 (B)	1. Purpose of report	✓	-	1
	2. Identification of project and proponent	✓	-	2
	3. Details of Consultant	✓	-	3
	4. Brief description of nature, size, and location of project	✓	-	3
2	Description of the project	✓	-	11
2.3 (C)	1. Type and category of project	✓	-	11
	2. Objectives of the project	✓	-	12
	3. Project Alternatives; Alternatives considered realistically (in detailed) and reason for the end of report)	✓	-	12
	4. Location and Site Layout of the project (May be annexed at the end of report)	✓	-	14
	5. Land use on the site	✓	-	14
	6. Road Access	✓	-	15
	7. Vegetation features at project site	✓	-	16
	8. Description of the project	✓	-	11
	9. Restoration and rehabilitation plans	✓	-	16
	10. Government approvals	✓	-	20
3	Environmental Baseline	✓	-	21
2.3 (D)	1. Existing environmental resources	✓	-	21
	i) Physical	✓	-	21
	ii) Ecological	✓	-	33
	iii) Social	✓	-	34
	2. Quality of life values	✓	-	35
	3. Lab reports of environmental analysis	✓	-	32, 33
4	Potential Environmental Impacts and Mitigation Measures	✓	-	39
2.3 (E)	Environmental parameters	✓	-	39
	1. Project location	✓	-	xv
	2. Design	✓	-	16
	3. During construction phase	✓	-	39
	4. During Operational phase	✓	-	43
	5. Potential Environmental Enhancement Measures	✓	-	43
5	Environmental Management and Monitoring Program	✓	-	47
	i) Institutional capacity	✓	-	54

Clause No.	Requirement for Preparation and Review of Environmental Reports	IEE/ EIA Report		
		Present (Tick)	Lacking	Page No. (if present)
2.3 (F)	ii) Training schedules	✓	-	56
	iii) Summary of Impacts and their mitigation measures	✓	-	57
	iv) Equipment maintenance details	✓	-	53
	v) Environmental budget	✓	-	58
6	Involvement of Stakeholders/ Public consultation (for EIA only)	✓	-	59
	Communicate the potential impacts & concerns to assist further analysis and decision making	✓	-	59
2.5	i) Project proponent		-	
	ii) Responsible authority	✓	-	59
	iii) Other departments and agencies	✓	-	59
	iv) Environmental practitioners and experts	✓	-	3
	v) Affected and wider community	-	-	-
2.7	Site Selection: Suitability of the site (not prohibited, environmentally sensitive, incompatible to surroundings and unsuitable)	✓	-	4
3	Assessing Impacts (for EIA only)	✓	-	40
3.2	Identification of all impacts	✓	-	40
3.3 Table 2	Methodologies for impact identifications (one/more)	✓	-	19
	• Checklists	✓	-	19
	• Matrices	✓	-	53
	• Networks	-	-	-
	• Overlays	-	-	-
	• GIS and computer expert systems	-	-	-
3.3 and 3.6	Impact analysis and prediction (one/more)	-	-	-
	• Meetings	✓	-	60
	• Workshops	-	-	-
	• Consultation/ case studies	✓	-	60
3.5	Characteristics of impacts (nature, magnitude, extent and location, timing, duration, reversibility, risk)	✓	-	40
3.10	Impact Significance: Acceptable, require mitigation or are unacceptable to the community	✓	-	40
	• Ecological importance	✓	-	34
	• Social importance	✓	-	45
	• Environmental Standards	✓	-	22
4	Mitigation and Impact Assessment	✓	-	40
4.1	Purpose of mitigation measures	✓	-	40
	1. What is the problem	✓	-	40
	2. When will problem will occur and when it should be addressed	✓	-	40
	3. Where problem should be addressed	✓	-	40
	4. How the problem should be addressed	✓	-	40
	Ways of achieving mitigation measures	✓	-	40
	• Changing in planning and design	✓	-	40
4.2	• Improved monitoring and management practices	✓	-	48
	• Compensation in money terms	-	-	-
	• Replacement, relocation and rehabilitation	✓	-	17

Clause No.	Requirement for Preparation and Review of Environmental Reports	IEE/ EIA Report		
		Present (Tick)	Lacking	Page No. (if present)
4.3	Prepare an Environmental Management Plan	✓	-	47
5	Reporting	✓	-	47
5.1	Clear reporting style supported by maps or other descriptive details	✓	-	47
5.2	Specific term of references should be present in report	✓	-	66
5.2	Appendices:	✓	-	67
	1. Glossary	✓	-	xiii
	2. List of abbreviations	✓	-	ix
	3. List of individuals and organizations consulted along with their written feedback	✓	-	59
	4. Sources of data and a full list of all reference material used	✓	-	70
	5. Terms of references of environmental reports and those given to individual specialists	-	-	-
	6. List of names, qualifications and roles of team members carrying out the EIA study	✓	-	3

GLOSSARY

Baseline Studies	Work done to collect and interpret information on the condition/trends of the existing environment.
Biodiversity	The variety of life forms, the different plants, animals and microorganisms, the genes they contain and the eco-systems they form. It is usually considered at three levels: genetic diversity, species diversity and ecosystem diversity.
Environment	Increasingly, it means the complex web of inter-relationships between abiotic and biotic components which sustain all life on earth, including the social/health aspects of human group existence. Thus, the environment can be defined as a sum total of all the living and non-living elements and their effects that influence human life. While all living or biotic elements are animals, plants, forests, fisheries, and birds, non-living or abiotic elements include water, land, sunlight, rocks, and air.
Environmental Impact Assessment	Environmental impact assessment (EIA) is a vital process used to determine the possible environmental effects of a proposed project and analyze ways to mitigate those effects.
Environmental Management	Managing the productive use of natural resources without reducing their productivity and quality.
Fauna	All of the animals found in a given area.
Flora	All of the plants found in a given area.
Impact Monitoring	Monitoring of environmental/social/health variables, which are expected to change after a project has been constructed and is operational, to test whether any observed changes are due to the project alone and not to any other external influences.
Initial Environmental Examination	Initial Environmental Examination (IEE) is a report containing a brief, preliminary evaluation of the types and magnitude of impacts/screening process that would result from the proposed project.
Mitigation	The purposeful implementation of decisions or activities that are designed to reduce the undesirable impacts of a proposed action on the affected environment.
Monitoring	Activity involving repeated observation, according to a pre-determined schedule, of one or more elements of the environment to detect their characteristics (status and trends).
Proponent	Organization (private or public sector) or individual intending to implement a development proposal.
Public involvement	A range of techniques that can be used to inform, consult or interact with stakeholders affected by a proposal.
Stakeholders	Those who may be potentially affected by a proposal e.g. local people (primary stakeholders), the proponent, government agencies, NGOs, donors and others referred as secondary stakeholders.

EXECUTIVE SUMMARY

Background

In Pakistan, engineering services play a pivotal role in modern industries by driving efficiency, innovation, and sustainability. They enable businesses to optimize operations through the integration of advanced technologies, reducing manual labour and minimizing human error. It enhances productivity and ensures precision in manufacturing processes, leading to higher quality products and faster time-to-market. These companies contribute to energy conservation and waste reduction, supporting environmental sustainability. Their expertise in cutting-edge technologies, such as internet of things (IoT), AI, and robotics, opens new possibilities for smart manufacturing and digital transformation, positioning industries to thrive in a competitive global market.

Title and Location of the Project

The proposed project is “MSI Engineering Services (Pvt.) Ltd.; and located at Mouza Lakho Dair, Mehmood Booti, Tehsil Shalimar, and District Lahore” under vicinity of Existing Industrial Phase-I of RUDA Industrial Zone, Lahore-Punjab, Pakistan. The location map of project site is illustrated in Figure 3.1 and Aerial view of the Project site is presented in Figure 3.2 of this report.

Project Proponent

The project proponent is named as *“MSI Engineering Services”* (Mirza Amir Baig, Chief Executive Officer), Mouza Lakho Dair, Mehmood Booti, Tehsil Shalimar, District Lahore-Punjab.

Project Consultants

The project consultant is named as *“M/s International Development Consultants (IDC)”*, (Mr. S.A. Shahid, Study Coordinator), Suite# 3, 11-Civic Centre, C-Block, Faisal Town, Lahore-Punjab.

Brief Outline of the EIA report

The Introduction including approach & methodology adopted for the study are discussed in Section 1 and a brief discussion on the existing national policy, legal framework, laws and regulations are discussed in Section 2, while the description of the major components of project are explained in Section 3. Section 4 deals with the description of the environmental baseline. Section 5 describes the potential environmental impacts/risks and mitigation measures. Section 6 discusses the environmental management and monitoring program, while Section 7 relates with the stakeholder’s consultations. The conclusions and recommendations are given in Section 8.

Potential Impacts/risks of the Project

As a result of the implementation of the proposed project, the potential impacts/risks or issues identified were minor in nature and the extent of impacts/risks is insignificant. The impacts/risks (insignificant) may arise during the construction and operational stage of the proposed project. The potential impacts/risks could be air, soil, water and noise pollution. The air quality of the area may be affected both during the construction and operational stage of the project, although the impact/risks could be insignificant/ minor. The ecology of the area will not be affected as the project area (project corridor of impact) has a plain land and free from any crops.

There will be no concerns/issues associated with the women routine activities during the project implementation. However, some of the local women emphasized that some suitable jobs should be provided to their male members in the project related activities, so that they could be accommodated under the project construction activities as well as during the operation of the project. The project impact matrix has shown that on overall basis, the project ranked as highly beneficial and having low adverse impacts/risks.

To address the unanticipated environmental and social impacts/risks as well as other project related concerns (if any), appropriate mitigations measures have been proposed/suggested under the EMMP/EMP.

Conclusions and Recommendations

Conclusions

The environmental impact assessment (EIA) study was carried out to assess the environmental & social impacts/risks under the implementation of proposed project, i.e. Construction of factory by MSI Engineering Services (Pvt.) Ltd. Located in the jurisdiction of Existing Industrial Zone (Phase-I) of RUDA, Mouza Lakho Dair, Mehmood Booti, Tehsil Shalimar, District Lahore-Punjab.

The project environmental and social impacts/risk assessment was carried out based on field survey including interviews/focus group discussions, transact walk and consultations with the stakeholders. Accordingly the EIA report was prepared in accordance with the national and international guidelines; Pakistan's Environmental Laws/Act (PEPA 1997 & amended in 2012) and Regulations (2022).

As a result of the implementation of the proposed project, the potential impacts/risks or issues identified were minor in nature and the extent of impacts/risks is insignificant. The impacts/risks (insignificant) may arise during the construction and operational stage of the proposed project. The potential impacts/risks could be air, soil, water and noise pollution. The air quality of the area may be affected both during the construction and operational stage of the project, although the impact/risks could be insignificant/ minor. The ecology of the area will not be affected as the project area (project corridor of impact) has a plain land. No endangered or threatened species found in the project area. The project impact matrix has shown that on overall basis, the project ranked as highly beneficial and having low adverse impacts/risks.

Recommendations

The following recommendations are forwarded:

1. The project potential impacts/risks will need to be mitigated by adopting all suggested technical/ engineering best practices and measures as reflected in the EMP.

2. All parameters especially noise, air, water will need to be remained within the permissible limit of NEQS as reflected in section 4.

3. All types of storage including fuels and septic tanks for the sewage waste should be cemented to prevent the percolation of contaminants.

4. In addition to above, there would be temporary impact of dust pollution during construction stage, so that sprinkling of water on regular basis especially during dry climatic conditions may need to be continued.

5. On the completion of project construction activities, the proponent will need to submit the completion report to the Environmental Protection Agency as well as RUDA.

6. On the commencement of project operation (business), the proponent will need to submit an annual report summarizing the operational performance of the project in compliance with the environmental management plan (EMP) including the measures and procedures taken to manage or mitigate the environmental impacts/risks (if any) for the project, including monitoring, reporting and auditing.

7. Periodic internal monitoring/auditing needs to be carried out to ensure proper implementation of EMMP/**EMP**.

8. To address the unanticipated environmental and social impacts/risks as well as other project related concerns (if any), appropriate mitigations measures need to be followed as proposed in the Environmental Management Plan.

1. INTRODUCTION

1.1 Background

In Pakistan, engineering services play a pivotal role in modern industries by driving efficiency, innovation, and sustainability. They enable businesses to optimize operations through the integration of advanced technologies, reducing manual labour and minimizing human error. It enhances productivity and ensures precision in manufacturing processes, leading to higher quality products and faster time-to-market. These companies contribute to energy conservation and waste reduction, supporting environmental sustainability. Their expertise in cutting-edge technologies, such as internet of things (IoT), AI, and robotics, opens new possibilities for smart manufacturing and digital transformation, positioning industries to thrive in a competitive global market.

This report presents the main findings of the Environmental Impact Assessment (EIA) for the project “Construction of factory by MSI Engineering Services (Pvt.) Ltd. situated at Mouza Lakho Dair, Mehmood Booti area of Tehsil Shalimar, District Lahore ”Environmental Impact Assessment (EIA)” of the project has been conducted in accordance with the Punjab Environmental Protection (Amendment) Act, 2012 and IEE/EIA Regulations, 2022. The process for conducting environmental assessment and the results are described in this EIA report.

1.2 Scope of the Study

The scope of study includes the preparation of Environmental Impact Assessment (EIA) of the proposed project, “Construction of factory by MSI Engineering Services” for the compliance of Section 12 of PEPA 1997 and to ensure the compliance with the Punjab Environmental Quality Standards (PEQS).

Project proponent has intention to establish the factory covering a total area of 5 kanals (22,540 Sq.ft). In this context, the Project proponent hired a consultant firm, i.e. *“M/s International Development Consultants (IDC)* for the preparation of Environmental Impact Assessment (EIA); Accordingly, *M/s IDC* has conducted the field survey/environmental impact assessment (physical, ecological & social), stakeholders consultations, environmental monitoring (Lab tests) etc.; and data inputting, processing and analysis; and prepared the Environmental Impact Assessment (EIA) of Construction of Factory by “MSI Engineering Services” in the jurisdiction of Existing Industrial Phase-I of RUDA Industrial Zone, Mahmood Booti, Lahore-Punjab.

1.3 Objectives of the EIA Study

The objective of conducting this EIA study is to identify the environmental impacts/risks of the project and accordingly suggest their mitigation measures. The environmental impacts include impacts regarding physical, ecological and social aspects of the project. In order to accomplish the above objective, the following aspects have been covered under the EIA report:

- Establish environmental baseline data including physical, ecological and social aspects of the project area.
- Assess the proposed activities, identify and evaluate the potential impacts; and

suggest appropriate mitigation measures.

- Develop an environmental management plan (EMP) for smooth implementation of the project.

1.4 Identification of the Project and Project Proponent

1.4.1 Identification of the Project

The proposed site is easily accessible from Lahore Ring Road Toll Plaza (2.5 km away). Main Road and link road are available to reach at project site. In the west of proposed site, River Ravi flows. Basic necessary infrastructure like markets, roads, water, power, telephone, Internet etc. is available at the project site. The availability of good roads facilitates the transportation of raw material and furnish goods/products at economized cost. The other basic facilities are vitally important for the entire business to be run. These facilities also go in favor of the present site selection for the project sitting.

1.4.2 Project Proponent

Mr. Amir Baig is the lead person of the subject project Construction of 'Factory' named as MSI Engineering Services (Pvt.) Ltd. The address and contact no. of the project proponent is as below:

- Mirza Amir Baig (CEO)
  MSI Engineering Services (Pvt.) Ltd
  Existing Industrial Phase-I of RUDA Industrial Zone,
  Mouza Lakho Dair, Mehmood Booti, Tehsil Shalimar, District Lahore-Punjab.
  Cell: +92 300-8407414

1.5 Objective of the Study

As per Punjab Environmental Protection Act-PEPA 1997 (Amended 2012), and Punjab Environmental Protection Regulations 2022[1], the preparation of environmental impact assessment (EIA) study is mandatory to comply-with the legal requirements of Act/Laws and Regulations. The following are the major objectives for conducting the environmental impact assessment (EIA) study:

- To identify the environmental issues pertaining to the operational site.
- To evaluate the ability of the project keeping in view of social acceptance and environmental soundness.
- To provide the maximum information to the project proponent and other stakeholders about the existing environmental conditions and the implications on the operation of proposed project.
- Collection of available data, drawings/ design, documents and other relevant information about operation of the project.

[1] Punjab Environmental Protection (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations, 2022, Environmental Protection Department, 16-Dec-2022.

- Review of applicable existing environmental legislation and Pakistan environmental quality standards (PEQS).
- Propose mitigation measures to eliminate/and or reduce the negative impacts/risks up to the acceptable level.
- Development of well-resourced environmental management and monitoring plans to identify the mitigation strategies targeted towards avoidance or minimization and remedy/treatment of the impacts/risks.

1.6 Details of Consultants

The services of Consultancy Firm named as *"M/s International Development Consultants (IDC)"* have been taken by the project proponent for the preparation of Environmental Impact Assessment (EIA) Report.

M/s IDC is a well reputed firm for providing high quality national and international services covering the Environmental and Social (E&S Standards) to ensure the compliance of Punjab Environmental Protection Act-PEPA 1997 (Amended 2012) as well as IFIs E&S Safeguards requirements. M/s IDC is dynamic, responsive and innovative in providing the quantity, quality and cost-effective outcomes/solutions at provincial, national and international level. M/s IDC has involved an interdisciplinary team constituting the following members for the accomplishment of this study:

- Mr. Shaukat Ali Shahid (Master's in Economics), Study Coordinator
- Ms. Iffat Umer, M.Phil (Environmental Sciences), Environment Specialist
- Ms. Aiman Anwar, M.Phil (Environmental Sciences), Associate Environmentalist
- Mr. Zaffer Ali Bhatti, (Master's in Economics), Social Development Specialist
- Ms. Laiba Razzaq (Bachelor's in Environmental Sciences), Survey Enumerator
- Mr. Mudassar-ul-Hassan, Data Manager
- Ms. Maheen, Data entry operator/computer application

1.7 Brief Description of nature, size and location of Project

The proposed project is situated at Mouza Lakho Dair, Mehmood Booti, Tehsil Shalimar and District Lahore, Punjab-Pakistan. The access to basic facilities/ infrastructure, i.e. markets, roads, water, power, telephone, Internet etc. is fully available to the project area/land parcels of 5 kanals. The cost of the proposed project is estimated as about Pak Rupees 50 million.

1.8 Regulatory Requirements of Environmental Impact Assessment

For the sustainability of this development project, in addition to the technical and economic viability, the project also needs to be environmentally sound and friendly. In this context, as per Government of Pakistan (PEP Act) it is an obligation for the project proponent to prepare and submit an Environmental Impact Assessment (EIA) as per Punjab Environmental Protection Act, 1997 (Amended, 2012) and EPA/PEP Regulation 2022; Schedule-II B (20) Auto mobile manufacturing and assembling units for which filing of an EIA is required.

1.9 Approach & Methodology

The approach and methodology includes assessing environmental and social impacts through collecting information on physical, ecological resources and social settings in the project area.

1.9.1 Review of Project Documents

The documents available related to the study was reviewed which include: Punjab Environmental Protection (Amendment) Act 2012, EPA Regulations 2022, World Health Organization (WHO) Guidelines, Environmental Procedures & Guidelines and reports relevant to the present study. A detailed review of these documents was carried out to conceptualize the scope of work for preparing the Environmental Impact Assessment (EIA).

1.9.2 Delineation of the Study Area

To minimize the environmental and social impacts of the project during the construction and operation stage of the project, the judicious site selection is an important aspect. The proposed project land is already owned by the project proponent, “MSI Engineering Services (Pvt.) Ltd”.

1.9.3 Reconnaissance Survey of the Project Area

The reconnaissance survey under this study was conducted by an interdisciplinary team consisting of Environment Specialist, Associate Environmentalist and Social Development Specialist to conceptualize the project and understand the potential environmental and social impacts associated with the construction and operation of the proposed project and also to familiarize the environmental setting and local conditions of the project site.

During the field reconnaissance, the main information regarding the topography, soils, land use, surface water, groundwater, flora, fauna, social setting, villages/ towns, in the surroundings of proposed project was examined.

1.9.4 Field Survey and Data Collection

The field surveys for data collection regarding environmental baseline and socio-economic setting of the project area were carried out from 10 – 30 March, 2024.

Both primary and secondary data were collected to accomplish the objectives of the study. The primary data was collected by conducting in-depth field surveys through individual interviews of local population, focus group discussions and consultations with local community, and village profiling, while secondary data was collected from the published Government documents, i.e. Economic Survey of Pakistan, District Population Census, Multiple Indicators Clusters Survey, Weather data, Government Acts, Laws and Regulations.

In addition to above, the consultative meetings were held with the representatives of all concerned Departments including Environment and other Stakeholders; and Design Engineer/ Consultants as well as other concerned. Based on the environmental checklist, socioeconomic and village profile as well as format for consultations, a field surveys were carried out to collect data on the physical, biological and social environment/ impacts/risk assessment of the project area. Thus, to establish environmental baseline conditions, 21 nos. Socioeconomic interviews (households resided in the vicinity of the project area); impact location profiles; environmental profile and 6 nos. public consultations were carried out during the field survey.

i) Physical Environment

The physical aspects/parameters of the project site covered the following:

- Soils - type of soils, erosion, stability
- Land use pattern of the area including agriculture crops, barren lands, industrial and residential use
- Impact on buildings - residential, industrial, commercial, and structures of buildings
- Drainage system/ pattern
- Available energy source(s)
- Other private/ public infrastructure/ utilities like pipelines, electric poles
- Water resources available both surface and groundwater
- Air quality and noise level in the project area

ii) Biological Environment

In consideration of ecological environment, the following main aspects were covered under this environmental impact assessment (EIA) study:

- Existing vegetation along the project area
- Trees likely to be affected due to the project implementation
- Local/migratory species especially migratory birds
- Endangered species both flora and fauna
- Wildlife in the project area
- Forests and game reserves existing along the project area
- Beneficial/ medicinal plants and animals in the project area

iii) Social/Socioeconomic Environment

Social assessment has attempted to determine the social implications in terms of assumed positive and negative impacts/risks as a result of the implementation of the proposed project. The socioeconomic baseline data covered the following major aspects/parameters:

- Demographic profile
- Population
- Number of households
- Literacy status
- Land use
- Livelihood/ household income
- Living standard of the population
- Women issues
- Social infrastructure available

1.9.5 Stakeholders/ Public Consultations

During the detailed field survey, consultations were made with local community/ general public both men and women and other stakeholders like concerned government departments and agencies.

The basic purpose of these consultative meetings/ focus group discussions were to i) share information with stakeholders about the expected impacts of proposed development works on the physical, biological and social/socioeconomic environment; ii) understand stakeholders' concerns regarding various aspects of the project, including the existing conditions and the potential impacts of construction related activities and operation of the proposed project.

1.9.6 Data Processing and Analysis

After collecting all above data from different sources including interviews, consultations, physical observations/transact walk etc.; and all collected/compiled data was inputted, processed and analyzed and derived the required tables as per tabulation plan. Accordingly, the results were presented through various tables (means, percentage, number) and graphical/ pictorial illustrations.

1.10 Structure of the Report

The executive summary of the report is presented in the beginning of the report.

The Introduction including approach & methodology adopted for the study are discussed in Section 1 and a brief discussion on the existing national policy, legal framework, laws and regulations are discussed in Section 2, while the description of the major components of project are explained in Section 3. Section 4 deals with the description of the environmental baseline. Section 5 describes the potential environmental impacts/risks and mitigation measures. Section 6 discusses the environmental management and monitoring program, while Section 7 relates with the stakeholder's consultations. The conclusions and recommendations are given in Section 8.

2. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

This Section provides an overview of Policy Framework, Legislation, Acts, Laws and Guidelines relevant for preparation of EIA report of the proposed project. In this context, the Pakistan Environmental Protection Act, Laws, Regulations, Ordinances are discussed in the ensuing section of the report.

2.1 National Policy and Administration Framework

The Pakistan National Conservation Strategy (NCS), approved by the Federal Cabinet in March 1992, is the principal policy document on environmental issues in the country (EUAD/UCA, 1992). The NCS outlined the country's primary approach towards encouraging sustainable development, conserving natural resources, and improving efficiency in the use and management of resources. The NCS has 68 specific programs in 14 core areas in which policy intervention is considered crucial for the preservation of Pakistan's natural and physical environment. The core areas that are relevant in the context of the proposed project are pollution prevention and abatement, increasing energy efficiency, conserving biodiversity, supporting forestry and plantations and the preservation of cultural heritage.

The Government of Pakistan promulgated "Pakistan Environmental Protection Act (PEPA) in 1997. Two organizations, the Pakistan Environmental Protection Council (PEPC) and the Pakistan Environmental Protection Agency (Pak-EPA), are primarily responsible for administering the provisions of the Act at the federal level. As per 18th amendment and constitution of Pakistan the environmental matter are being dealt by the respective provisional government. Accordingly environmental protection department is responsible for review and approval of environmental assessment reports of projects undertaken in their respective jurisdictions. The Provisional EPA is required to ensure compliance of the National Environmental Quality Standards (NEQS) and establish monitoring and evaluation systems

2.2 Punjab Environmental Protection Act 2012 (Amended) & PEP Regulations 2022

Establishment of the (Provisional) Environmental Protection Agency:

1. The Government shall, by notification in the official Gazette, establish the Provisional Environmental Protection Agency to exercise the powers and perform the functions assigned to it under this Act, the rules and the regulations.
2. The provisional agency shall be headed by a Director General, who shall be appointed by the Government on such terms and conditions as it may determine.
3. The provisional agency shall have such administrative, technical and legal staff as the Government may specify, to be appointed in accordance with such procedures as may be prescribed.
4. The power and functions of the provisional agency shall be exercised and performed by the Director General.
5. The Director General may, by general or special order, delegate any of these powers and functions to staff appointed under sub-section.

[2] Punjab Environmental Protection (Review of Initial Environmental Examination and Environmental Impact Assessment) Regulations, 2022, Environmental Protection Department, 16-Dec-2022.

6. For assisting the provisional agency in the discharge of its functions, the government shall establish Advisory Committees for various sectors, and appoint as members thereof eminent representatives of the relevant sector, educational institutions, research institutes and non-governmental organizations.

2.3 National Environmental Quality Standards, 2000

The NEQS 2000 specify the following standards (adapted by Punjab Province):

- Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents discharged to in land waters, sewage treatment facilities, and the sea (three separate sets of numbers).
- Allowable concentration of pollutants (16 parameters) in gaseous emissions from industrial sources.
- Allowable noise levels from vehicles.

The list of waste water and ambient air quality standards is presented in Annex 2.1 and 2.2.

2.4 Punjab Environmental Quality Standards (PEQS), 2016

PEQS promulgated recently in 2016. All projects to be implemented in Punjab must conform to PEQS during all the phases i.e., construction and operation. Specified standards under PEQS are for:

- Drinking Water
- Ambient Air
- Noise
- Industrial Gaseous Emissions
- Municipal and Liquid Industrial Effluents
- Motor vehicle exhaust and noise; and
- Treatment of Liquid and Bio-medical
- Waste

2.5 Interaction with Other Agencies

It is the responsibility of project proponent to ensure that project complies with the Laws and Regulations controlling the environmental impacts at both construction and operation stage of the project and that all pre-construction requisites, such as permits and clearances are met.

2.5.1 Punjab Environmental Protection Department

The Proponent is responsible for providing the complete documentation required by the Punjab Environmental Protection Department and remain committed to the approved project design. No deviation is permitted during the project implementation without the prior and explicit permission of the Punjab EPA/ EPD.

2.5.2 Provincial Departments of Forest and Wildlife

In case the implementation of the proposed project involves the clearing of vegetation and trees in project area, the project contractor will be responsible for acquiring “No Objection

Certificate" from concerned provincial Department. The application for NOC will need to be endorsed by the Proponent. Where the construction is to be carried out in close proximity of protected forests and wildlife areas, the Proponent is required to coordinate with the departments to ensure that impact on vegetation and wildlife are minimized.

2.5.3 Provincial Revenue Departments

Under the National Laws, the matters relating to land use and ownership are provincial subjects, and the Revenue department of the concerned province is empowered to carry out the acquisition of private land and built-up property for public purposes, including on behalf of another provincial or federal agencies. For those purpose, the lead department must lodge an application with the concerned provincial government to depute a Land Acquisition Collector (LAC) and revenue staff, which will be responsible for handling matters relating to land in case of any issue arises, although the project proponent presently owned the project site. Furthermore, it also requires a liaison with the provincial departments of agriculture, horticulture and forestry in case of issues associated with these departments. The concerns could be relating to the affected vegetation resources, such as trees and crops. In case of some public buildings/ infrastructure is involved, proponent will approach the building department for relocation/ assessment of compensation.

2.6 Other Relevant Acts

2.6.1 Forest Act, 1927

The Forest Act, 1927 establishes the right of the government to designate areas for reserve forest, village forest and protected forest, and may acquire such areas for prohibiting or restricting the public use of the resources or other activities.

2.6.2 Punjab Wildlife Protection Act, 1974

The Punjab Wildlife Protection Act, 1974 was passed by the provincial assembly of Punjab in 1974. This Act is applicable to the whole of the Punjab province for protection, conservation, preservation and management of Wildlife. This Act also designated areas of sanctuaries and protection of rare and endangered species.

2.6.3 Canal and Drainage Act, 1873

The Canal and Drainage Act, 1873 under Section 32 (e & f), elucidate that: unless with the permission of the Superintending Canal Officer, no person is entitled to use the water of any canal, or any work, building or land appearing to any canal, shall sell or sublet or otherwise transfer his right to such use and no right to the use of the water of a canal shall be, or be deemed to have been, acquired under the Indian Limitation Act, (XV of 1877), Part IV, nor shall '(the Provincial Government) be bound to supply any person with water except in accordance with the terms of a contract in writing.

2.6.4 Local Government Act 2001 and Amended in 2003

These ordinances, issued following the devolution process, establish regulations for land use, the conservation of natural vegetation, air, water, and land pollution, the disposal of

solid waste and wastewater effluents, as well as matters related to public health and safety.

2.6.5 Land Acquisition Act, 1894

The land acquisition Act 1894 is a law for the acquisition of land and implemented to fulfill the needs of government and companies for land required by them for their projects, and secondly, to determine and pay compensation to those private persons or bodies whose land is to be acquired. The experience of the power of acquisition has been limited to a cash compensation policy purposes. The LAA is limited to a cash compensation policy for the acquisition of land and built-up property, and damage to other assets such as, crops, trees and infrastructure. The LAA does not take into account the rehabilitation and settlement of displaced population and restoration of their livelihoods. Presently, the requisite land for the proposed project is already owned by the project proponent, so that no additional private or government land will need to be acquired for the project.

2.6.6 Protection of Trees and Brushwood Act, 1979

This Act prohibits cutting or lopping of trees and brushwood without permission of the concerned Forest Department as a no objection certificate needs to be acquired from Forest Department for cutting of trees.

2.6.7 The Ravi Urban Development Authority Act, 2020

The establishment of the Ravi Urban Development Authority (RUDA) Act 2020 is pivotal for planning and developing the Ravi River area, as outlined in its Master Plan, to enhance community living standards. This initiative aims to adopt a modern, integrated approach to urban and regional development, focusing on environmental excellence, quality of life improvements, and advanced facilities. A key goal includes revitalizing the Ravi River and surrounding lands into vibrant, sustainable urban spaces. Additionally, the authority will develop and implement policies for environmental enhancement, housing, industry, and infrastructure across various sectors, ensuring the area's transformation into a healthy and prosperous community.

The RUDA Act 2020 focuses on the administrative, procedural and operational activities of the Authority with certain prohibitions attached to its functions. The preamble of the RUDA Act 2020 is exhaustive in nature pointing out the entire actions in public interest for the purpose of comprehensive system of planning and development in the area specified in Master Plan of the Project so as to improve the quality of life as per legislative objectives and further to establish an integrated modern and regional development approach and a continuing process of planning and development to achieve the highest environmental standards, quality of life and modern standard facilities so as to make a healthy and prosperous community in the designated area duly determined by the Government to rehabilitate water aquifer and the dying Ravi River into fresh perennial water body with a state-of-the-art water front and urban development on reclaimed and adjoining lands. The objectives of the Act 2020 are to provide quality life along with developed infrastructure and modern standard facilities. This Act is directly related to the establishment of proposed Industrial Zone including Estate as it falls under jurisdiction of RUDA.

3. DESCRIPTION OF THE PROJECT

3.1 Type and Category of the Project

Construction of factory owned by MSI Engineering services is located in Mouza Lakho Dair, Mehmood Booti, Tehsil Shalimar and District Lahore with the aim of providing excellent services for domestic/commercial & industrial maintenance, electrical installation, electrical compliance testing & commissioning; and asset remediation works/ retrofitting with major areas in electrical, mechanical, switchgear, automation and instrumentation. A well-tuned instrumentation and control system provides accurate and adequate information about the process parameters of the system for safe, continuous, reliable, and economical operation of the plant. It involves the design, installation and maintenance of control systems and instruments that monitor and regulate various processes and equipment in a plant.

3.1.1 Requirement of EIA for the Proposed Project

The proposed Project is located in district Lahore of the Punjab Province, therefore, the Punjab Environmental Protection Act, 1997 (Amended 2012 & 2017) is the core environmental law for the proposed Project. As per Punjab Environmental Protection Act (PEPA), EIA is mandatory for the subject project, which states that:

"No proponent of a project of public and private sector shall commence construction or operation unless he has filed an Initial Environmental Examination/Environmental Impact Assessment with the Punjab Environmental Protection Agency, as the case may be, or, where the project is likely to cause adverse environmental effects; and has obtained approval from the Provincial Agency in respect thereof".

Environment Protection Agency, Punjab (Review of EIA) Regulation 2022, Schedule-II clearly states the list of projects requiring EIA. The proposed project of "Construction of factory of MSI Engineering factory Situated at Mouza Lakho Dair, Mehmood Booti, Tehsil Shalimar and district Lahore" falls under **Schedule-II (EIA)** B (20) "Auto mobile manufacturing and assembling units" for which filing of an EIA is required by the **federal agency of review of Regulations, 2022**" and above as prescribed by the Environmental Protection Agency, Government of the Punjab, hence, project under consideration categorizes in the category of the projects requiring Environmental Impact Assessment (EIA). Therefore, to fulfill the legal requirements of Section-12 of the Punjab Environment Protection Act-2012, the client is required to submit the consolidated EIA report in the Environmental Protection Agency, Government of the Punjab, Lahore to obtain the required Environmental Approval (EA).

The EIA report has prepared and submitted to Punjab Environmental Protection Agency incompliance with the legal requirements for Punjab Environmental Protection Act-1997 (Amended 2012 & 2017) for obtaining Environmental Approval/ NOC before starting construction and operation of the project as per section 12 of the Act. Other relevant regulations and guidelines considered while preparation of this EIA report include.

- Policy and procedure for filing, review and environmental approval.
- Guidelines for the preparation of and review of environmental reports.
- Guidelines for public participation
- Guidelines for sensitive and critical areas.

- Detail sectorial guideless.

Various aspects like environmental, social, physical and other of the project both construction and operational phase are highlighted in the EIA report. Measures necessary to be adopted to mitigate any environmental impacts/risk on any part of the environment around were also described.

3.2 Objectives of the Project

The primary overall objective of Project is to promote factory which can be defined as that function which provides the proper space for the safe keeping of goods, provides a system to economically coordinate the necessary activities, facilities, manpower and provides for overall control of the entire operation.

- Designing, developing and maintaining risk/ impacts.
- Configuring automated, electrical systems and processes.
- Integrating electrical systems and sensors with recorders, transmitters, displays or control systems.
- Designing and supervising installation of wiring and signal conditioning.
- Conducting calibration, testing and maintenance of control system, electrical systems and sensors.
- Manage systems and products delivery on time and within budget.
- Instruments adhere to health, safety and legal requirements.
- Ensuring instruments are high quality and useful to clients.

3.3 Analysis of Alternatives

The main objective for analysis of alternates is to consider various alternatives to make the project more environmental friendly and sustainable with respect to the location and layout of the whole project. For the selection of appropriate layout, under existing site conditions, following environmental and social precautions were considered:

- Minimum environmental adverse impacts/risks
- Minimum resettlement and land acquisition
- Cost effective solution

Three alternatives were taken into the consideration during the project preparation such as:

i). No project option
ii). Project location/ site
iii). Technology option.

3.3.1 No Project Option (Worst Case Scenario Option)

The EIA for ‘MSI engineering industry’ involves implementing measures and strategies at a broader level, rather than conducting individual project assessments. It ensures management of environmental impacts/risks more effectively by integrating industry-wide measures and strategies.

The given below are the disadvantages if this proposed project is not implemented:

- Limited job opportunities and economic growth for the people of the area.

- Dependence on external sources for goods and services, including electricity. This dependency can increase vulnerability to supply chain disruptions and economic fluctuations.
- Lack of infrastructure development in the areas where they operate.
- Lack of technological advancements and innovation.
- Current issue of electricity shortage of the area will remain the same.

3.3.2 Technology Option

In Pakistan, technology of proposed project 'MSI industry' involves leveraging advanced technologies and innovative solutions to minimize environmental impacts and ensure sustainable development. This approach to be implemented for the proposed industry/factory project is discussed in Table 3.1:

- Green technology adoption using energy-efficient machinery and implementing clean production processes.
- Utilizing digital twin technology to stimulate and optimize processes.
- Integration of renewable energy sources such as solar, wind and hydropower for electricity generation.

Table 3.1: Comparison of Different Options under the Project Alternatives

Options	Positive Impacts			Adverse Impacts		
	Physical	Biological	Social	Physical	Biological	Social
No Project Option	-	-	-	-	-	-
Project Location/ Site	▸ Most suitable site as no land acquisition involved. The land is already owned by the project proponent. ▸ Easy access to all requisite inputs and raw material & facilities.	▸ No/ or Minimum impact on the flora and fauna as the project site is at plain land, free from vegetation & already owned by the Project Proponent.	▸ No/or minimal social impacts/risks as per given project site.	▸ No or minimal impact on the adjacent settlement because of pollution (if any).	▸ No adverse impact on flora and fauna as well as endangered species in the project area.	▸ No and/ or minimal impact on health and safety as there will be a limited number of workers/workforce in the industry as well as in nearby area. ▸ No or insignificant impact for a limited time of construction activities on the adjacent agricultural land.
Technology option.	▸ The project would have a good step towards providing the domestic/ commercial & industrial items/ equipment, electrical installation and testing/ commissioning.	▸ There will be no impact on flora and fauna as the project site is at plain land.	▸ Employment opportunities for local population. ▸ Improvement in the economic development of the area. ▸ Infrastructure development of the area.	▸ No or insignificant impact of pollution during the limited time of construction activities. However, mitigation measures need to be adopted in this context.	▸ No such impact observed	▸ Nearby community may indicated their concerns to involve the local labour during the project construction activities. In this context, preference may needs to be given to engage local labour under the project. In addition, the PPEs may need to be provided to workforce.

3.3.3 Reasons for Selection of Project Site

The proposed project site was selected due to the following factors:

- Located within the jurisdiction of the existing Industrial zone of RUDA (Phase-I)
- Economically and socially feasible
- Skilled & unskilled workforce is easily available
- Access to roads
- Communication facilities
- Availability of electricity and basic infrastructure
- Sewerage system
- Approved drainage system
- Less/few vegetation/plantation

3.3.4 Alternative Site Option

Construction of project on exactly the selected site is a sound development proposed and it is a worthwhile environmentally sound activity. Therefore, this option can be supported for a significant benefit to all stakeholders. Availability of land at the best convenient place is equally important among other considerations for the site selection. Availability of access roads, communication facilities, electricity, basic infrastructure, sewerage etc. is yet the other necessary requirements. Obviously, environmentally sound, neat and clean environment are the other considerations for site selection. The project will also facilitate the people of the area with increasing the opportunity of employment and others related facilities. Keeping in view these requirements and their feasibility as well as other basic infrastructural requirements are fully available at the selected project site. Accordingly, the selected site is preferable for construction of the present project as compared with an alternate site option.

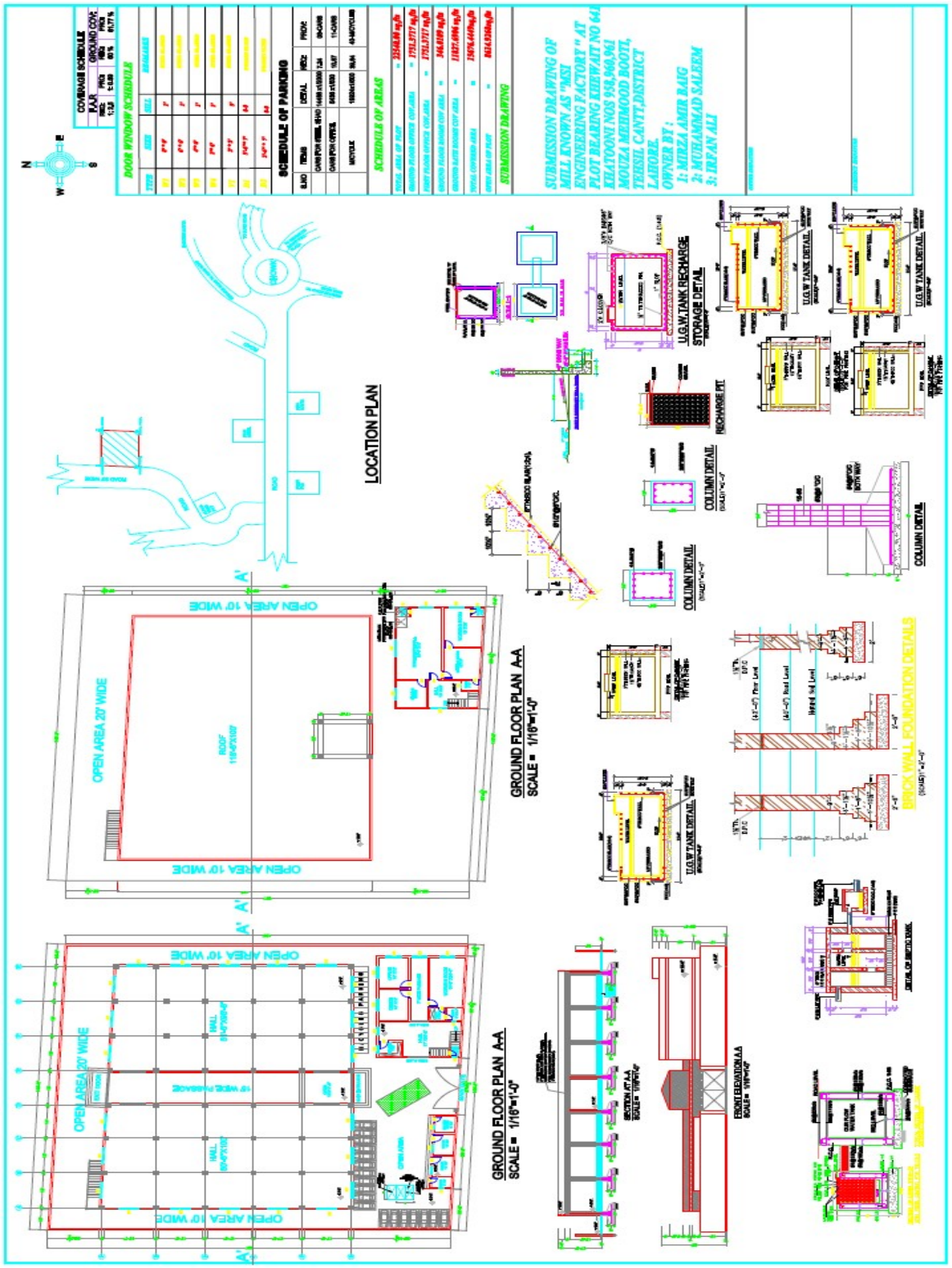
3.4 Location and Site Layout of the Project

The proposed project of 'MSI Engineering Industry' situated at Existing Industrial Phase-I of RUDA Industrial Zone, Mouza Lakho Dair, Mehmood Booti, Tehsil Shalimar and District Lahore. The proposed site is easily accessible from Lahore Ring Road Toll Plaza (2.5 km away). Main Road and link road are available to reach at project site. In the west of proposed site, River Ravi flows. This information is based on the preliminary design data. The layout plan is given in Figure 3.1.

3.5 Land Use of Project Site

The existing land use of the proposed project site consisting of 5 kanals is presently un-cultivated and there is no any farming activity observed at the proposed project site. The plot (5 kanals) proposed for the construction of MSI industry is already owned by the proponent and is presently empty, i.e. no any residential and commercial activity. The measurement of project land parcel is presented in Annex 3.1.

Figure 3.1: Layout Plan of MSI Engineering Services



3.6 Road Access

The project site can be accessed through main Mehmood Booti ring road Lahore. Lahore-Sialkot motorway, main ring road and link road is available to be used for transportation both during the construction and operation phase of project. The road is wide enough that it will not cause any congestion during the construction activities of MSI Industry. Basic necessary infrastructure like markets, roads, water, power, telephone, Internet etc. is available at the project site. The availability of good roads facilitates movement of raw material and furnished goods/product at cheaper cost. The other basic facilities are vitally important for the entire business to be run. These facilities also go in favor of the present site selection for the project sitting. The location map is placed in Figure 3.2 and Aerial view of the proposed Project site is presented in Figure 3.3.

Figure 3.2: Location Map of the Project Site

Figure 3.3: Aerial View of the Project Site

3.7 Vegetation Features at Site

The project site is already owned by the project proponent and is free from any vegetation cover or trees/plantations. However, MSI Engineering Industry will carry out the plantation of 400 trees (both timber & fruit).

3.8 Restoration and Rehabilitation Plan

During the construction phase of the project, the construction activities will cause disruption of land, which needs to be restored and rehabilitated. The restoration and rehabilitation of the site will be responsibility of contractor as well as proponent. This may include:

- Filling of dug pits/ holes.
- Disposal of all extra solid waste and empty drums to the proper designated area or site.
- Plantation of tress or landscaping of the area.
- Others

3.9 General Plant Layout

The proposed project is based on an optimized arrangement of workshop/plant, buildings and the main components with special regard to the natural topography, geological conditions, water sources, fuel storage, fuel transportation and handling facilities, operational requirements, maintenance and optimum utilization of land etc. The final layout plan of MSI Engineering Services is presented in Figure 3.1.

3.10 Major Equipment's used during Construction Stage

The major equipment involved during the construction stage are Batching plant, Concrete mixers, Loaders, Cranes, Welding machines, Winches and Fabrication equipment.

3.11 Major Equipment of the MSI Engineering Services

The list of major equipment's to be used in the proposed project is given below, while the detail description of major equipment/ items to be used in the proposed project is attached as Annex 3.2.

- Conveyors special devices like lifters and turn-over machine
- Switches
- Fuses
- Circuit Breakers
- Protective Relays
- Magnetic Contractor
- Instrument Transformers
- Electrical wire pliers
- Conduit bender
- Insulated screwdrivers
- Fish tape
- Cordless cable and wire cutter
- Wire strippers
- Surface measuring equipment: magnetic gauge, radar transmitters, ultrasonic transmitters, range
- Temperature measuring equipment and accessories
- Pressure measuring equipment and accessories

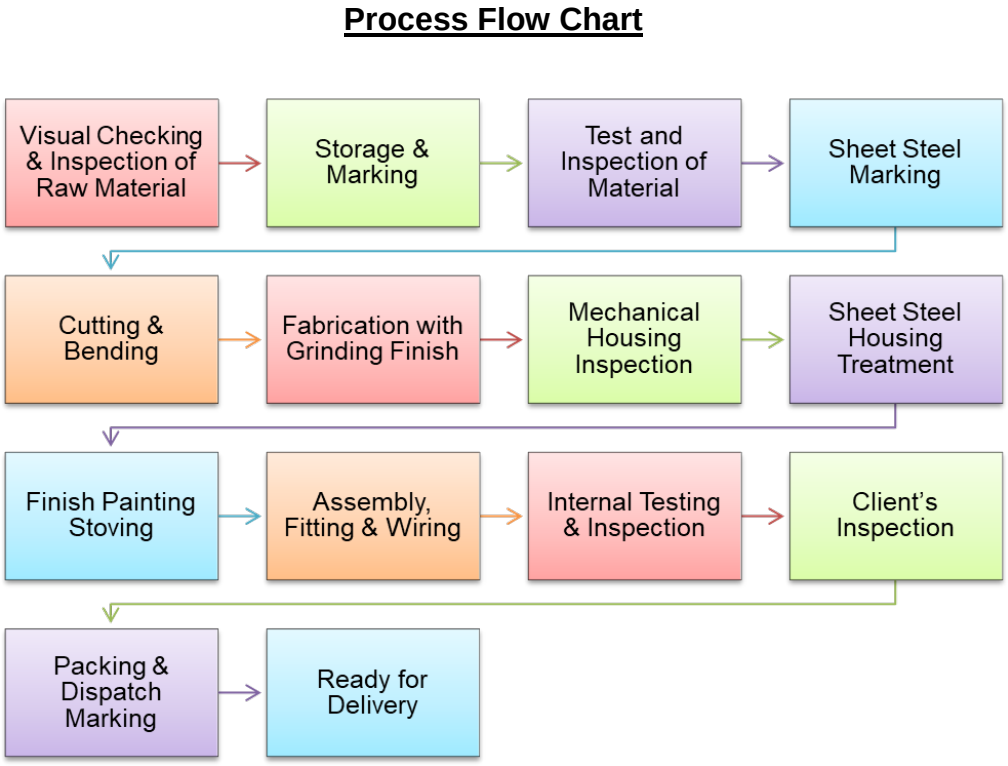
3.12 Raw Material

The raw material to be used in proposed Project is basically comprised of copper and aluminum that are commonly used for conducting electricity. These metals help to ensure efficient power distribution. Additionally, steel is often used for the structural components of switchgear, providing strength and durability. Plastic materials are also frequently utilized for insulation and protection. Along with plastic materials, many other insulating materials are also used. The process flow involved in the operation phase are visual checking and inspection of raw materials, storage and marking, testing and inspection of materials, sheet steel marking, cutting and bending, fabrication with grinding finish, mechanical housing inspection, sheet steel housing treatment, finish painting stoving, assembling, fitting and wiring, internal inspection, client's inspection, packing and dispatch marking and ready for delivery. The process involved in product of Electrical, Mechanical, and Switchgear & Automation from the MSI Engineering Services Industry is illustrated in Figure 3.4 and detailed process flow of the proposed MSI Engineering Services is presented in Annex 3.3.

3.13 Schedule of Implementation

On the environmental approval and issuance of No Objection Certificate (NOC) from Environmental Protection Department (EPD), the commencement of construction work will be initiated as the Company has submitted the Environmental Impact Assessment (EIA) report to the Punjab Environment Protection Agency (EPA). The construction activities/ civil works of the proposed project will be completed within period of 6-8 months during the year of 2024-25.

Figure 3.4: Process Flow Chart of the Proposed Project



3.14 Emissions from Proposed Project

There will be no as such emissions from the construction of company of MSI Engineering Services. However, the emissions as a result of construction activities of the company are categorizes as under:

3.14.1 Wastewater Generation

The wastewater generation is estimated to be 960 liters/day for 30 labor (approx.) for the proposed Project.

3.14.2 Solid Waste

Solid waste will primarily consist of the domestic solid waste from the project. There is no solid waste generated from the processes of the industry. About 150 kg/day of domestic solid waste will be generated from the project. For domestic solid waste collected from building. The garbage will be collected at a designated area within the area as an intermediate garbage disposal. From this place, garbage will be collected and transported to a suitable location for final disposal. The location for this final disposal will be decided in consultation with the City District Government.

Solid Waste from MSI Engineering Industry includes general waste such as paper and other domestic waste. There is no factory waste generated at the site and the waste such as, sheet scrap generated is recyclable/ resalable. All kinds of waste need to be properly disposed-off at proper designated areas to avoid disturbance or contamination in the environmental conditions.

3.14.3 Liquid Waste

Effluents from MSI include discharges, such as sanitary wastewater. The waste water of the site (if any) will be disposed-off into an already existing sewerage/dumping well (locally named as Gherki).

3.14.4 Gaseous Waste

There will be no as such gaseous emissions involved in the proposed industry project because it does not include combustion process.

3.14.5 Noise

In general, there will not be any noise risk, however, in case of some insignificant noise, the main source of noise could be from vehicles movement during the construction phase.

3.15 Infrastructure

3.15.1 Existing Infrastructure

Adequate infrastructure is available for the transportation of equipment, goods and services both during the construction and operation stage of the project.

3.15.2 Required Infrastructure

The infrastructure required during the construction and operation stages of the project is discussed below:

3.15.2.1 Water Supply

Water extracted from groundwater through storing in overhead tank will be used.

3.15.2.2 Sewerage System

The waste water of the proposed MSI Engineering Industry will be disposed in owned sewerage well (gherki) already existing in the area. This sewerage well (gherki) will be used for the disposal of MSI Engineering Industry wastewater/effluent. The sewage from the sewerage well (gherki) is available that is 35 feet deep with 5 feet diameters.

The sewerage system of project site is meticulously integrated with the extensive network of the RUDA sewerage system, ensuring efficient waste management and environmental sustainability. The project site, located approximately 1000 meters, the connection between the project's internal sewer lines and the RUDA main sewer ensures that all effluents are transported safely and hygienically to the central treatment facilities. This features a robust infrastructure designed to handle both residential and commercial wastewater. This system includes a series of underground pipelines, pumping stations, and manholes strategically placed to optimize flow and prevent blockages. Waste water from the project site is first collected in local treatment facilities, where primary treatment processes are conducted to remove large solids and sediments. The partially treated effluent is then transported through a dedicated main sewer-line, spanning a distance of 1000 meters, to connect with the

RUDA's primary sewer system. This integration not only adheres to environmental regulations but also enhances the project's sustainability by ensuring proper sewage disposal and treatment.

3.15.2.3 Security

There will be two security guards provided at the MSI Engineering Industry at both day and night times. The two security guards round the clock will improve the security of the project site and also in its vicinity.

3.15.2.4 Atmospheric Emissions

Dust and particulate matter will be generated during the construction activities. Sprinkling of water will be done on dust tracks, stock piles; raw material will be covered by plastic sheets, loading and unloading of raw material will be done at night etc.

3.15.2.5 Electricity

There is no electrical facility currently available in the MSI Engineering Industry. The design criterion for the electrical works will be in compliance with the requirements of WAPDA. Maintenance will be carried out by the management of the Industry.

3.15.2.6 Telecommunication

Telephone facility will be provided by the PTCL. An underground cable will also be provided for electronic media.

3.15.2.7 Fire Protection System

An addressable fire protection system with detection and alarm annunciation and other installations etc. would be provided to protect against any fire hazards. Fire buckets and fire extinguishers will be placed at all sensitive places within the proposed project.

3.15.2.8 Emergency Exit

The emergency exits are to be provided in the MSI Engineering Industry.

3.15.2.9 Gas Facility

There is no Gas facility currently available in the area of MSI Engineering Industry, so that no risks involved in this context.

3.15.2.10 Manpower

A number of skilled, semi-skilled and unskilled manpower to be engaged both during the construction and operation phase of the project. During the construction phase of the project 10-20 persons will be required, while during operation about 25-30 persons will be required.

3.15.2.11 Approval of Industry Site

The required land has already acquired by the project proponent and at present, it is the

property of MSI Engineering Industry. The approval of layout plan in respect of “MSI Engineering Services (Pvt.) Ltd” is located in the area of Existing Industrial Phase-I of RUDA Industrial Zone, Mouza Lakho Dair, Mehmood Booti, Tehsil Shalimar, District Lahore and the document has already submitted to RUDA for approval.

4. ENVIRONMENTAL BASELINE

4.1 General

This section of the report covers a comprehensive description of the environmental baseline conditions of the project area and in the area of influence (AoI) with respect to the physical, ecological and social aspects. In addition to the secondary data, the field survey was carried out from 10-30 March and 15-25 April, 2024 to represent the ground reality of the project area. The environmental baseline conditions were established based on environmental and social survey; and public consultations as well as consultations with the stakeholders.

4.2 Physical Environment

The following section provides an overview of information on physical environment of the project area collected & compiled based on both primary as well as secondary sources. The major parameters covered are: Topography, Geology, Soil, Seismicity, Climate and Meteorology, Water Resources, Solid Waste, and Land Use, etc.

4.2.1 Topography

Topographically, it lies between river Satluj which flows its boundary with India and river Ravi which flows its boundary with Sheikhupura District. Lahore is located in Central Punjab which is known as heavy producer of cotton and rice. It may be divided into two parts, a low lying or riverine area along the two bordering rivers and upland, away from the rivers. The riverine area is generally inundates during monsoon season (Jun-Sep). The water level in this area is higher than that of upland area. The soil is sandy. The upland is flat plain sloping from north-west to south-west. The land use of the project/site area is uncultivated including some built-up area/structures/office etc., while outside the site area/ or in the vicinity of the project site, the land use was under agriculture, trees, built-up area and track/roads.

4.2.2 Geology

The project lies in the Lahore District, which derives itself naturally between the central up-lands and alluvial lands of Ravi, having no hills or mountains of any kind. The Ravi flows in the West of District along its boundary with Sheikhupura District. The general height of the area is from 208 to 213 meters above the sea level. The only mineral worth of any value is Kallar and Kankar.

The project area is plain land with cultivation practices. Lahore city is the capital of Punjab Province of Pakistan, covering a total area of 1,772 km^2. It has a flat surface with a variation of altitude from 208 to 213 MSL. The Lahore's unconfined aquifer is composed of unconsolidated alluvial deposits up to 400m thickness with a transmission rate of about 2,100 m^2/day and alternate layers of sand, silt, and clay formations. The groundwater is the significant source for drinking, domestic and industrial usage in the area under study. The 82 % of the groundwater aquifer of Lahore is recharged by River Ravi (the primary source), 12 % from monsoon rainfall, and 6 % from the return flows from irrigation[3].

[3] GIS-based Spatio-Temporal and Geo-statistical Analysis of Groundwater Parameters of Lahore Region Pakistan and their Source Characterization https://assets.researchsquare.com/files/rs431857/v1_covered.pdf?c=1631863392

4.2.3 Hydrology

The aquifer under Lahore area is composed of unconsolidated alluvial sediments, consisting of sand, silt and clay in different proportions. The Lahore has recently faced significant hydrological challenges, marked by record-breaking monsoon rains that led to widespread urban flooding.

The Lahore city experienced two intense spells of torrential rain accompanied by a powerful 90 km windstorm, resulting in at least 11 fatalities and extensive flooding of roads. These weather events shattered a 30-year-old rain record with 291mm of rain recorded in a 10-hour period, inundating over 200mm in more than a dozen areas across Lahore. This situation prompted urgent actions from local departments to expedite drainage processes and caused considerable disruptions, including loss of electricity and water supply for approximately 35% of the city[4].

Groundwater is the major source of water in the project area, which is extracted with the help of hand pumps and motors. The groundwater extracted is used to fulfill various domestic, irrigation and industrial needs. The depth of groundwater table in the project area is 200-400 feet and the quality of water is good. The available minimum Sweetwater table depth is 300 feet.

4.2.4 Soils

The soils of Lahore have been formed by the alluvium deposited by the River Ravi during the long course of its geological history thus mostly the soils of the district are alluvial in nature. The silt and loam is in dominating proportions therefore the soil texture is silty and clayey loam. It appears that top layer in Lahore division roughly consists of fill material. The fill varies from 1 to 2.0 m depth below natural surface level and goes up to 10.0 m in case of walled city of Lahore this lies mainly in zone I. This is ascertained by the observed soil profile in several trenches excavated across the walled city area of central Lahore showing difference of existing ground levels, where there is excessive variation in the freshly deposited fill material. It shows that the top-soil in the region comprises of mainly medium dense to dense silty-sand with layers of clay/ silty-clay at various depths. This is followed by stiff lean clay (CL)/ silty-clay (CL-ML)/silt (ML). Below cohesive layer, granular silty-sand (SM)/sand with silt (SP-SM) is present in a medium dense to very dense state with fluctuation in depths, as specified in each zone. Zone II (a) and (b) show considerable uniformity in terms of stratification and mainly consists of clayey-silt/ silty-clay in top average 2 to 5 m followed by silty-sand (SM)/sand with silt (SP-SM). Whereas, zone III shows a bedding of lean clay (CL)/silty-clay (CL- ML) at a depth of 18 m overlaid by silty-sand (SM)/sand with silt (SP-SM)/silty-clay (CL-ML) and zone IV is quite similar to that of zone II but with a difference of thin layer of silty-clay(CL-ML) ranging at a depth from1.5 to 3m. Similarly, zones G-I and G-II majorly comprises of dense silty-sand with layers of clay/silty-clay and lean clay (CL) at shallow depths. The generalized soil[5] profile of the project site is attached as Annex 4.1.

[4] Hydrochemistry modeling: evaluation of groundwater quality deterioration due to anthropogenic activities in Lahore, Pakistan.https://link.springer.com/article/10.1007/s10668-020-00703-3

[5] Geotechnicalcharacterizationandstatisticalevaluationofalluvialsoilsof Lahore https://www.researchgate.net/profile/Jahanzaib-Israr/publication/360159791_Geotechnical_characterization_and_statistical_evaluation_of_alluvial_soils_of_Lahore/links/632b49110a708521500f5891/Geotechnical-characterization-and-statistical-evaluation-of-alluvial-soils-of-Lahore.pdf

4.2.5 Geography

The project area is situated in the area of Lahore-west city and is situated along the river Ravi. The geography comprises the various features relating to the land and climate of Lahore. Lying between 31°15′—31°45′ N and 74°01′—74°39′ 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. It covers a total land area of 1,772 km^2. This area encompasses a mix of cultivated land, uncultivated areas, forests, and spaces not available for cultivation, highlighting the diverse geographical and environmental makeup of the district.

The project site lies along the Ravi River, which flows along its northern edge, contributing to the area's fertility and supporting agriculture. As of 2023-24, Lahore continues to expand both horizontally and vertically, with numerous urban development projects enhancing its infrastructure and skyline. The city is known for its historical sites, including the Lahore Fort and the Shalimar Gardens, both of which are UNESCO World Heritage Sites, as well as for modern developments and commercial areas. The city is an economic hub, with a focus on manufacturing, services, and commerce. Lahore's economy benefits from its strategic location and serves as a key transit point for trade with India and other countries in the region[6].

4.2.6 Climate

The project area lies in District Lahore. This section describes the general climatic condition of project area. The data reflects various aspects of climate and weather for a specific location over a year. The average annual temperature was recorded at 24.2°C, offering a glimpse into the general climate warmth. Meanwhile, the annual average maximum temperature reached 30.0°C, indicating the peak daytime conditions, whereas the average annual minimum temperature stood at 19.0°C, highlighting the coolest nighttime temperatures experienced. Humidity, a key factor in the feel of the air and comfort levels, averaged at 65.10% over the year, suggesting a moderately humid environment. The total annual precipitation, encompassing rain or snow, was measured at 1116.63 mm, essential for understanding the area's water cycle dynamics and potential agricultural productivity. Visibility, affected by various weather conditions such as fog, rain, or pollution, averaged at 3.7 km, pointing to numerous days with reduced clarity. Finally, the annual average wind speed was relatively low at 2.6 km/h, indicating a calm atmosphere with few days of significant wind.

4.2.6.1 Temperature

The months of April-September, 2023 are considered as the hottest months in which the maximum temperature varies from 37.0°C to 43.2°C with the May as the hottest month. January is the coldest month with the minimum temperature recorded as 4.2°C. The month-wise minimum and maximum temperature is presented in Table 4.1 and graphic presentation is given in Figure 4.1.

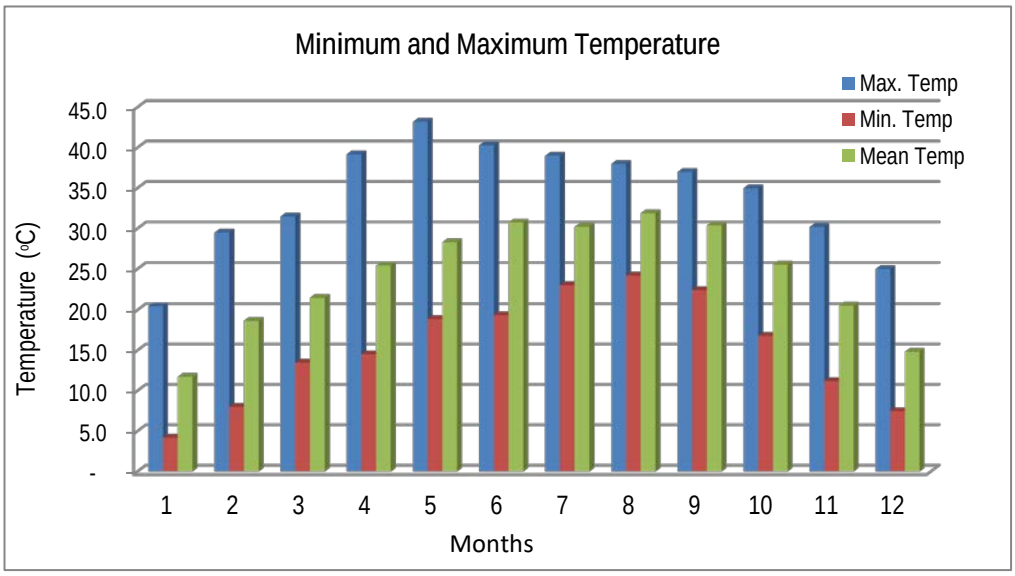
6 Geographical Boundaries of Lahore: https://lahore.punjab.gov.pk/constituencies

Table 4.1: Month-wise Minimum and Maximum Temperature

Temp. Category	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Max. Temp ^{o}C	20.5	29.5	31.5	39.2	43.2	40.3	39.0	38.0	37.0	35.0	30.2	25.0
Min. Temp ^{o}C	4.2	8.0	13.5	14.5	18.9	19.4	23.0	24.2	22.4	16.8	11.2	7.5
Mean Temp ^{o}C	11.7	18.7	21.5	25.4	28.3	30.7	30.2	31.9	30.4	25.6	20.5	14.8

Source: Historical Weather, Lahore (2023).

Figure 4.1: Month-wise Temperature



4.2.6.2 Humidity

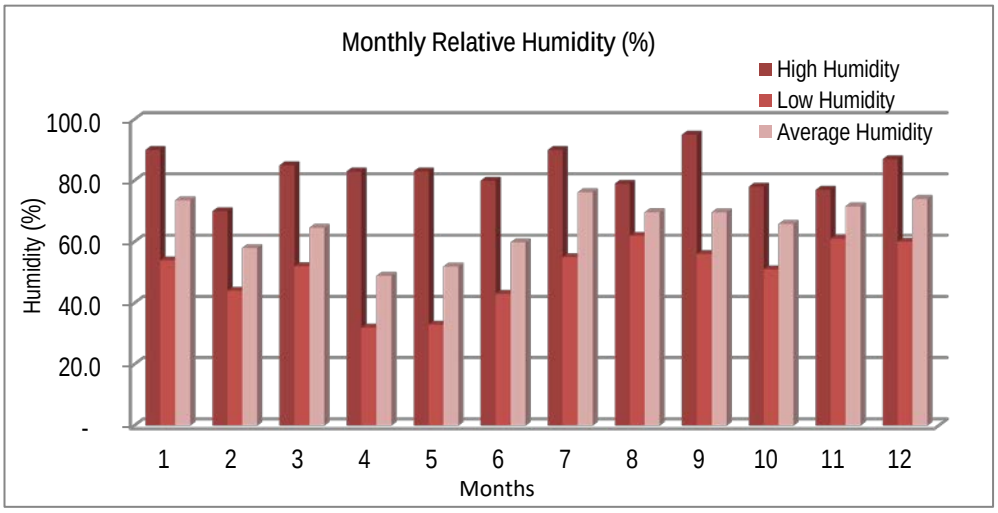
The humidity variation in the year 2023 from February to August in District Lahore ranges from 70.0% to 90.0%. The highest humidity level was observed in September i.e. 95.0% and the lowest humidity level was observed in April i.e. 32.0%. Month-wise average humidity values are shown in Table 4.2 with its graphic illustration in Figure 4.2.

Table 4.2:Month-wise Average Humidity

Humidity	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
High Humidity (%)	90.0	70.0	85.0	83.0	83.0	80.0	90.0	79.0	95.0	78.0	77.0	87.0
Low Humidity (%)	54.0	44.0	52.0	32.0	33.0	43.0	55.0	62.0	56.0	51.0	61.0	60.0
Average Humidity (%)	73.6	58.0	64.6	48.9	51.9	59.8	76.1	69.6	69.6	65.8	71.6	74.0

Source: Historical Weather, Lahore (2023).

Figure 4.2: Month-wise Relative Humidity



4.2.6.3 Precipitation (Rainfall)

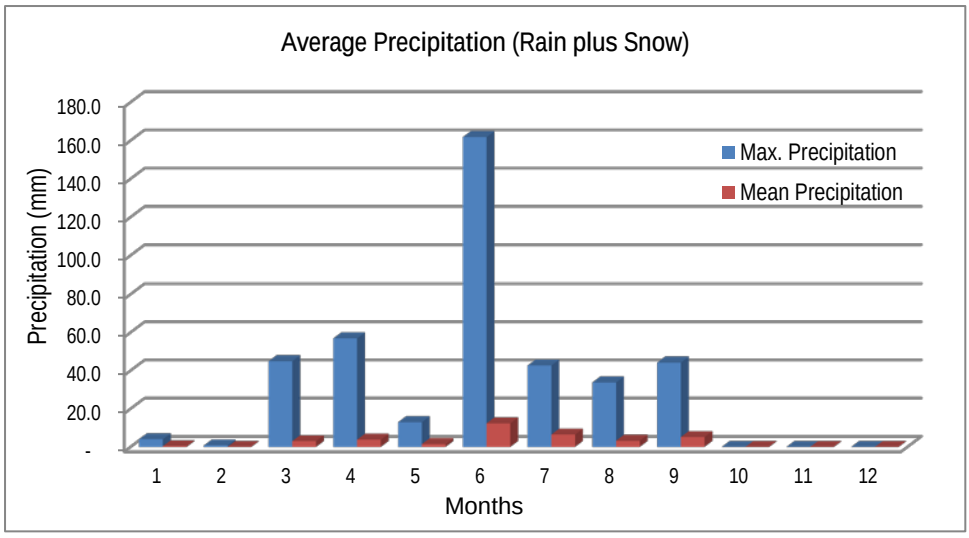
The average precipitation (rainfall) in District Lahore varies markedly. Average maximum precipitation in 24 hours (mm) ranges from 0.4mm in January to 12.4mm in June. The rainfalls mainly occurred during the months of June, which is commonly known as monsoon month. Month-wise rainfall in district Lahore is given in Table 4.3 and graphic illustration is shown in Figure.4.3.

Table 4.3: Month-wise Precipitation (Rainfall and Snowfall)

Precipitation	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Max. Precipitation(mm)	4.1	0.8	45.0	56.9	13.0	161.8	42.7	33.8	44.2	-	-	-
Mean Precipitation(mm)	0.4	0.8	3.1	3.8	1.5	12.4	6.5	3.2	5.1	-	-	-

Source: Historical Weather, Lahore (2023).

Figure 4.3: Month-wise Distribution of Precipitation (Rainfall & Snowfall)



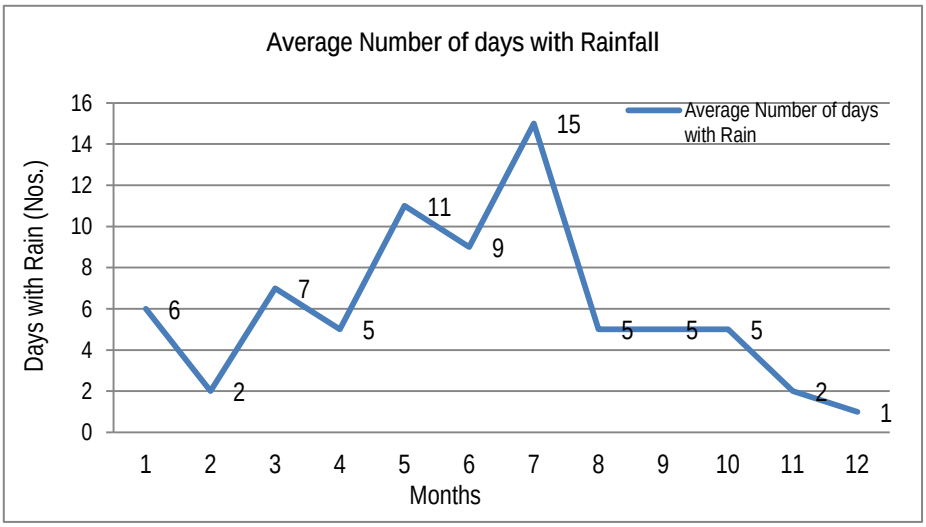
Maximum rainfalls in the month of July, which is typically a monsoon month and the minimum rain falls in month of December. Table 4.4 provides the average number of days with rain in the project area; however, Figure 4.4 shows graphical presentation of it.

Table 4.4: Month-wise Average Number of Days with Rainfall

Number of Days with Rainfall	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average No. of Days	6	2	7	5	11	9	15	5	5	5	2	1

Source: Historical Weather, Lahore (2023).

Figure 4.4: Average Monthly Number of Days with Rainfall/Precipitation



4.2.6.4 Thunderstorms

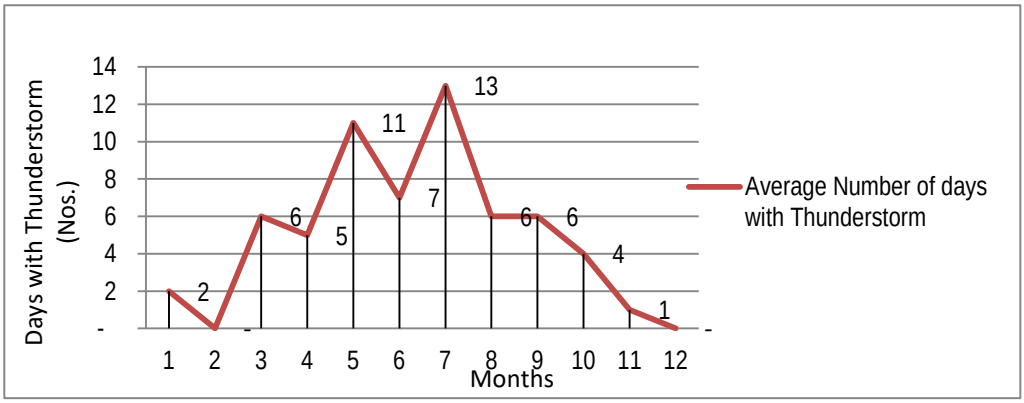
The average number of thunderstorm days in the project provinces is given in Table 4.5 and Figure 4.5. On average, the district Lahore has monthly 1 to 13 days of thunderstorms, with highest number of thunderstorm recorded in month of July and lowest in month of November.

Table 4.5: Average Number of days with Thunderstorm

Days with Thunderstorm	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average No. of Days	2	-	6	5	11	7	13	6	6	4	1	-

Source: Historical Weather, Lahore (2023)

Figure 4.5: Average Monthly Number of days with Thunderstorm



4.2.6.5 Wind Direction

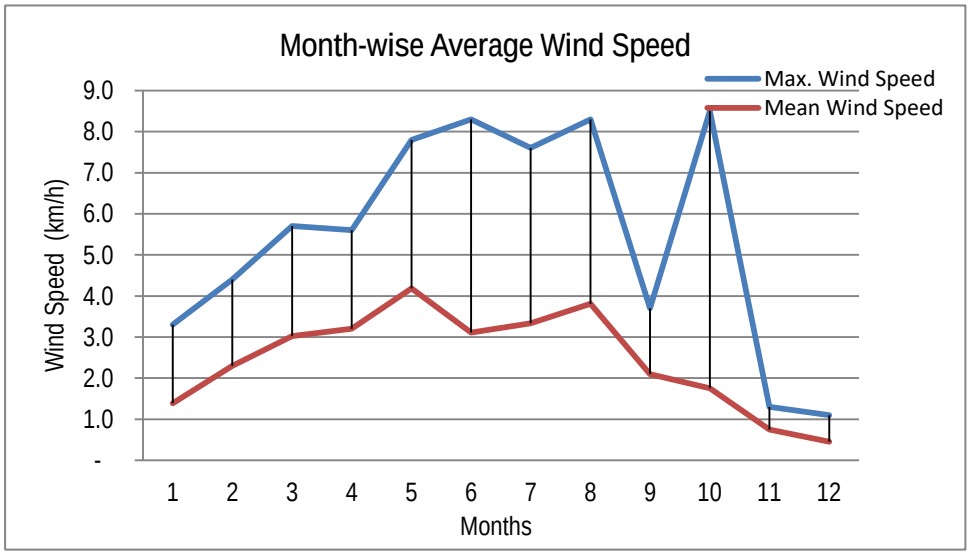
The wind direction is highly variable and is not predominantly from any single direction. The wind is least often out of the south and south west. Table 4.6 shows that wind speed is low in the months of October-January. Maximum wind speed is during summer season. Maximum wind speed is recorded in month of June i.e. 8.3 km/h and minimum is recorded in month of December i.e. 1.1km/h. The month-wise wind speed for District Lahore is indicated in Table 4.6. Graphic illustration is also shown in Figure 4.6.

Table 4.6: Month-wise Average Wind Speed

Wind Speed	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Max. Wind Speed (km/h)	3.3	4.4	5.7	5.6	7.8	8.3	7.6	8.3	3.7	8.5	1.3	1.1
Mean Wind Speed (km/h)	1.4	2.3	3.0	3.2	4.2	3.1	3.3	3.8	2.1	1.8	0.7	0.5

Source: Historical Weather, Lahore (2023).

Figure 4.6: Month-wise Average Wind Speed



4.2.6.6 Atmospheric Pressure

The average pressure in the Lahore district varies markedly as presented in Table 4.7. Atmospheric pressure is an indicator of weather. When a low-pressure system moves into an area, it usually leads to cloudiness, wind, and precipitation. High-pressure systems usually lead to fair, calm weather.

4.2.6.7 Atmospheric Sea Level Pressure

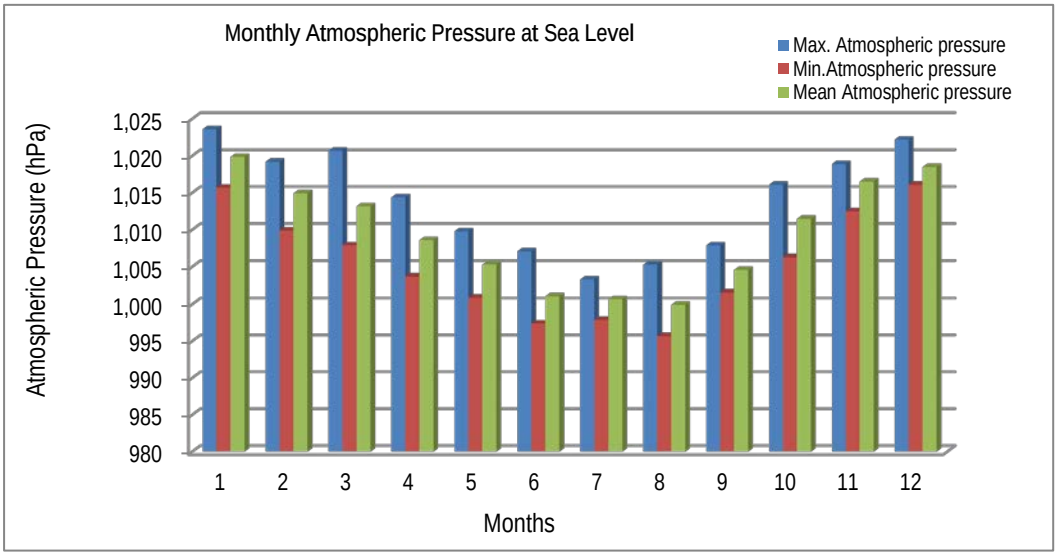
Atmospheric sea level pressure in the district Lahore as a whole remains same throughout the year, which ranges from 999.9 to 1019.2. Month-wise values of mean Sea level atmospheric pressure are depicted in Table 4.7 while the graphic presentation is given Figure 4.7.

Table 4.7: Month-wise Atmospheric Pressure at Sea Level

Atmospheric Pressure-Category	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Max. Atmospheric Pressure	1,023.6	1,019.2	1,020.7	1,014.4	1,009.8	1,007.1	1,003.3	1,005.3	1,007.9	1,016.1	1,018.9	1,022.2
Min. Atmospheric Pressure	1,015.7	1,009.9	1,007.9	1,003.7	1,000.9	997.4	997.9	995.7	1,001.6	1,006.3	1,012.5	1,016.1
Mean Atmospheric Pressure	1,019.9	1,014.9	1,013.2	1,008.6	1,005.3	1,001.1	1,000.7	999.9	1,004.6	1,011.5	1,016.5	1,018.5

Source: Historical Weather, Lahore (2023).

Figure 4.7: Month-wise Atmospheric Pressure at Sea Level



4.2.6.8 Visibility

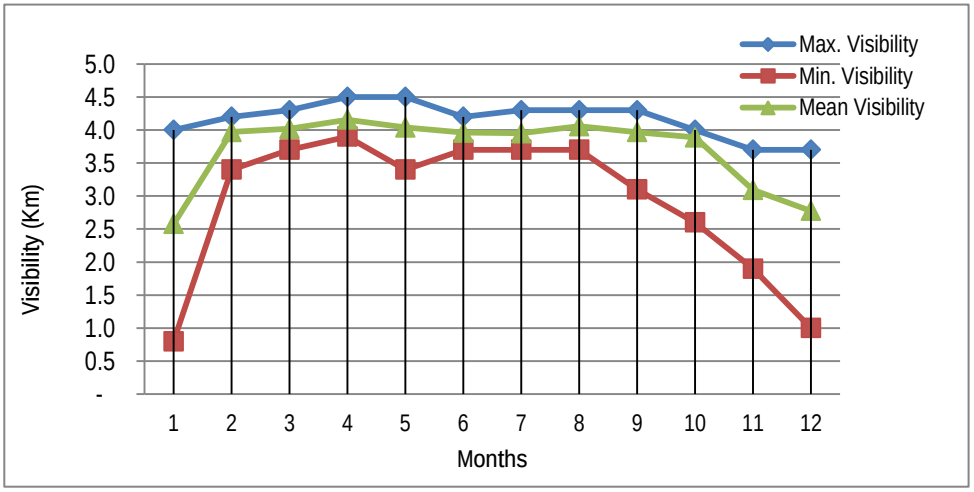
The visibility usually remains good throughout the year except for December, January and February, where it is lowest relative to other months due to thick fog. Month-wise values of mean visibility are depicted in Table 4.8, while the graphic illustration is given in Figure 4.8.

Table 4.8: Month-wise Mean Visibility

Visibility-Category	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Max. Visibility (Km)	4.0	4.2	4.3	4.5	4.5	4.2	4.3	4.3	4.3	4.0	3.7	3.7
Min. Visibility(Km)	0.8	3.4	3.7	3.9	3.4	3.7	3.7	3.7	3.1	2.6	1.9	1.0
Mean Visibility(Km)	2.6	4.0	4.0	4.2	4.0	4.0	4.0	4.1	4.0	3.9	3.1	2.8

Source: Historical Weather, Lahore (2023).

Figure 4.8: Month-wise Mean Visibility



4.2.7 Air Quality and Noise Level

In general, the observation regarding air quality of the project site was good because it lies away from the densely populated areas of Lahore city. However, the presence of vehicular activity on access road (Ring Road) to the project site contributes towards gaseous emission in the study area. As the area comprises of both residential and commercial areas; the other sources of air pollution are burning of solid waste and presence of generators.

As far as noise level is concerned, during the field survey, it was observed that frequency of noise level was under control and has no impact/risk on daily routine activities of the residents. Details are given in Table 4.9 and Table 4.10.

4.2.7.1 Air Quality

Air quality is measured at 3 locations in the project area using portable $PM_{2.5}$ and PM_{10} meters. These measurements were conducted at different locations. At each site, three readings were taken one from the center, two 500m apart from this point in two opposite directions. The $PM_{2.5}$ concentration for Mehmood Booti is 85.6µg/m^3, Lahore-Sialkot Motorway is 75.33µg/m^3 and Sagian Road is 123.63µg/m^3, whereas, for PM_{10} concentration, Mehmood Booti is 127.30µg/m^3, Lahore-Sialkot Motorway is 102.97µg/m^3 and Sagian Road is 169.60µg/m^3.

The values ranges from (0–50) is good and have minimal Impact, and values ranges from (51–100) is Satisfactory and it may cause minor breathing discomfort to sensitive people while values ranges from (101–200) are moderately polluted and it may cause breathing discomfort to people with lung disease such as asthma, and discomfort to people with heart disease, children and older adults, and values ranges from (201-300) are very unhealthy and values ranges from (301-500) are consider hazardous. A summary of this data is given in Table 4.9, the air sampling sites map is placed in Figure 4.9 and detailed air quality results are given in Annex 4.2**.**

Table 4.9: Air Quality Data at the various locations in the Industrial area

Location	Type of Habitat/ Site	Mean Reading	
		$PM_{2.5}$ ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)
Mehmood Booti: MSI Engineering Services (Pvt.), Dera Mehraj Din (Baba Kala) & Shahveer Palace	Mud Road and Link Road	85.6	127.30
Lahore-Sialkot Motorway	Residential/Lhr-Sialkot Motorway	75.33	102.97
Sagian Road	Link Road, Sagian Road	123.63	169.60

Figure 4.9: Air Quality Sample Sites at the Various Locations

4.2.7.2 Noise Quality

Ambient noise quality is measured at 3 locations in the project area using portable sound level meters. At each site, three readings, one at the centre of the location, and the other two on 500m on both sides of the center point were taken.

Generally, average noise levels along the entire alignment are below 79.7dBA. Average noise levels along the entire alignment are high dBA. The noise level ranges from 79.7 to 49.7 dBA. The high noise values are recorded because of the industrial area. The low noise values are recorded because the transmission line passes through sparsely populated areas with low human activities. The noise level readings are given in Table 4.10, while the noise sample sites map is placed in Figure 4.10; and details of these results are presented in Annex 4.3.

Table 4.10: Noise Levels at the various locations in the Industrial Area

Location	Type of Habitat/Site	Mean (dB)	Min-max (dB)
MSI Engineering Services	Mud Road	62.47	50.7-72.4
Dera Mehraj Din (Baba Kala)	Mud Road	68.43	59.8-79.7
Shahveer Palace	Link Road	59.90	49.9-70.3
Lahore-Sialkot Motorway	Residential/Motorway	53.27	49.7-58.1
Lahore-Sialkot Motorway	LHR-Sialkot Motorway	60.00	50.3-72.2
Lahore-Sialkot Motorway	LHR-Sialkot Motorway	63.53	57.7-71.6
Sagian Road	Link Road	66.27	57.9-77.5
Sagian Road	Link Road Sagian Road	66.47	62.7-72.5
Sagian Road	Link Road	71.73	66.5-79.5

Figure 4.10: Noise Sample Sites at the various locations

4.2.8 Water Resources

The water resource in the study area includes both surface and groundwater. Based on the secondary data and the information collected during the field survey, the groundwater table depth varied from 90-100 feet. The groundwater is extracted by means of wells, hand pumps and electric motors.

The community reported that the groundwater is of good quality that is used for drinking purpose, although there is no proper sewerage system present in the project area for disposal of wastewater. The water sample sites map is presented in Figure 4.11.

Figure 4.11: Water Sample sites at the various locations

4.2.8.1 Water Quality

In the project area, the water quality at 3 locations consisting of 3 water samples, (i.e. surface water, groundwater and waste water) at Existing Industrial Zone Phase-I of RUDA, Mouza Lakho Dair is measured during March 2024, and the results provided by the PCSIR are presented in Table 4.11 and Table 4.12. Details of water quality analysis provided by the Pakistan Council of Scientific and Industrial Research (PCSIR) is given in Annex 4.4.

4.2.8.2 Groundwater and Surface Water Quality

The water sample of Groundwater was taken from a depth of 250 to 300 feet at the project site (MSI factory area) located in the Existing Industrial Zone Phase-I of RUDA. The results presented in Table 4.11 reveal that the value of pH are within the limit of 6 -10 pH; while no BOD and COD found in the analysis of water samples. Thus, it can be concluded that the quality of groundwater found adequately good and satisfactory; and within the limit of NEQS standards of EPA.

Table 4.11: Groundwater and Surface Water Quality at Project Site

Sr. No.	Parameters	Units	NEQS	Sample Groundwater At MSI Engineering Services	Sample Surface water At Dera Mian Dawar Mehraj
1	Temperature	°C	40 °C	23 °C	23 °C
2	Humidity	%	-	42 %	42 %
3	Total Coliforms	MPN/ 100ml	-	Not detected	17 MPN/ 100ml
4	pH value at 25 °C	-	6 – 10 pH	7.51	7.23
5	Total Alkalinity as $CaCO_3$	meq./L	-	4.00 meq./L	4.20 meq./L
6	Total Hardness as $CaCO_3$	mg/L	-	184.00 mg/L	196.00 mg/L
7	Total Dissolved Solid (TDS)	mg/L	3500 mg/L	187.00 mg/L	207.00 mg/L
8	Chlorides (Cl^-)	mg/L	1000 mg/L	43.02 mg/L	45.16 mg/L
9	Sulphate (SO_4^{2-})	mg/L	-	15.30 mg/L	16.30 mg/L
10	Electrical Conductivity at 25 °C	µS/cm	-	321.00 µS/cm	355.00 µS/cm
11	Fluoride F^-	mg/L	-	0.17 mg/L	0.17 mg/L

Sr. No.	Parameters	Units	NEQS	**Sample** **Groundwater** At MSI Engineering Services	**Sample** **Surface water** At Dera Mian Dawar Mehraj
12	Lead	mg/L	0.5 mg/L	<LoD*	<LoD*
13	Cadmium	mg/L	0.1 mg/L	<LoD*	<LoD*
14	Iron	mg/L	8.0 mg/L	<LoD*	<LoD*
15	Total Nitrogen	mg/L	-	0.24 mg/L	0.29 mg/L
16	Color	-	-	Colorless	Colorless
17	Odor	-	-	Odorless	Odorless
18	Turbidity	NTU	-	0.19	0.20
19	Acidity	mg/L	-	0.06	0.05

Note: * Limit of Deduction; ** Accredited scope

4.2.8.3 Waste Water Quality

The wastewater sample was taken from a drain/nullah adjacent to the project site at Existing Industrial Zone Phase-I of RUDA. The results of waste water sample are presented in Table 4.12 reveals that the quality of waste water is within the limit of NEQS, i.e. the value of pH is 6.64 at 25°C. The BOD at 20 °C, 113.0 mg/L, while COD is 188.0 mg/L, which are not within the limit of NEQS. The value of Chloride of the wastewater sample is 213.0 mg/L. Moreover, Iron value for the sample is under NEQS i.e. 0.08 mg/L. Lead and Cadmium is not detected in the sample. Total Nitrogen of the wastewater sample is 20.5 mg/L. Electrical conductivity of the sample is 1205.0 mg/L. The TDS and TSS of the sample are 711.0 mg/L and 140.0 mg/L, respectively. In case of the waste water, an adequate and appropriate mitigation measures need to be adopted for the improvement of water quality.

Table 4.12: Waste Water Quality of Proposed Project Site

Sr. No.	Parameters	Units	NEQS	**Sample** **Waste Water** at Drain, Sagian Road, Lahore
1	Temperature	°C	40 °C	23.3 – 24.7 °C
2	Humidity	%	-	59.1 – 65.1 %
3	pH value at 25 °C	-	6 – 10 pH	6.64 mg/L
4	Chemical Oxygen Demand (COD)	mg/L	150 mg/L	188.0 mg/L
5	Biological Oxygen Demand (BOD) at 20 °C	mg/L	80 mg/L	113.0 mg/L
6	*Dissolved Oxygen	mg/L	-	2.65 mg/L
7	Chlorides	mg/L	1000 mg/L	213.0 mg/L
8	*Alkalinity	mg/L	-	290.0 mg/L
9	Total Hardness	mg/L	-	256.0 mg/L
10	*Lead	mg/L	0.5 mg/L	Not detected
11	*Cadmium	mg/L	0.1 mg/L	Not detected
12	*Iron	mg/L	8.0 mg/L	0.08 mg/L
13	Total Nitrogen	mg/L	-	20.5 mg/L
14	Electrical Conductivity	µS/cm	-	1205.0
15	Total Dissolved Solid (TDS)	mg/L	3500 mg/L	711 mg/L
16	Total Suspended Solid (TSS)	mg/L	200 mg/L	140 mg/L

Note: *Parameters are not accredited for ISO-17025

4.3 Ecological Resources

This section describes the flora and fauna in the jurisdiction of the proposed project area.

4.3.1 Flora

The vegetation of the project area shows that it is suitable for plantation of native species along the agriculture fields. Variation in diversity is caused due to climate, heterogeneity, biotic interaction and habitat. The project area is accessible to humans for a long time resulting in low diversity.

The land owners belonging to the vicinity of the proposed project site have already grown trees like *Shesham (Dalbergiasissoo), Neem (Azadirachtaindica), Kikar (Acacia Arabica), Safaida (Eucalyptus camaldulensis), Sharin (Albizzialebbek), Bohr (Ficusbengalansis), Sumbal (Bombac Cieba), Toot (Morus alba), Jaman(Syzygiumcumini),Mango (Mangifera indica), Guava (Psidiumguajava), Beri (Zizyphus jujube)*, etc. in their agricultural fields. The common/ local trees species grown in the surrounding areas of the project site are given in the Table 4.13 with their local and botanical names.

Table 4.13: List of Trees in the Surroundings of Project Site

Sr. No.	Local Name	Technical/Botanical Name
I.	**Timber/ Wood Tree**	
1	Shesham	*Dalbergia sissoo*
2	Neem	*Azadirachta indica*
4	Kikar	*Acacia Arabica*
5	Safaida	*Eucalyptus camaldulensis*
6	Sharin	*Albizia lebbec*
7	Bohr	*Ficus bengalansis*
8	Sumbal	*Bomba Ceiba*
II.	**Fruit Trees**	
1	Toot	*Morus nigra*
2	Jaman	*Syzygium cumini*
3	Mango	*Mangifera indica*
4	Guava	*Psidium guajava*
5	Beri	*Ziziphus jujuba*

4.3.2 Fauna

Most of the animal species present in the adjacent area of the project site are domestic animals, which include: cows, buffaloes, goats/ sheep and poultry which provide adequate amount of milk, meat and by-products like butter and cheese etc. Some of the animals are being used for draught power like donkeys. The main bird species present in the study area is given in below Table 4.14.

Table 4.14: List of Bird Species in the Project Area

Bird Species	Scientific Name	Status	
		Local	Migrated
- Bulbul	*Pycnonotidae*	☑	☒
- House crow	*Corvus splendens*	☑	☒
- House sparrow	*Passer domesticus* *Passer domesticus*	☑	☒
- Koel	*Eudynamys scolopaceus*	☒	☑
- Mynah	*Acridotheres tristis*	☑	☒
- Parrot	*Psittacula krameri*	☑	☒

- Pigeon	*Columba livia*	☑	☒
- Quill	*Coturnix coturnix*	☒	☑

4.3.3 National Parks, Reserved Forests and Wildlife Sanctuaries

There is no national park and wildlife sanctuaries present in the project as well as adjacent to the project area, so that there will be no impact/risk on such important events as a result of project implementation.

4.3.4 Forests and Recreational Area

There is no forest (private and government) observed in the project area as well as adjacent to the project area/ area of influence, so that there is no risk on forest and recreational spots, due to the implementation of the proposed project/industry.

4.3.5 Endangered Species

During the field survey, it was observed that there is no floral and faunal endangered species in the project area as well as in the area of influence.

4.4 Social and Cultural Environment

This section describes the social and cultural environment conditions belong to project area.

4.4.1 Administrative Setting

The project lies in the district Lahore, between 31°15′ - 31°45′ N and 74°01′ - 74°39′ E, with an elevation of 210 meters above sea level. The district covers an area of approximately 1,772 km^2, consisting the population of 14.407 million (March, 2024[7]). The Lahore city included 10 towns and 274 union councils.

4.4.2 Settlement Pattern

The field survey has shown that the settlement pattern of the project area and its vicinity is urban residential locality. The project site is located along the Mehmood Booti Ring Road at village named as “Lakho Dair”, which comes under the jurisdiction of district Lahore. The predominant first language is Punjabi and Urdu. Based on interviews of all available respondents (21 Nos.) located in the vicinity of the project site, the FGDs, demographic profile and other socio-economic features were established based on the field survey and are discussed.

4.4.3 Demographic Characteristics of the Population

The field surveys (including interviews, focus group discussions and village profile) were carried out (10-30 March, 2024) to collect the data including focus group discussions (FGDs) from the nearby residential community to accomplish the baseline information, which may provide the basis for onward monitoring (if any). The demographic features include the information on household’s profile, gender composition, occupations, and literacy status of the population residing adjacent to the project area. The information relating to the demographic profile of the people in the project area are discussed below.

[7]“Lahore”.https://worldpopulationreview.com/world-cities/lahore-population.

4.4.4 Family Size and Gender Composition

In the project area, in general, nuclear and extended families live and working individually as well as jointly for all productive resources such as land, crops, trees and cattle. The internal domestic management and arrangements are managed by the family elder/lead persons. Generally, the outside concerns/matters are managed by the lead person of household.

The results of field survey of sample households presented in Table 4.15 reveals that on overall basis, the average family size accounted for 5.7 members, out of which, the proportion of male and female estimated as 59.8 percent and 40.2 percent respectively.

Table 4.15: Average Family Size and Gender Composition

Average Family Size (No.)	Gender Composition (%)	
	Male	Female
5.7	59.8	40.2

4.4.5 Literacy Status

The field survey results summarized in Table 4.16 reveal that on the whole, the average literacy rate of sampled households estimated as 58.2 percent. The percentage of average literacy rate among male and female estimated as 70.0 and 40.0 respectively.

Table 4.16: Average Literacy Rate of the Sample Households

Overall	Average Literacy Rate (%)	
	Male	Female
58.2	70.0	40.0

4.4.6 Income Analysis

The income analysis indicates the socioeconomic conditions of sample households. This section covers following aspects:

- Occupations of the sample households
- Income by source
- Household expenditure

4.4.6.1 Occupations

The survey results presented in Table 4.17 reveal that almost 40% of the sample households were involved in service, while 10% were operated their own business, 30% were labours, 5% were shopkeepers and remaining 15.0% were involved in agriculture/ livestock/dairy farming to supplement their household income.

Table 4.17: Major Occupations of the Sample population

Occupation (%)				
Service	Business	Labour	Shop Keeper	Agriculture/ Livestock
40.0	10.0	30.0	5.0	15.0

4.4.6.2 Major Sources of Income

The assessment of annual household income is one of the important indicators to measure the household well-being/ livelihood. The survey results indicate that the major sources of income included: income from crops, livestock, private job, business, shop keeper and labour.

4.4.7 Housing Conditions

The ownership and housing conditions are also one of the important indicators for the assessment of living standard/ household well-being. It was observed, that on overall basis, a major proportion (72%) of sample households had their own houses, while remaining (28%) are on-rent basis. As far as the housing conditions are concerned, it was assessed during the field survey that a major proportion of sample households (72.5%) have their pacca (concrete) houses, 21.4% sample respondents were living semi-pacca houses, while remaining (6.1%) were living in katcha (earthen) houses.

In the project area, the public water supply facilities were limited, however, major proportion (96%) of sample households have their own hand pumps for their domestic drinking water supplies etc. Similarly, the major source of lighting is electricity, while for cooking purposes fuel wood followed by LPG were commonly used in the vicinity of the project area.

4.4.8 Availability of Basic Infrastructure

During the field survey, the availability of the social amenities/basic infrastructure to the local population was recorded. It was noted that on the whole, the facilities such as drinking water, electricity and schools (primary) were fully available in the project area as well as adjacent of the project area (i.e. within a radius of 4 sq. km). In case of health facilities, the majority of the locals are going to Mayo hospital, Kot Khawaja Saeed hospital, Shahdara Hospital, Mian Munshi Hospital etc. to avail the health facilities. Moreover the access to roads, sui-gas and sewerage system found limited in the jurisdiction of the project area.

4.4.9 Educational Facilities

The educational facilities in the vicinity of the project site are Primary and Middle schools for ‘boys’ and ‘girls’. The higher secondary schools/education facilities, the locals have to go nearby areas in Lahore city. There are number of educational institutions both in public and private sectors located at nearby the project area as well as in Lahore city. The proposed project site is close to main Lahore city where almost all types of educational facilities are available.

4.4.10 Women Participation

On overall basis, of the sample households in the vicinity of the project area, one-third of the women are involved in income generation activities to enhance the household income as indicated below:

- Livestock rearing and caring activities – fodders cutting, watch & ward to animals, milking etc.
- Poultry - feeding & health care.
- Education- tuitions at home/teaching in academy.

- Participate in social obligations/ ceremonies.
- Other Activities - washing clothes, cooking, child caring, etc.

In general, there were no women related concerns associated with the project implementation, however, the local women indicated that their male members may be engaged in jobs during the project construction activities as well as in operation.

4.4.11 Historical and Religious Structures

There was no any cultural/historical structure found in the jurisdiction of the project area. However, a shrine locally named as “Mian Feroz Din and Dhan Pir Darbar” is located in the adjacent area to the project site (i.e., within a radius of about 1,000 meters), where social gathering took place on every Thursday (including males, females & children) and annually as well. The Shrine site map is presented in Figure 4.12.

Figure 4.12: Location of Shrine at adjacent to the Project Site

4.4.12 Indigenous People/ Groups

During the field survey, it was observed that there was no indigenous people/groups resided in the project area as well as in the vicinity of the project area. Thus, there will not be any impact/risk on the indigenous people/groups as a result of implementation of this project.

5. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

5.1 General

This section identifies the potential environmental impacts/risks relating to the design, construction and operation of the project considering the physical, ecological and social domains of the environment. Accordingly, appropriate mitigation measures have been proposed in this EIA report to avoid/ or minimize the environmental impacts/ risks (if any) to make the project sustainable. Legal requirements of the PEPA and Punjab environmental quality standards (PEQS) will be ensured to comply-with. Furthermore, the compliance with the EMMP and EMP as recommended in the EIA report will also be adhered.

The component-wise impacts and their proposed mitigation measures are discussed in the section below.

5.2 Construction Stage Impacts on Physical Environment

This section explains the potential physical environmental impacts/risks (if any) and its mitigation measures to manage the impacts/risks. Although the impacts may be minor/and or temporary, even then specific mitigation measures have been proposed to avoid/ or reduce such impacts/risks.

5.2.1 Impacts on Land and Soil

The primary bio-physical impacts associated with the construction of the project are the change in land use and vegetation loss, which will cause soil erosion.

5.2.1.1 Mitigation measures

Avoid/ or minimize the disruption of soil stability as much as possible and reclaim the area through back filling, compaction and leveling at the best possible extent.

5.2.2 Impact on Air, Climate and Noise

- Dust emissions likely to occur during the excavation of the top soil.
- Use of vehicles during the construction phase can generate gaseous emission, dust and noise.
- Dispersion of particles from Stockpiles during high velocity wind.
- Noise caused by construction machinery and vehicles used for mobilization of construction equipment and workers.

5.2.2.1 Mitigation measures

- All vehicles transporting construction material will be covered with tarpaulin to avoid fugitive dust during transportation.
- Speed limits on unpaved surfaces on site to limit dust.
- Sprinkling of water to all active construction areas when necessary.
- Cover all trucks hauling soil, sand and other loose materials, soil stabilizers on all

unpaved access roads and staging areas at construction sites.

- Fast growing trees will be planted around the project area to act as a wind breaker to reduce the particulate matter.
- Covering or use of wind sheets around the stockpiles to avoid air pollution through dispersion.
- Control noise through control of working hours and selection of less noisy equipment.
- Prohibit use of pressure horns.
- Provision of acoustic enclosures (hood and shrouds) on generator.
- Proper maintenance of vehicles and construction equipment.
- The construction materials will be properly maintained and barricades will be provided around the site for reducing the noise levels.
- Minimize/avoid unnecessary use of pneumatic drills and other noisy machinery.
- The personal protective equipment (PPE) will be provided to the construction workers and its usage will be made mandatory.

In addition to above, vehicles mobility/transportation may be carried out considering the routine working hours/activities of the locals/local community.

5.2.3 Impact on Water Resources

- Run-off water from construction area will disrupt water quality.
- Drainage of wastewater on ground can contaminate the soil and groundwater.
- Open sewerage water disposal on land can contaminate groundwater.

5.2.3.1 Mitigation measures

- Septic tanks will need to be constructed which will be cemented to prevent the groundwater contamination
- Proper disposal of waste material on dumping sites to avoid leachate generation and contamination of groundwater/surface water.
- The quality of water (wastewater discharged) will need to be analyzed once in three months during construction for its compliance to the disposal's standards of pollution control authorities.

5.3 Construction Related Impact on Biological Environment

The construction related impacts on biological environment including flora, fauna and wildlife of the study area and their corresponding mitigation measures are described in the following section:

5.3.1 Impact on Flora

As the project site is located at a plain land and free from any vegetation, so that there will be no/ or insignificant impact/risk on flora.

5.3.1.1 Mitigation measures

No endemic floral species exist in the site area as the project site is presently a plain non-agricultural land. A Trees Plantation Plan is attached as Annex 5.1**.** Therefore, the mitigate action (if any) may be in relation to preservation of rare floral species.

5.3.2 Impact on Fauna

In general, there will be no/ or minimal impacts/risks on fauna (animals & birds) as a result of the implementation of the project construction activities.

5.3.2.1 Mitigation measures

- Special measures need to be adopted to minimize impacts on the animals and birds in the area such as minimizing noise generation activities.
- Staff working/workers at the project site should not be allowed for any sort of hunting of birds.
- Organic waste material produced from the construction camps (if required) should properly dispose-off to avoid generation of insects, rodents and scavengers.

5.3.3 Impact on Wildlife

In general, there is no wildlife observed in the proposed project site area. However, the noise and vibrations produced during construction activities may cause wildlife (if any) to migrate out of the area.

5.3.3.1 Mitigation Measures

The noise and vibrations will need to be avoided/ or minimized by adopting the appropriate timing for carrying out such construction activities in the project area.

5.4 Construction related Social Impacts

This section describes the social impacts/risks of the project during the construction stage.

5.4.1 Impact on nearby Community Residents

In general, there will be no/ minor impacts/risks on locals/or nearby local community, as in the project area of influence, there are no/ few settlements.

5.4.1.1 Mitigation Measures

- It is preferred that the labour/unskilled as well as skilled labour may be engaged from nearby local community to avoid/ or minimize the presence of outsiders workers in project area.
- The project staff, workers/ labourers should not interfere in the local community related matters.
- A certain proportion, at-least one-third of the total unskilled labour may be employed by contractor from local community, so that their livelihood/ income could

be supplemented.

- The timing of construction machinery and traffic plan will need to be adjusted in a way that it will not disturb the routine activities of the locals/local community.

5.4.2 Impact on Health of Local Community

There may be some minor impacts/risks to the 'Health' of locals/ local community as a result of the implementation of the project construction activities.

5.4.2.1 Mitigation Measures

- Appropriate technologies including careful designs and construction activities should be used to minimize the potential risks.
- Awareness of safety measures needs to be disseminated/disclosed
- Adoption of maximum possible measures to avoid impact on communities.
- Security fences and barriers/boundary wall around the project area should be placed to avoid any incidents/and other interruptions to nearby residents especially children.
- Proper placement of safety signs & boards should be placed/installed.

5.4.3 Impact on Health and Safety of Workers

Protection of health and safety of workers/workforce is very essential under the project. The potential impact on health and safety of the workers due to noise and air/dust (if any) may cause respiratory diseases among the workers.

5.4.3.1 Mitigation Measures

- Proper training of workers/workforce is required in the areas of health & safety, emergency rescue, first-aid etc. on the commencement of project construction activities.
- Personal protective equipment's (PPEs) like helmets, gloves, long work boots, ear muffles, masks, first aid/ medical kit and safety glasses etc. should be provided to workers/workforce and accordingly ensure to use by them during the construction work.
- Health and Safety Plan (Annex 5.2) will be implemented

5.4.4 Solid Waste Generation

During the project construction phase, different types of waste may be generated. The municipal waste may be in the form of food, cans, paper and wastewater and other. The construction waste may include excavated soil, sand, gravel, rocks, asphalt, pieces of concrete, bricks, wood, metal pieces and electrical wires. The solid wastes particularly garbage and trash may cause degradation of soil and land. Thus, the solid & liquid wastes may have the impacts/risks temporary and minor in nature.

5.4.4.1 Mitigation Measures

- Solid waste generated during construction activities and camp sites will need to dispose-off safely in demarcated waste disposal sites as per waste management plan of contractor.
- Waste disposal plan will require to be reviewed/amended during the project construction phase considering climate change.
- Waste Management Plan (Annex 5.3) will be implemented to ensure safe handling, storage, collection and disposal of construction wastes and the training of employees who handle waste;

5.5 Project Operation related Impact on Physical Environment

This section explains the project operation related potential impacts/risks on the environment (physical, biological & social) and accordingly their mitigation measures to be adopted to avoid/ and or minimize those impacts to the possible extent.

5.5.1 Air Pollution

There will be no pollutants will be generated as well as no combustion activities will be involved during the operational phase of the project. Consequently, no air pollution will be expected.

5.5.1.1 Mitigation Measures

There will no impact/risk on air quality, so that no mitigation measure will be required.

5.5.2 Noise Pollution

Generally, during the operational phase of the project, no/or minor noise pollution will be generated.

5.5.2.1 Mitigation Measures

There will no impact/risk on air pollution, so that no mitigation measure will be required.

5.5.3 Impact on soil

There will be no impact/risk on soil during the operational stage of project.

5.5.3.1 Mitigation Measures

There will no/or insignificant impact/risk on soil, so that no mitigation measure will be required.

5.5.4 Impact on Water Resources

There will be no/insignificant water resources/pollution due to no use of water in any process of factory during the operational phase.

5.5.4.1 Mitigation Measures

There will no/or insignificant impact/risk on water resources, so that no mitigation measure will be required. However, awareness training will need to be provided to all personnel and workforce involved during the project operation.

5.5.5 Natural and Man-Made Disasters

Natural disasters (earthquakes) and accidents such as fire, falls, slips and trips may result in injuries, financial losses and may even lead to deaths. The workers shall be trained and facilitated to cope with such disasters.

5.5.5.1 Mitigation Measures

Mitigation measures include the following:

- Emergency numbers should be clearly posted at all disposal stations; and
- Minor incidents and near misses should be reported, and preventive measures should be formulated accordingly by the Management An Emergency Response Plan (ERP) for earthquakes and manmade disasters should be developed by MSI and implemented in close consultation with the RESCUE Services and other concerned departments;
- Training of the MSI staff and employees regarding the emergency procedures and plans should be regularly conducted;

An Emergency Response Plan (ERP) is attached as Annex 5.4**.**

5.6 Project Operation related Impact on Biological Environment

5.6.1 Impact on Flora

In general, no/ and or minor impact/risk on ‘flora’ of the area as a result of operation of the project activities.

5.6.1.1 Mitigation Measures

There will no/or insignificant impact/risk on the flora of the area, so that mitigation measure may not be required.

5.6.2 Impact on Fauna

As there are no endangered species in the project area, so that no adverse impact/ and or risk on fauna is expected during the operation of the proposed project.

5.6.2.1 Mitigation Measures

Generally, no mitigation measure will be required in case of no/ or insignificant impact on the ‘fauna’.

5.7 Project Operation related to the Social Impacts/Risks

5.7.1 Impact on Health & Safety of Workers and Local Community

There will be no/ and or minimal social impacts/risks during the operation of the proposed project. However, there could be some minor risks for the workers/labour as well as local community of nearby area.

5.7.1.1 Mitigation Measures

- Proper training/education of workers/labour as well as local community of adjacent area is required in the areas of health & safety, emergency rescue, first-aid etc. on the commencement of project operation.
- Awareness of social risks safety measures will need to be disseminated/disclosed to the workers/labour as well as local community resided at nearby the factory area during the project operation.
- Safety signs and boards should be prominently displayed both inside and outside the project site.
- An Emergency Response Plan (ERP) is attached as Annex 5.4 needs to be in-place to prevent/ or minimize the impacts during emergency situations.
- Provision of Personal Protective Equipment (PPEs) to the workers.

5.8 Factory Processes Impacts/Risks (E&S)

In the proposed project (Factory), the potential impacts/risks (environmental & social) refer to the possible outcomes or hazards those could be occurred as per MSI Industry flow chart/ processes/activities. To carry out the industry processes and appropriate mitigation measures to avoid the E&S risks is given in Table 5.1.

Table 5.1: Industrial Processes Impacts/Risks Matrix

Sr. No.	Processes as per MSI	Mitigation Measures to avoid E&S Risks
1.	Visual checking and inspection of raw material	- Quality and quantity needs to be checked carefully. - Raw material needs to be stored at designated area. - PPEs may be used by the workers/labour during the process of engineering activities, i.e. cutting, bending, grinding, fabrication, fitting wiring etc. - Packing and dispatch marking carefully in the allocated/designated area. In this context, an environment/health and safety person may ensure the avoidance of environmental and social risks.
2.	Marking and storage of raw materials	
3.	Testing and inspection of materials	
4.	Sheet steel marking	
5.	Cutting and bending	
6.	Fabrication with grinding finish	
7.	Mechanical housing inspection	
8.	Sheet steel housing treatment	
9.	Finish painting	
10.	Assembly, fitting and wiring	
11.	Internal inspection	
12.	Client's inspection	
13.	Packing and dispatch marking	
14.	Delivery of products	

6. ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM

6.1 General

This section provides a brief description for the management of environment and social issues of the proposed project during its construction and operation phases. It was observed in this EIA report that there are minimal environmental and social impacts/risks in the project area. Nevertheless, it is important that an environmental management plan (EMP) is pursued to protect from the environmental and social risks and compliance with EPA standards as well as safeguards requirements.

6.2 Objectives of Environmental Management (EMP)

The main objectives of the EMP are to:

- Provide the details of the Project impacts along with the proposed mitigation measures, and the corresponding implementation activities;
- To ensure that all necessary corrective actions are carried out and monitored in time to counter any adverse environmental impact under a systematic monitoring approach;
- Provide a procedure for timely action in the face of unanticipated environmental situation;
- Define the role and responsibilities of the Project Proponent and other key players in order to effectively communicate environmental and social issues among them;
- Define a monitoring mechanism, reporting frequency and identify monitoring parameters to ensure that all the mitigation measures are completely and effectively implemented;
- Design the trainings for enhancing the capacities of the Project Proponent on environmental and social management;
- Identify the resources required to implement the EMP and outline the corresponding financing arrangements; and
- Define the requirements necessary for documenting compliance with EMP and communicating it to all the concerned regulatory agencies.

6.3 Environmental Management and Monitoring Plan (EMMP)

The objective of the Environmental Management & Monitoring Plan (EMMP) is to address all the relevant major issues and provide necessary framework for the implementation of the proposed mitigation measures during the construction and operational phase of the project. The EMMP is one of the most important outputs of the environmental assessment process. The major focus of the EMMP is to: (i) provide the details of the proposed project impacts/risks along with the proposed mitigation measures and (ii) define the responsibilities of the project proponent, contractor and other concerned/ role players; and effectively communicate environmental issues/ and or risks among them. The proper implementation of the EMMP ensures that all relevant impacts/risks of the proposed project were identified and accordingly, appropriate mitigation measures have been suggested to comply-with the NEQS. The required actions will be carried out by the concerned institutions/ or regulatory agency to accomplish the project objectives successfully. The potential impacts/risks, mitigation measures, monitoring mechanism and the roles and responsibility of concerned institutions are presented in Table 6.2.

Table 6.2: Environmental Management and Monitoring Plan

Sr. #	Potential Impacts/ Risks	Targets to be Achieved	Mitigation Measures & Monitoring	Responsibility
I.	**Construction Stage**			
1.	**Physical Environment**			
i)	**Soil and Land** - The primary bio-physical impacts associated with the construction of the project are the change in land use and vegetation loss, which may cause soil erosion.	- Prevention from disruption of soil and degradation of land (if any) of project area.	- There will not be use of any chemical (s) in the industry/factory during the construction phase. However, the disruption of soil stability will be minimized as much as possible and reclaim the area through back filling, compaction and leveling at the best possible extent.	Contractor/ Project Proponent (PP)
ii)	**Air, Climate and Noise** - Dust emissions likely to be occurred during the excavation of top soil. - Then use of vehicles during the construction phase can generate gaseous emissions, dust and noise. - Dispersion of particles from stockpiles during high velocity wind. - Noise may cause by machinery (used for construction) and vehicles used for transportation of construction equipment.	- Control of noise through fix the timing & working hours as well as selection of appropriate equipment. - Compliance with PEQS to control air pollution.	- There will be no/minor air, climate and noise issues in the industry/factory. - All vehicles transporting construction material shall be covered with Tarpaulin to avoid fugitive dust during transportation. - Speed limits on unpaved surfaces on site to minimize dust/air pollution. - Watering/sprinkling of water in all active construction areas as per requirement. - Cover all trucks hauling soil, sand and other loose materials, soil stabilizers on all unpaved access roads and staging areas at construction sites. - Fast growing trees will be planted around the project area to act as a wind breaker to reduce the particulate matter. - Covering or use of wind sheets around the stockpiles to avoid air pollution through dispersion. - Control noise through fixing of timing & working hours and use less noisy equipment. - Pressure horns may not be used. - Use of acoustic enclosures (hood and shrouds) on generator. - Proper maintenance of vehicles and construction equipment. - The construction materials will be properly maintained and barricades to be provided around the site for reducing the noise	Contractor/ Project Proponent

Sr. #	Potential Impacts/ Risks	Targets to be Achieved	Mitigation Measures & Monitoring	Responsibility
			levels. - Minimize/avoid unnecessary use of pneumatic drills and other noisy machinery. - The personal protective equipment's (PPEs) to be provided to the workforce and its usage should be mandatory.	
iii)	**Water Resources** - Run-off water from construction area will disrupt water quality. - Drainage of wastewater on ground can contaminate the soil and groundwater. - Open sewerage water disposal on land may contaminate groundwater.	- Control of groundwater/ and or surface water pollution during the construction activities (if any).	- Septic tanks will need to be constructed and cemented to prevent the groundwater contamination. - Proper disposal of waste material on dumping sites/designated area to avoid leachate generation and contamination of groundwater/ surface water. - The quality of water (waste water discharged if any) will need to be analyzed on quarterly basis.	Contractor/ Project Proponent
2.	**Biological**			
i)	**Flora** - During the pre-construction stage, the activities such as installation of construction camps, construction of temporary facilities & mobility of construction staff may damage the local vegetation/trees. - As the heavy machinery may be moved, which may require significant space due to which available vegetation (if any) may need to be removed. - This impact may be site-specific/ and or permanent; and having a medium level impacts/risks which need to be considered prior to commencement of construction works.	- Prevention from the impacts/ risks in the project area.	- The mobility of machinery/ vehicles and construction of temporary facilities should be properly planned and well designed to avoid impacts/risks (if any). - An alternate routes and access to roads may need to be designated where no/ or minimal impacts/risks are expected.	Contractor/ Project Proponent
ii)	**Fauna** - In general, there will be no/ or minimal impacts/risks on fauna (animals & birds) as a result of the implementation of the project construction activities.	- Prevention of animals to get harmed (if any) by constructional activities.	- Wildlife movements and routes must be considered during construction activities (if any) and should be avoided to the possible extent. - Special measures need to be adopted to minimize impacts on the animals and birds in the area such	Contractor/ Project Proponent

Sr. #	Potential Impacts/ Risks	Targets to be Achieved	Mitigation Measures & Monitoring	Responsibility
			as minimizing noise generation activities. - Staff working/workers at the project site should not be allowed for any sort of hunting of birds. - Organic waste material produced from the construction camps (if required) should properly dispose-off to avoid generation of insects, rodents and scavengers.	
iii)	**Wildlife** - The noise and vibrations will need to be avoided/ or minimized by adopting the appropriate timing for carrying out such construction activities in the project area.	- No wildlife exists in the proposed project area.	- In general, there is no wildlife observed in the proposed project site area. However, the noise and vibrations produced during construction activities may cause wildlife (if any) to migrate out of the area.	Contractor/ Project Proponent
3.	**Social Aspect**			
i)	**Nearby Community Residents** - The nearby community may react negatively, if their local skilled/ unskilled labour is not involved in the construction activities and all outsiders are employed.	- Providing labour to the residents of the area to raise employment.	- HSE Unit will be formed in operational phase for avoiding health and social issues. - The project staff, workers/ laborers should not interfere in the local community related matters. - A certain proportion, at-least one-third of the total unskilled labour should be employed by the contractor from local population, so that their livelihood/ income could be supplemented. - The timing of construction machinery and traffic plan will be adjusted in a way that it will not disturb the routine activities of the local residents.	Contractor/ Project Proponent
ii)	**Human Health** - The health of project staff/ workers and adjacent community may be affected if proper measures are not adopted during construction activities to avoid health hazards.	- Prevention of any possibility of work site accident impact on worker's health.	- Appropriate technologies including careful designs and construction activities should be used to minimize the potential hazards. - Security fences and barriers around the project area should be placed to avoid accidents/ and other interruptions by the nearby residents especially children. - Proper placement of safety signs and boards	Contractor/ Project Proponent

Sr. #	Potential Impacts/ Risks	Targets to be Achieved	Mitigation Measures & Monitoring	Responsibility
			wherever needed.	
iii)	**Health and Safety of Workers** - Protection of health and safety of worker is very essential under the project. - The potential impact on health and safety of the workers due to noise and dust may cause respiratory diseases among the workers.	- Prevention of any possibility of work site accident impact on worker's health.	- HSE officers will be hiring before operational phase. - Proper training of workers on how to respond in case of any accidents or safety emergency and approach to nearby health care/ medical unit. - Safety awareness should be provided to all staff. - Workers should also be provided with all safety necessary Personal Protective Equipment's (PPE) like helmets, gloves, long work boots, ear muffles, masks, first aid/ medical kit and safety glasses and encourage them to wear it during work for their safety and protection. - Provision of first-aid facility should be available on site to react immediately in case of any accidents.	Contractor/ Project Proponent
iv)	**Solid waste generation** - Different type of waste is likely to be generated during the construction phase of the proposed Project. The municipal waste will be in the form of food, cans, paper and wastewater from construction camps toilets and washing yards. Construction waste will include excavated soil, sand, gravel, rocks, asphalt, pieces of concrete, bricks, wood, metal pieces and electrical wires. - Insecure and unhygienic disposal of the solid wastes particularly garbage and trash may cause degradation of soil and land. Insecurely disposed off heaps of wastes containing kitchen garbage and food waste can serve as breeding grounds for the disease spreading vectors and rodents. Throwing away of solid wastes into water channels and the	- Proper & safe handling and disposal of construction related waste. - Compliance with applicable waste management rules for waste disposal. - Implementation of waste Management plan.	- Solid Waste generated during construction and camp sites will be safely disposed in demarcated waste disposal sites and the contractor will provide a proper waste management plan. - Construction workers and supervisory staff should be encouraged and educated to practice waste minimization, reuse and recycling to reduce quantity of the waste; proper labeling of containers, including the identification and quantity of the contents, hazard contact information, etc. - Waste disposal plan must be reviewed during the entire construction phase in the light of changing weather conditions - Construction waste such as waste wood can be recovered and recycled into wood for new building projects, and cement, bricks, and plaster can be crushed and reused in other construction and building projects.	Contractor/ Project Proponent

Sr. #	Potential Impacts/ Risks	Targets to be Achieved	Mitigation Measures & Monitoring	Responsibility
	wastewater network can result into choking of the latter. These impacts are temporary and minor negative in nature.		For detail, Waste Management Plan is Attached as Annex 5.3.	
II.	**Operational Stage**			
1.	**Physical Aspect**			
i)	**Air** – No as such pollutants will be generated during the operation phase of the project as no combustion activities are involved in operation phase of the project.	– Compliance with prescribed PEQS to control air pollution.	- No mitigation measure will be required in case of no impact on air.	Project Proponent (PP)
ii)	**Noise Pollution** – During the operation phase of the project, no noise can be generated.	– No noise pollution	- No mitigation measure will be required in case of no impact on noise.	Project Proponent (PP)
iii)	**Soil** – There will be no impacts on soil at operational stage of project.	– No impact on soil	- No mitigation measure will be required in case of no impact on soil.	Project Proponent (PP)
iv)	**Water Resources** – There will be no as such water pollution due to no use of water in any process of factory.	– Control of groundwater or surface water pollution from operational activities.	- There is no water pollution during operational stage of the process. - Preventative Maintenance and Monitoring Program - Awareness training to be provided to all personnel regarding responsibilities to the environment	Project Proponent (PP)
2.	- Biological aspect			
i)	**Flora and Fauna** – No impact on flora and fauna will be there due to the proposed project.	– No flora and fauna	- No mitigation measure will be required in case of no impact on flora and fauna. - Approximately 400 numbers of trees shall be planted to enhance the landscape of the project area. Plantation at available spaces may be carried out. For detail, Tree Plantation Plan is Attached as Annex 5.1.	Project Proponent (PP)
3.	**Social aspect**			
i)	**Impact on local community, health and safety of workers.** - There will be no/ minor impacts/risks on locals/or nearby local community, as well as health & safety of the workers/labour during	– Health and Safety of workers and nearby local community.	– Safety signs and boards should be prominently displayed both inside and outside the project site. – Training regarding safety measures should be provided to all operational staff. – Education and training regarding emergency response plan should also	Project Proponent (PP)

Sr. #	Potential Impacts/ Risks	Targets to be Achieved	Mitigation Measures & Monitoring	Responsibility
	the operational activities of the project. – There could be some minor risk of staff getting injured during the operational activities of the project.		be provided to concerned staff. – An Emergency Response Plan (ERP) needs to be in-place to prevent/ or minimize the impacts during emergency situations. – Provision of Personal Protective Equipment (PPEs) to the workers. For detail, please refer to Health, Safety and Environment (HSE) Management Plan Annex 5.2	

6.4 Equipment Maintenance Detail

The equipment maintenance will be carried out keeping in view the equipment maintenance plan as well as EMMP/EMP. Monitoring program provides the important information that allows for more effective planning and an adaptive response based on the assessment of the effectiveness of mitigation measures. The monitoring of various parameters (i.e. noise, smoke emissions and water quality) will help to determine the extent to which project construction/ operational activities (if any) will cause environmental disturbance.

6.5 Plantation of Trees

Under the project, plantation of trees (about 400) may be carried out for the reduction of noise, odor and air pollution. Plantation of trees may be around the project boundary wall, road side as well as other appropriate locations inside the factory. The tentative cost for the plantation is about Rs. 0.3 Million. Detailed Tree Plantation Plan is attached as Annex 5.1.

6.6 Project Impact Evaluation Matrix

Keeping in view the type and magnitude of project impacts/risks relating to the physical, biological and social aspects of the project, an impact matrix has been developed and presented in Table 6.3.

The project impact matrix has shown that on overall basis, the project is highly beneficial with low adverse impact/risks in the project area. Accordingly, to address the environmental and social impacts/ risk, an Environmental Management and Monitoring Plan (EMMP) has been prepared and presented in Table 6.2.

Table 6.3: Project Impact Evaluation Matrix

Component	Physical Environment											Biological Environment										Social Environment										
	Soils (Erosion/stability)	Rocks	Energy/Mineral Resources	Waterlogging	Salinity	Drainage	Surface Water	Groundwater	Air Quality	Noise		Aquatic Ecosystem	Wetland Ecosystem	Trees	Endangered Species	Migratory Species	Crops	Birds and Animals	Plant Pests	Disease Vectors		Public/ Workers Health & Safety	Land Use	Flow of Road Traffic	Employment	Structures and Infrastructure	Temporary Disruption of People	Permanent Disruption of People	Cultural & Religious Values	Tourism and Recreation	Living Standards	Overall Ranking
I. Construction Phase																																
Land Acquisition	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-		-	LA	-	LA	-	LA	-	-	-	-	
Excavation/ Land Removal	LA	-	-	-	-	-	-	-	MA	MA		-	-	-	-	-	-	LA	-	-		MA	LA	LA	HB	-	-	-	-	-	-	
Construction Machinery Use	LA	-	-	-	-	-	-	-	LA	LA		-	-	-	-	-	-	LA	-	-		LA	-	LA	MB	-	LA	-	-	-	-	
Construction Camp	LA	-	-	-	-	-	-	LA	-	-		-	-	-	-	-	-	LA	-	LA		-	-	-	MB	-	LA	-	-	-	LB	
Overall	LA	-	-	-	-	-	-	-	MA	LA		-	-	-	-	-	MA	LA	-	LA		LA	LA	LA	MB	-	LA	-	-	-	-	LA
II. Operational Phase																																
Generator / Transformer operation	-	-	-	-	-	-	-	-	MA	MA		-	-	-	-	-	-	-	-	-		LA	HB	-	HB	HB	-	-	-	-	HB	
Chamber operation	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-		-	-	-	HB	HB	-	-	-	-	HB	
Overall	-	-	-	-	-	-	-	-	MA	MA		-	-	-	-	-	-	-	-	-		LA	H B	-	HB	HB	-	-	-	-	HB	HB

Note:

Non-significant/ not applicable:			
Low Adverse:	LA	Low Beneficial:	LB
Medium Adverse:	MA	Medium Beneficial:	MB
High Adverse:	HA	High Beneficial:	HB

6.7 Overlays

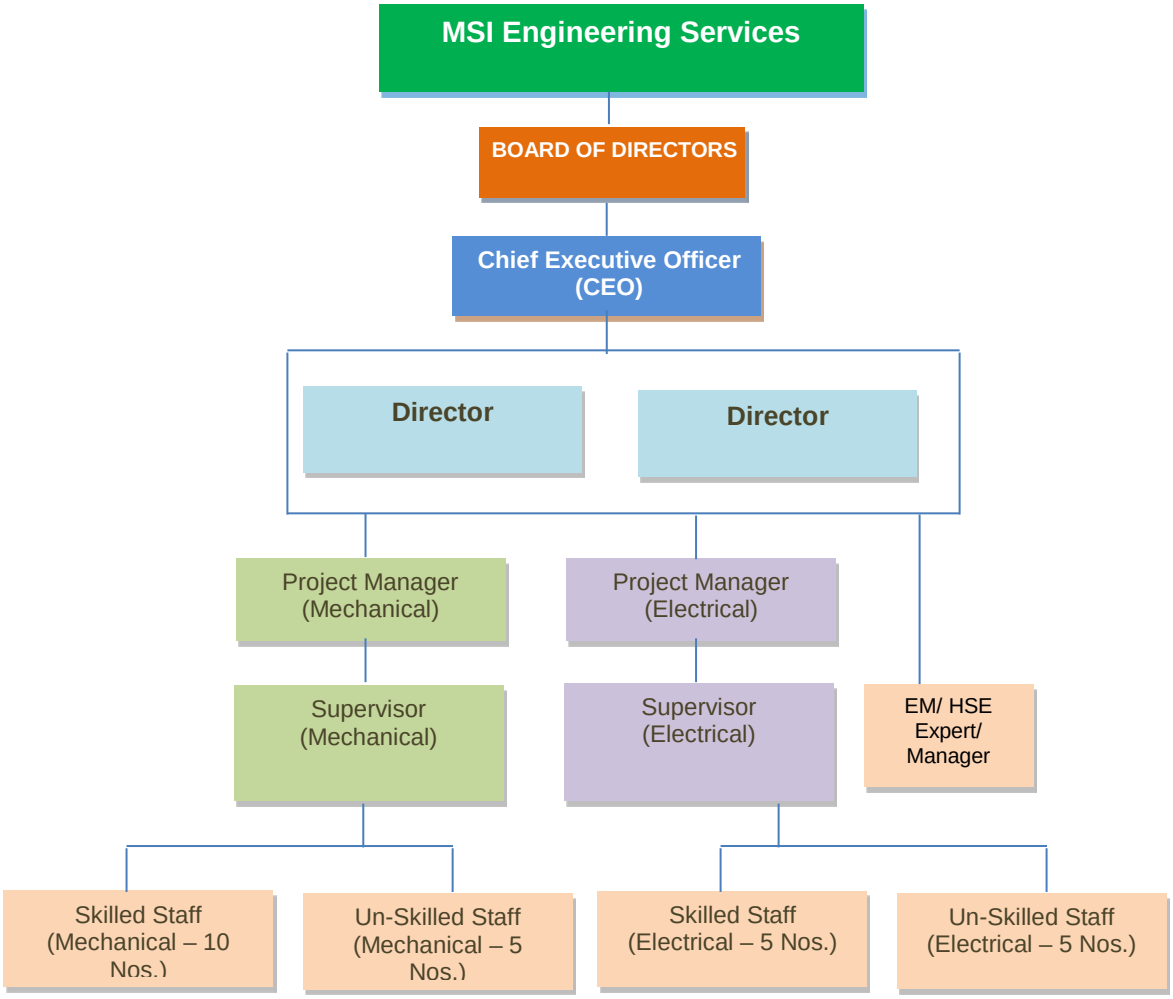
In order to identify spatial based impacts, overlays were used. An overlay is based on a set of transparent maps, each of which represents the spatial distribution of environmental characteristics. Information for an array of variables such as land use, infrastructure, vegetation etc. was collected for the standard geographical units within the project's area of influence (AoI). The characterize the Project area's land use, physical, social, ecological and other relevant parameters related to proposed intervention. The overlays maps used in this EIA study for the quantification of the landuse categories referred in section 4.

6.8 Organizational Capacity & Competency

Project Proponent will be responsible for periodic environmental monitoring (quarterly/ or semi-annually) by engaging environment/ health & safety expert and also ensure the monitoring of EMP and EMMP implementation in the field during the preparation of monitoring reports and to be submitted to the Project Proponent. Moreover, the representative of the RUDA and EPA may monitor the project construction as well as operational activities at the project site.

The hierarchy and organizational chart of the project proponent (MSI Engineering Services) is illustrated in Figure 6.1.

Figure 6.1: Organizational Structure of the Project Proponent



6.9 Training Schedules

The training of the project staff (both skilled and unskilled) is necessary to avoid any impacts/risks on the environment both during the construction and operational stage of the project. The training will need to cover the occupational health and safety, First-Aid-Kit, personal protective equipment's (PPEs) and other potential risks mitigation measures.

An environmental and social training and technical assistance (TA) program is to be carried out before the implementation of the proposed project as it strengthens the institutional capacity required to manage the environmental and social issues. Contractor's environmental awareness and appropriate knowledge of environmental protection is critical to the successful implementation of the EMMP because without appropriate environmental awareness, knowledge, and skills required for the implementation of the mitigation measures, it would be difficult for the Contractor(s) workforce to implement effective environmental protection measures. Table 6.4 provides brief detail of the capacity building and training plan for the proposed project. The objective of the TA will be as follows:

- To help in establishment of appropriate systems;
- To train senior MSI staff, Contractor workers and
- MSI employees, responsible for managing environment and social tasks and planning during construction and post construction phase; and
- Training courses on specialized areas such as air, water and noise pollution monitoring.

Table 6.4: Training & Capacity Building Programs

Provided by	Topics/ Contents	Trainees	Duration
Environmental Monitoring/ HSE expert	Short Seminars and Courses on: • Environmental laws and • regulations; • Environmental Sustainability; and • Environmental Management and Monitoring Plan (EMMP)	MSI Staff and Contractor Workers	1 Day
Environmental Monitoring/ HSE expert in Social Management and Monitoring, and Occupational Health and Safety	Short Seminars and Courses on: • Occupational Health and Safety • Plan (OHS); • Basic First Aid; • Occupational and Community • Health and Safety Management; • Labour Accommodation; • Traffic Management; • COVID-19 Protection and Control; • Use and Importance of Personal • Protective Equipment's (PPEs); and • Fire Safety and Emergency Response Measures.	MSI Staff and Contractor Workers	1 Day
Environmental Monitoring/ HSE expert in Environmental and Social Management and Monitoring	Short Seminars and Courses on: • Environmental Management Plan (EMP); • Environment Health and Safety Management;	Operation and Maintenance Staff of MSI	1 Day

Provided by	Topics/ Contents	Trainees	Duration
	• Occupational Health and Safety; • Basic First Aid; • Waste Management; • Fire Safety and Emergency Response Measures; • Electrical Safety; and • Use and Importance of Personal Protective Equipment's (PPEs)		

6.10 Summary of Impacts/Risks and their Mitigation Measures

The project potential impacts/risks (significant/insignificant) were identified that may arise during the construction and operational stage of the proposed project. Accordingly, appropriate mitigations measures were proposed under the EMMP. The potential impacts/risks could be air, soil, water and noise pollution. The air quality of the area may be affected both during the construction and operational stage of the project, although the impact/risks could be insignificant/ minor. The ecology of the area will not be affected as the project area (project corridor of impact) has a plain land and free from any crops.

There will be no concerns/issues associated with the women routine activities during the project implementation. However, some of the local women emphasized that some suitable jobs should be provided to their male members in the project related activities, so that they could be accommodated under the project construction activities as well as during the operation of the project. The project impact matrix has shown that on overall basis, the project ranked as highly beneficial and having low adverse impact/risk.

To address the environmental and social impacts/risks as well as other project associated concerns/issues (if any), the EMP and EMMP has been developed and presented in Section 6 of the report.

6.11 Schedule of Implementation

On the issuance of no objection certificate, there will be commencement of the project construction activities. As per implementation schedule, the project will be completed within a period of 6-8 months.

6.12 Reviewing & Reporting Procedure of EMP/EMMP

The EMP/EMMP will specify the procedures for the review and revision of the EMP/EMMP i.e. tree plantation / reforestation plan, health, safety and environment (HSE) management plan, emergency preparedness and response plan, waste management plan and drinking water supply and sanitation plan during project implementation both construction and operational phase. The site-specific EMP/EMMP will be reviewed by the Contractor to determine if an amendment or revision is warranted:

- At least once every six (6) months or on a seasonal basis;
- As a result of changes in the project or changes in the anticipated environmental effects of the project;
- After corrective actions have been taken in response to an environmental incident;
- After an adaptive management measure has been proposed

- A material revision is one which would be relevant to the question of whether an adverse environmental effect is more likely to occur, or become more adverse, and be significant;
- After a material revision of the EMP is proposed that changes a commitment such as: a reduction or increase of monitoring or reporting requirements; or making a specification less stringent or more stringent.

6.13 Management Plans

Various site-specific management plans will be prepared by Contractor as a part of EMP for the better management and implementation of EMP during all phases of the proposed Project. However, approval of these site-specific plans from RUDA should be sought before start of construction activities. These site-specific plans are listed below but not limited to these:

- Tree Plantation / Reforestation Plan;
- Health, Safety and Environment (HSE) Management Plan;
- Emergency Preparedness and Response Plan;
- Waste Management Plan;
- Drinking Water Supply and Sanitation Plan (Annex 5.5)

6.14 Public Disclosure

M/s MSI will disclose this EIA to all the stakeholders prior to the start of the construction. This report will be made available to the stakeholders at places as designated by the PEPA.. This will ensure the locals to be aware of the Project impacts, its mitigation, responsible staff and mode of implementation.

6.15 Environmental Management and Monitoring Cost

The cost required to effectively implement the mitigation measures is important for the sustainability of the project both during the construction and operation stages. The environmental management/ monitoring cost estimated as Rs. 1.333 million is presented in Table 6.5. The cost items include periodic (semi-annual) environmental monitoring reports by an environment expert.

Table 6.5: Environmental Management and Monitoring Cost

Description	Quantity	Unit Rate (Rs.)	Cost (Rs. M.)	Remarks
Environmental Monitoring/ HSE expert	1 person	Rs. 200,000 for one report	0.400	Periodic (i.e. quarterly/semi-annual) environmental monitoring reports
Health and Safety of Workers	30 employees	Lum-sump	0.603	For 30 employees for the provision of dust masks, safety shoes, gloves, first aid box, ear plugs, safety helmets and safety jackets (Hi Vis) and provision of dust bins, warning tap, safety cones and safety sign boards.
Cost of Environmental and Social training	30 employees	Lum-sump	0.030	Short Seminars, Courses, Trainings and Lectures on Environment, Social and Occupational, Health and Safety constituents and components (Rs. 15,000/- per session twice a year during construction phase)
Planation of 400 trees	400 trees	Lum-sump	0.300	Not less than 400 trees should be planted (including fruit trees) to enhance the landscape of the proposed project area. Plantation at available spaces may be carried out .
Total			1.333	

7. PARTICIPATION AND CONSULTATIONS WITH STAKEHOLDERS

7.1 General

In accordance with the EPA and environmental guidelines, the participation and consultations were carried out with the project beneficiaries, local community/general public and other stakeholders. The outcomes of both public and stakeholders consultations are discussed in this section of the report.

Consultations were carried out keeping in view the following:

- Sharing of information with stakeholders/general public regarding the proposed project and project activities and assess expected impacts on the physical, biological and social conditions of the project area.
- Understanding the stakeholder's concerns regarding the various aspects of the project, including the project location/ site, technology, existing situation, construction activities and potential impacts of the project during construction and operational phase of the project.

7.2 Objectives of Stakeholders Consultations

The public/stakeholders plays a vital role in studying stakeholders' perspectives regarding the project and henceforth the successful implementation and execution of the proposed project. Public involvement is a compulsory feature of environmental impact assessment (EIA), which leads to improve and acceptable decision-making during the project implementation. The primary objective of the stakeholders' consultations is to learn and know the apprehensions, concerns, and opinions of the key stakeholders over environmental implications of the project activities from public perception. The consultation sessions also served as a source of firsthand information about the users and the beneficiaries' expectations from the proposed project. Discussions with the stakeholders and recording their concerns at appropriate stages of the project would help to tailor the project in-line with stakeholders' aspirations and so increases the likelihood for public acceptance of the project and its subcomponents. It also helps to develop and maintain communication links between the project proponents and stakeholders, providing opportunities to the public to incorporate in project design in a positive manner. This ensures that the views and concerns of the stakeholders are incorporated into the project design and implementation with the objectives of reducing or offsetting negative impacts and enhancing benefits of the proposed project.

7.3 Responsibility for Consultations

Stakeholders' consultations for the proposed project play a crucial role in development and also assist in quantifying the role of different stakeholders involved. The stakeholders' consultations were carried out with the project beneficiaries, local community/general public and other stakeholders by project consultant during the preparation of EIA report. Thus, both primary and secondary stakeholders were considered during the process of consultations/consultation meetings. The stakeholders' feedback has been presented through the stakeholders' feedback matrix and proposed mitigation measures.

7.4 Stakeholders' Consultations Feedback

The survey team conducted six consultations/FGDs consisting of 24 participants that included 17 men and 7 women belonging to the villages/ local communities located nearby the project area.

During the consultative meetings with both primary and secondary stakeholders, the following major concerns were indicated relating to the construction and operational phase of the project:

- It is preferred that the project operations should be in accordance with beneficiaries' requirements;
- Beneficial factors and job opportunities to the local people may be considered for both construction and operational phase of the project;
- Careful materials transport need to be ensured during the construction and operational stage of the project;
- Appropriate management of water, wastewater and solid waste during construction and operational phases may need to be ensured;
- Precautionary measures may need to be followed in case of natural hazards (if any);
- All possible efforts may need to be made to minimize the traffic mobility/issues associated with the project related activities.

The major feedback/ concerns highlighted during the stakeholders consultations were categorized with respect to design, construction and operational phase of the project are as under:

I. Design Stage

- Project should be designed as to minimize the environmental and social impacts/risks on adjoining settlements.
- Storage of material should be carried out in the designated area to avoid any impact/risk on the surrounding community.

II. Construction Stage

- Proper covering of trucks and regular sprinkling of water on land may need to be ensured to avoid or minimize dust particulates emissions.
- It is preferred that the job opportunities should be provided to the local persons;
- Workers should be guided by contractor to control/limit their movement/mobility outside the project area.
- Provision of First-Aid-kits and PPEs to combat any emergency situation.
- Dumping of waste material at nearby/adjacent to the project site area may need to be avoided.

III. Operational Stage

- Proper and regular maintenance of machinery needs to be carried out.
- Plantation of trees should be encouraged in the available space/land of project area.
- Fuel should be stored properly to avoid any adverse environmental impacts/risks.
- It is preferred that the job opportunities (skilled & unskilled) should be provided to the local persons;

- Provision of First-Aid-Kits and fire extinguishers to combat any emergency as well as health & safety situation.

List of consultations (participants) is given in Table 7.1, while the details are given in Annex 7.1 and signed copy of the participants including women is presented in Annex 7.2. The pictorial presentation of Stakeholders' consultations events are presented in a separate section of this EIA report.

Table 7.1: List of Public Consultations

PC. No.	Date	Location/ Venue	Category of Participant	No of Participants	Name of Participants
1	28-02-2024	MSI Factory, Mehmood Booti, Tehsil Shalimar, District-Lahore.	Project Beneficiaries	3	- Mr. Amir Baig - Mr. Muhammad Saleem - Mr. Abu Bakar
2	19-03-2024	Dera Mian Miraj, Mehmood Booti, Tehsil Shalimar, District-Lahore.	local community/ general public	4	- Mr. Zubair S/o Fazal Rahim - Mr. Rafaqat S/o Makhan - Mr. Ali Ahmed S/o Muhammad Yasin - Mr. Ali Raza S/o Muhammad Naeem
3	20-03-2024	Mehmood Booti, Tehsil Shalimar, District Lahore	local community/ general public	6	- Mr. Muhammad Younas S/o M. Arif - Mr. Abdul Majeed S/o NabiBukhsh - Mr. Ghulam Murtaza S/o Mehtab Din - Mr. M. Azeem S/o M. Zameer - Mr. Babar Hussain S/o M. Saleem - Mr. M. Ashfaq S/o Abdul Rasheed
4	20-03-2024	Sagian, Tehsil Baghbanpura, District Lahore	local community/ general public	4	- Mr. M. Dilawar S/o Ashraf Ali - Mr. Dilshad S/o Dilbar Hussain - Mr. Abdul Sattar S/o Noor M. - Mr. Sadiq Ali S/o Allah Ditta
5	20-03-2024	Mehmood Booti, Tehsil Baghbanpura, District Lahore.	local community/ general public	3	- Ms. Naseem W/o Rizwan - Ms. Parveen W/o Mushtaq - Ms. Shamma W/o Afzal
6	20-03-2024	Baba Feroz Darbar, Tehsil Shalimar, District Lahore.	local community/ general public	4	- Ms. Sumaira W/o Gullzar - Ms. Ayesha W/o Ghulam Abbas - Ms. Tayyaba D/o Muhammad Sarwar - Ms. Farah D/o Muhamad Ali

A summary of concerns/feedback and redress strategy by the Project Proponent is presented in Table 7.2.

Table 7.2: Concerns/Feedback and Redress Strategy

Issues/ Concerns	Concerns/ Feedback	Redress Strategy by Project Proponent
Employment Opportunities	Expectations of job opportunities for the locals belonging to the nearby/or adjacent to the project area.	➢ Providing the employment opportunities in the factory will be the priority of the project proponent. ➢ In this context, skilled and or unskilled local labour/workers will be preferred to engage during the project construction and operation phase along with the required training/capacity development.
Training/capacity building	Locals/local community is keen to work for the subject industry if they will provide training and upgrading opportunities to enhance their trade or professional skills.	➢ Installation of training facilities will be carried out for workers of the company as well as up-gradation of the training skills.

Issues/ Concerns	Concerns/ Feedback	Redress Strategy by Project Proponent
Health &safety	Traffic (heavy) mobility/ transportation of material are a main concern because the road is being used by the general public/local community as well as different industries vehicles located at nearby the project area.	➢ Development of Transport Management Plan including traffic safety training. ➢ Traffic advisory signs will be installed along project site and all nearby specific areas.
Local economy and business development	Local service providers are keen to participate in providing services regarding raw material etc. to enhance the associated small businesses activities.	➢ Project proponent has already considered that materials/raw material regarding construction and plant operation activities will be purchased from the local market/ or nearby area.
Environmental Issues	Dust/air and noise pollution produced particularly during the construction activities as well as in operation due to mechanically substandard machines (if any).	➢ Dust/air and noise pollution will be fully monitored as well as controlled by following the mitigation/ precautionary measures suggested in the EMP/EMMP. ➢ Project awareness will be disseminated to the local community/ general public as well as workers/labour to mitigate/and or minimize the dust/air & noise pollution during the construction and operational phase of the project.
Water quality	Water quality and impacts from the wastewater (if any) may have significant impact in the nearby area as local community indicated their concerns.	➢ Under the proposed project, an area will be designated for waste water disposal to avoid such impacts/risks. ➢ In addition, waste water may also be disposed-off at nearby available waste water disposal station/place.

7.5 Consultative Meetings with the Officials

Consultative meetings were held with officials/ representative of different departments, agencies and civil society organization including Ravi Urban Development Authority, Environmental Protection Department, Water and Sanitation Authority and other concerned. The following major points were highlighted:

- In general, the proposed project (construction of factory) is good step towards the development of the area including the jobs opportunities, income generation, small enterprise development and ultimately development of the area.
- Before the commencement of construction activities, the project proponent may ensure to fulfill the formalities/requirements of all concerned departments/agencies including RUDA, Water and Sanitation Authority, Punjab EPA as well as others.
- The project proponent may ensure to designate an area for disposal of waste material/waste water to avoid/ and or minimize the adverse impacts/risks.
- Proper mitigation measured need to be adopted for dust/air & noise pollution generated during the project implementation as well as in operation.
- Appropriate number of trees need to be planted for creating the friendly environment.

- Health and safety of the workforce as well as local community must be ensured by managing the trainings/capacity development as well as providing the ‘First-Aid-Kits’ & ‘PPEs’ during both construction and operation phase of the project (i.e. construction and operation of the factory).

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

The environmental impact assessment (EIA) study was carried out to assess the environmental & social impacts/risks under the implementation of proposed project, i.e. Construction of factory by MSI Engineering Services (Pvt.) Ltd. Located in the jurisdiction of Existing Industrial Zone (Phase-I) of RUDA, Mouza Lakho Dair, Mehmood Booti, Tehsil Shalimar, District Lahore-Punjab.

The project environmental and social impacts/risk assessment was carried out based on field survey including interviews/focus group discussions, transact walk and consultations with the stakeholders. Accordingly the EIA report was prepared in accordance with the national and international guidelines; Pakistan's Environmental Laws/Act (PEPA 1997 & amended in 2012) and Regulations (2022).

As a result of the implementation of the proposed project, the potential impacts/risks or issues identified were minor in nature and the extent of impacts/risks is insignificant. The impacts/risks (insignificant) may arise during the construction and operational stage of the proposed project. The potential impacts/risks could be air, soil, water and noise pollution. The air quality of the area may be affected both during the construction and operational stage of the project, although the impact/risks could be insignificant/ minor. The ecology of the area will not be affected as the project area (project corridor of impact) has a plain land. No endangered or threatened species found in the project area. The project impact matrix has shown that on overall basis, the project ranked as highly beneficial and having low adverse impacts/risks.

8.2 Recommendations

The following recommendations are forwarded:

- The project potential impacts/risks will need to be mitigated by adopting all suggested technical/ engineering best practices and measures as reflected in the EMP.

- All parameters especially noise, air, water will need to be remained within the permissible limit of NEQS as reflected in section 4.

- All types of storage including fuels and septic tanks for the sewage waste should be cemented to prevent the percolation of contaminants.

- In addition to above, there would be temporary impact of dust pollution during construction stage, so that sprinkling of water on regular basis especially during dry climatic conditions may need to be continued.

- On the completion of project construction activities, the proponent will need to submit the completion report to the Environmental Protection Agency as well as RUDA.

- On the commencement of project operation (business), the proponent will need to submit an annual report summarizing the operational performance of the project in compliance with the environmental management plan (EMP) including the measures

and procedures taken to manage or mitigate the environmental impacts/risks (if any) for the project, including monitoring, reporting and auditing.

- Periodic internal monitoring/auditing needs to be carried out to ensure proper implementation of EMMP/**EMP**.
- To address the unanticipated environmental and social impacts/risks as well as other project related concerns (if any), appropriate mitigations measures need to be followed as proposed in the Environmental Management Plan.

PHOTOLOG

PICTORIAL PRESENTATION OF SELECTED EVENTS

A view of Main Gate of Existing Industrial Zone of RUDA at Mehmood Booti.

A view of Consultation meeting with the Proponent MSI Engineering Services at Project Site.

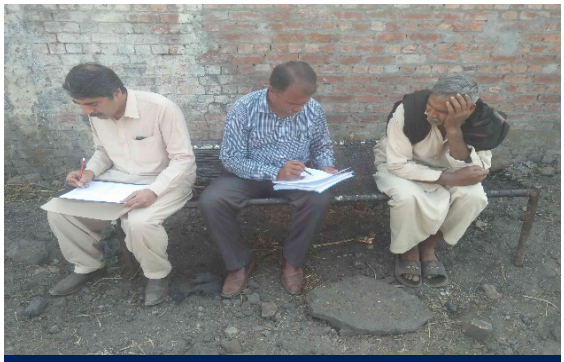
A view of the Project site of MSI Engineering Services at Mehmood Booti

A view of Consultation meeting with project management (MSI Engineering Services).

An outer view of the proposed factory boundary wall of MSI Engineering Services at Mehmood Booti

A view of the Boundary wall of proposed factory of MSI Engineering Services

Pictorial Presentation of Selected Events



A view of meeting with the local community at Mehmood Booti.

A view of Consultation meeting with local community/ farming labour at outside of the project site, (Dera Mian Dewar).

A view of Consultation meeting with local community (females) at Mouza Lakho Dair, Mehmood Booti.

A view of Consultation meeting with local community adjacent to the project area at Mehmood Booti.

A view of Consultation meeting with local community at Saghian.

A view of *"Shrine of Dhan Peer"* at Saghian nearby the project area.

Photographs of Environmental Monitoring

A view of vegetation outside the project area

A view of environmental conditions adjacent to the project site.

Consultation meeting with local community at nearby the project area.

A view of project site prior to commencement of the construction activities.

A view of environmental conditions adjacent to the project site.

A view of survey team collecting the desired information

ANNEXES

REFERENCES

- GIS-based Spatio-Temporal and Geostatistical Analysis of Groundwater Parameters of Lahore Region Pakistan and their Source Characterization. https://assets.researchsquare.com/files/rs431857/v1_covered.pdf?c=1631863392
- Hydrochemistry modeling: evaluation of groundwater quality deterioration due to anthropogenic activities in Lahore, Pakistan. https://link.springer.com/article/10.1007/s10668-020-00703-3
- Geotechnical characterization and statistical evaluation of all uvial soils of Lahore https://www.researchgate.net/profile/Jahanzaib-Israr/publication/360159791_Geotechnical_characterization_and_statistical_evaluation_of_alluvial_soils_of_Lahore/links/632b49110a708521500f5891/Geotechnical-characterization-and-statistical-evaluation-of-alluvial-soils-of-Lahore.pdf
- Geographical Boundaries of Lahore https://lahore.punjab.gov.pk/constituencies
- “Lahore”.https://worldpopulationreview.com/world-cities/lahore-population
- Historical Weather for data on Humidity, Temperature, Rainfall, Visibility and Wind Direction.

Annex 2.1: Pakistan Waste water Standards

Sr. No.	Items	Standard Value
1	Temperature Difference	40°C
2	pH value (acidity/basicity)	6-10 pH
3	5- days Biochemical Oxygen Demand (BOD) at 20 c	80 mg/L
4	Chemical oxygen Demand (COD)	150 mg/L
5	Total Suspended Solids	150
6	Total Dissolve Solids	3500 mg/L
7	Grease and Oil	10mg/L
8	Phenolic Compounds (as Phenol)	0.1mg/l
9	Chlorides (as Cl)	1000 mg/L
10	Fluoride (as F)	20mg/L
11	Cyanide (as CN)	2mg/L
12	An ionic detergents	20mg/L
13	Sulphate SO4	600mg/L
14	Sulphide (S)	1.0mg/L
15	Ammonia (NH3)	40mg/L
16	Pesticides, herbicides, fungicides and insecticides	0.15mg/L
17	Cadmium	0.1mg/L
18	Chromium	1.0mg/L
19	Copper	1.0mg/L
20	Lead	0.5mg/L
21	Mercury	0.01mg/L
22	Selenium	0.5mg/L
23	Nikel	1.0mg/L
24	Silver	1.0mg/L
25	Total toxic metals	2.0mg/L
26	Zinc	5.0mg/L
27	Arsenic	1.0mg/L
28	Barium	1.5mg/L
29	Iron	2.0mg/L
30	Manganese	1.5mg/L
31	Boron	6.0mg/L
32	Chlorine	1.0mg/L

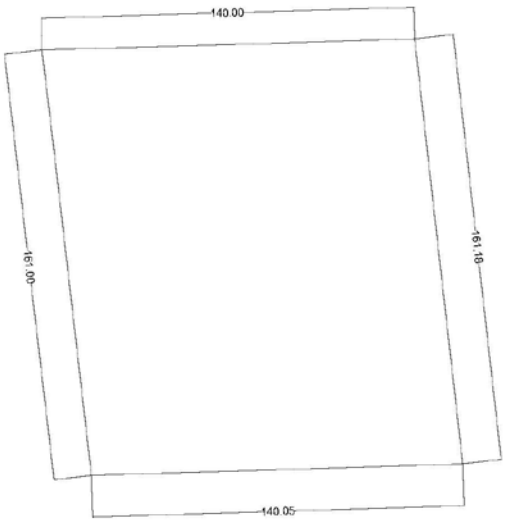
Annex 2.2: National Environmental Quality Standards for Ambient Air

Pollutants	Time-weighted average	Concentration in Ambient Air		Method of measurement
		Effective from 1st January 2009	Effective from 1st January 2012	
Sulphur Dioxide (SO_2)	Annual Average*	80 µg/m³	80 µg/m³	-Ultraviolet Fluorescence method
	24 hours**	120 µg/m³	120 µg/m³	
Oxides of Nitrogen as (NO)	Annual Average*	40 µg/m³	40 µg/m³	- Gas Phase Chemiluminescence
	24 hours**	40 µg/m³	40 µg/m³	
Oxides of Nitrogen as (NO_2)	Annual Average*	40 µg/m³	40 µg/m³	- Gas Phase Chemiluminescence
	24 hours**	80 µg/m³	80 µg/m³	
O_3	1 hour	180 µg/m³	130µg/m³	-Non dispersive UV absorption method
Suspended Particulate Matter (SPM)	Annual Average*	400µg/m³	360µg/m³	- High Volume Sampling, (Average flow rate not less than 1.1 m3/minute).
	24 hours**	550µg/m³	500µg/m³	
Respirable Particulate Matter. PM_{10}	Annual Average*	200µg/m³	120µg/m³	-β Ray absorption method
	24 hours**	250µg/m³	150µg/m³	
Respirable Particulate Matter. $PM_{2.5}$	Annual Average*	25µg/m³	15µg/m³	-β Ray absorption method
	24 hours**	40µg/m³	35µg/m³	
	1 hour	25µg/m³	15µg/m³	
Lead (Pb)	Annual Average*	1.5µg/m³	1 µg/m³	- ASS Method after sampling using EPM 2000 or equivalent Filter paper
	24 hours**	2 µg/m³	1.5µg/m³	
Carbon Monoxide (CO)	8 hours**	5 mg/m³	5 mg/m³	- Non Dispersive Infra Red (NDIR) method
	1 hour	10 mg/m³	10 mg/m³	
*Annual arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.				
** 24 hourly /8 hourly values should be met 98% of the in a year. 2% of the time, it may exceed but not on two consecutive days.				

Annex 3.1: Land Measurement & Revenue Record of MSI Engineering Services

(Produced by an Autodesk Educational Product)

MSI Engineering Factory



1 Marla = 225 Sft

Boundary Area = 22540 Sft

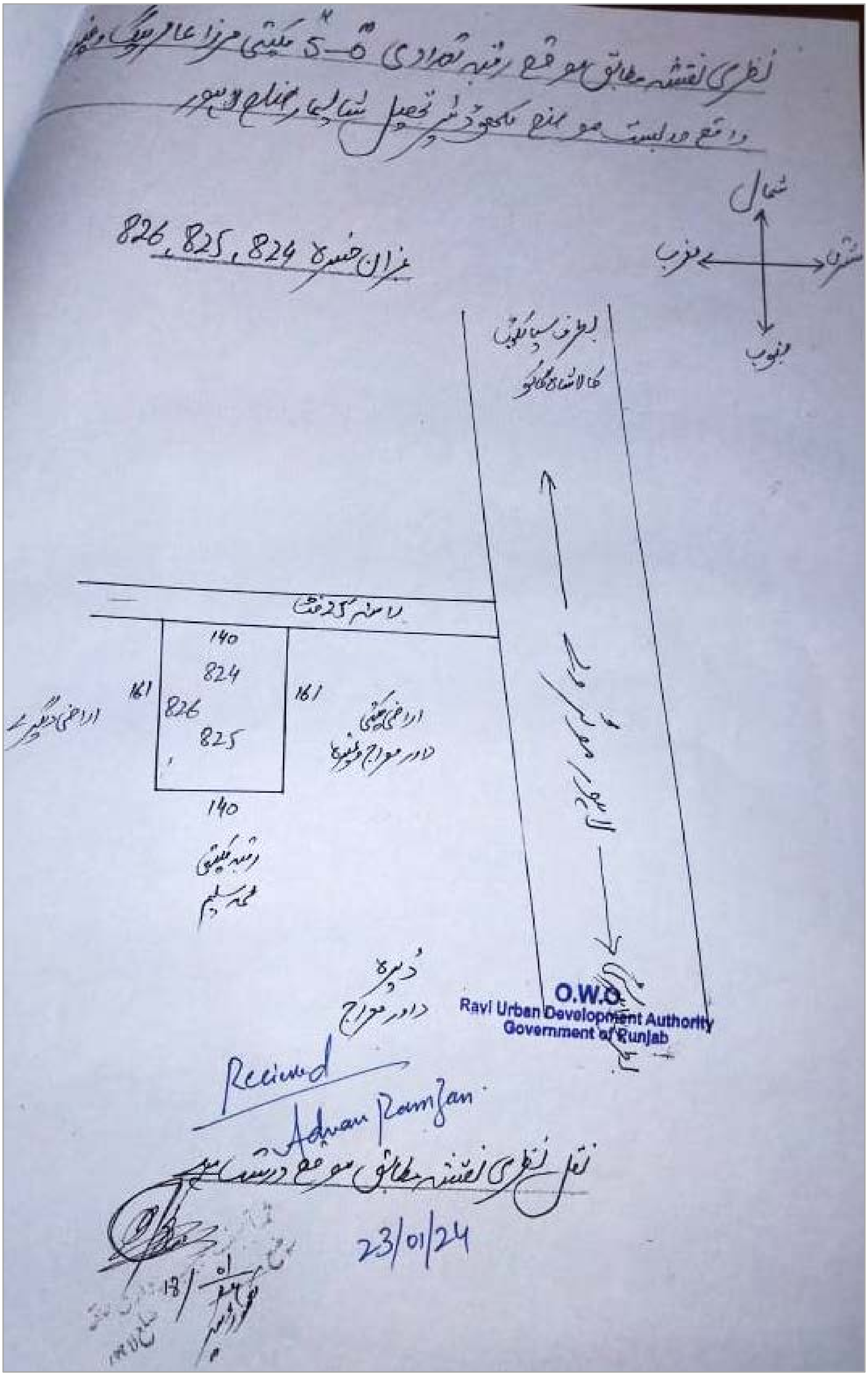
= 100 Marla

= 5 K

Khawat No. 641

Khatooni No. 958, 960, 961

Owner Name
Mirza Amir Baig
Mohd. Saleem
Irfan Ali



826, 825, 824
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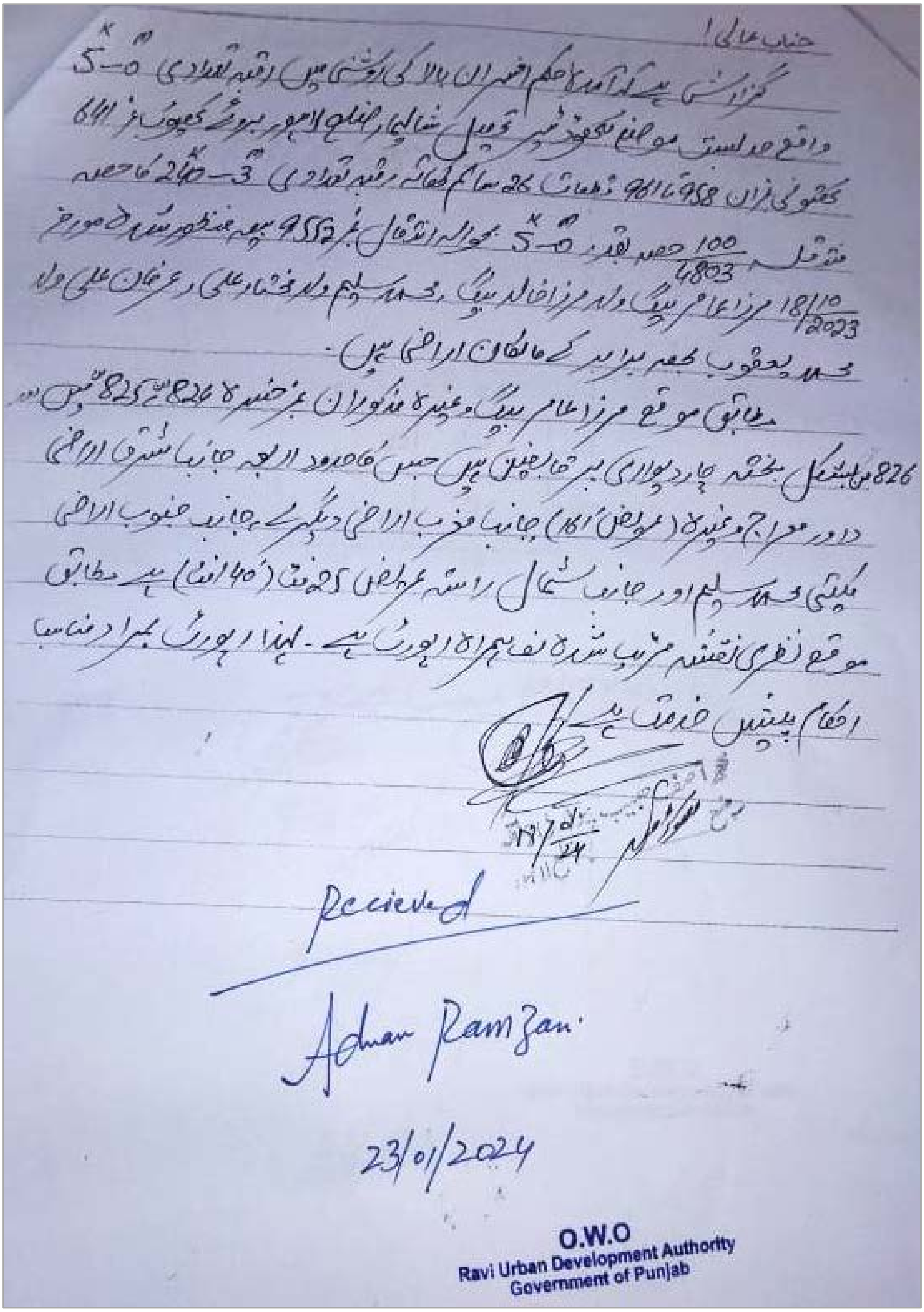
O.W.O
Ravi Urban Development Authority
Government of Punjab
Received
Adnan Ramzan
23/01/24



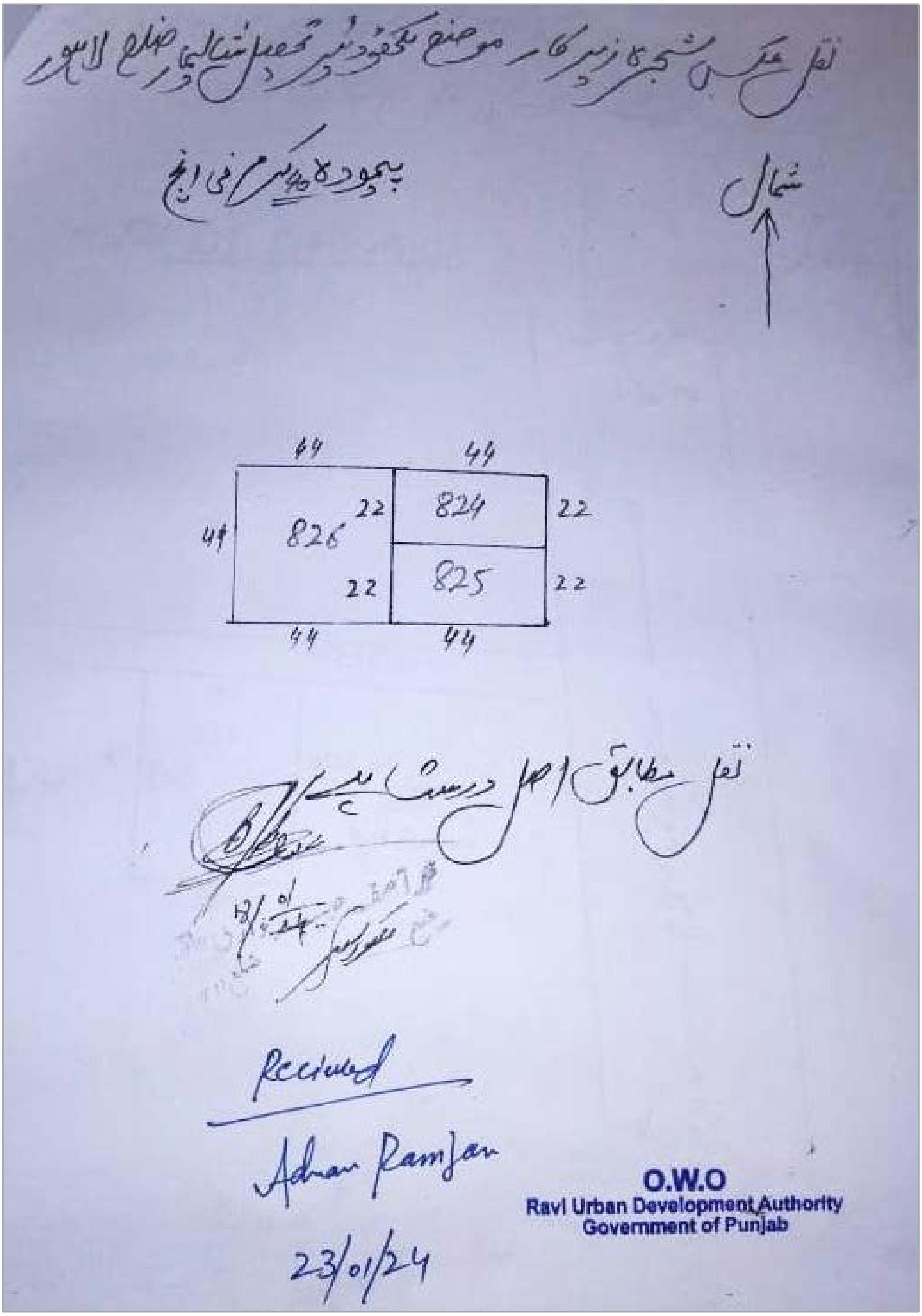
جناب عالی!
گزارش ہے کہ حسب حکم افسران بالا کی روشنی میں رقبہ تعدادی 5-0
واقع حد بست موضع محمود بوٹی تحصیل شالیمار ضلع لاہور بروئے کھیوٹ نمبر 641
کھتونی نمبران 958 تا 961 خسرہ جات 26 سالم کھاتہ رقبہ تعدادی 3-240 کا حصہ
منتقلہ 100/4803 حصہ بقدر 5-0 بحوالہ انتقال نمبر 9552 بیعہ منظور شدہ مورخہ
18/10/2023 مرزا غلام بیگ ولد مرزا فضل بیگ، محمد سلیم ولد مختار علی، عرفان علی ولد
محمد یعقوب بحصہ برابر کے مالکان اراضی ہیں۔
مطابق موقع مرزا غلام بیگ وغیرہ مذکوران بر خسرہ 824 تا 825 و میں
826 میں بشکل بخشہ چار دیواری بر قابض ہیں جس کی حدود اربعہ جانب شرق اراضی
دور معراج وغیرہ (مورخہ ۱۸۱) جانب مغرب اراضی دیگر ہے جانب جنوب اراضی
ملکیتی محمد سلیم اور جانب شمال راستہ عرض 20 فٹ (40 فٹ) ہے مطابق
موقع نظری نقشہ مرتب شدہ نف ہمراہ رپورٹ ہے۔ لہذا رپورٹ ہمراہ نقشہ
احکام پیش خدمت ہے

Recieved

Adnan Ramzan

23/01/2024

O.W.O
Ravi Urban Development Authority
Government of Punjab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نقل مطابق اصل درست ہے
Received
Adnan Ramzan
23/01/24
O.W.O
Ravi Urban Development Authority
Government of Punjab


O.W.O
Ravi Urban Development Auth
Government of Punjab
Received
Adnan Ramjan
23/01/24

The list of major equipment to be used in the proposed project is given in Annex 3.2 as below:

Annex 3.2: List of Equipment to be installed by MSI Engineering Services

Item No.	Equipment/ Items	Description
1	Conveyors are special devices like lifters and turn-over machine	Conveyers are essential in industries for transportation of materials and products from one location to another. Conveyors use will streamline production and reduce the manual labour; and commonly used in assembly lines, warehouses and manufacturing facilities.
2	Switches	Switches are integral components in industries to enable the control and regulation of electrical circuits. These are used in a wide range of applications, including lightning, machinery and electrical distribution.
3	Fuses	Fuses are important safety devices used in electrical systems to protect circuit from over current by melting and breaking the circuit when there is excessive flow of electricity. Fuses help to prevent damage to equipment and reduce the risk of electrical fires.
4	Circuit Breakers	Circuit breakers automatically detect and interrupt electrical faults, such as overloads or short circuits, to protect the circuits and prevent damage to the equipment.
5	Protective Relays	Protective relays monitor electrical systems and detect abnormal conditions such as over current, over voltage or fault currents. They ensure safety and reliability in industries.
6	Magnetic Contractor	These devices are like heavy duty switches and are being used as electromagnet to control the flow of electricity in a circuit. Magnetic contractors are commonly used in applications like motor control, lighting systems and industrial machinery.
7	Instrument Transformers	There are other essential components in electrical power systems. These are used to measure and monitor high voltage and high current levels safely by stepping down the voltage or current to a level that can be accurately measured by instruments like ammeters, voltmeters, and protective relays.
8	Electrical wire pliers	These are handy tools used for gripping, cutting and twisting electrical wires.
9	Conduit bender	It is a tool being used to bend metal conduit pipes, making it easier to route electrical wiring.
10	Insulated screwdrivers	Insulated screwdrivers are essential tools for electrical work having protective cover that help to prevent electrical shocks while tightening and loosening screws.
11	Fish tape	It is a super useful tool for pulling wires through walls, conduits or other tight spaces.
12	Cordless cable and wire cutter	It is a handy tool used to cut through wires with precision.
13	Wire strippers	These are used for removing the insulation from electrical wires. They make it easy to expose the bare wire for connections.
14	Surface measuring equipment: magnetic gauge, radar transmitters, ultrasonic transmitters & range	Surface measuring equipment refers to tools used to measure various characteristics of surfaces. This can include devices like tape measures, rulers, magnetic gauge, radar transmitters and ultrasonic transmitters.
15	Temperature measuring equipment and accessories	Temperature gauge, thermometer, thermocouple, temperature transmitter, temperature controller, temperature switch, thermo-well etc. These are essential tools for determining the temperature of various objects/or environments. Some common examples include

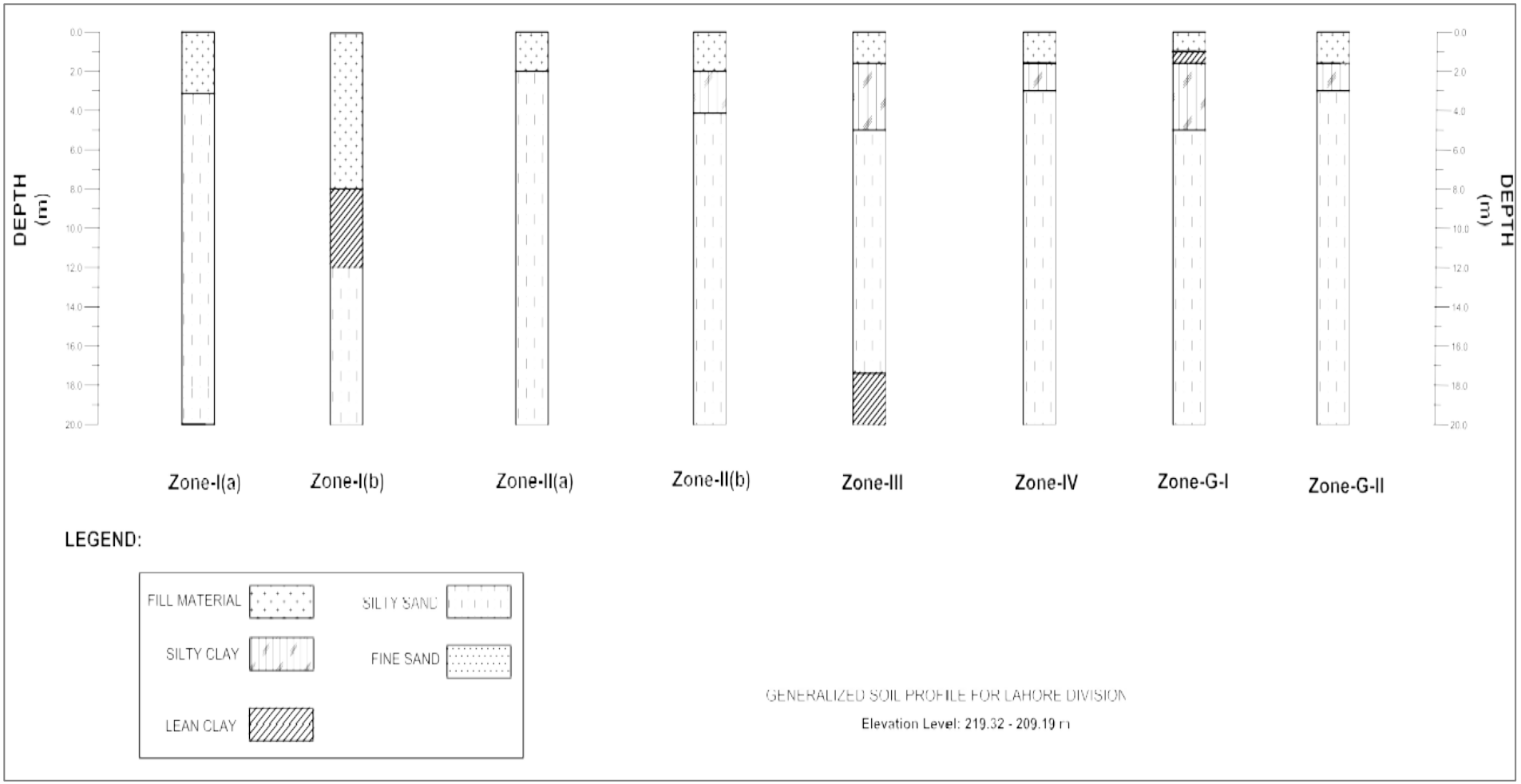
Item No.	Equipment/ Items	Description
		temperature gauge, thermometers and temperature probes.
16	Pressure measuring equipment and accessories	Pressure gauge, pressure transmitter, capillary, seal diaphragm, sniper etc. Pressure measuring equipment's are used to measure the pressure of gases or liquids in various applications. Some common examples include pressure gauges, pressure transmitters, and pressure sensors etc.

Annex 3.3: Process Flow under the Proposed Project

Sr. No.	Process Flow	Description
1	Visual checking and inspection of raw materials	Visual checking and inspection of raw materials will be done in the proposed industry and this will be a simplest and most common method for checking raw materials. This will include the examining the appearance, color, shape, size, and texture of the raw materials, as well as looking for any defects, damages, or contaminants. Visual inspection can helps to identify any obvious problems or deviations from the expected quality.
2	Storage and marking	In this step, storing and marking of raw materials will be done. It is an integral part of any engineering company. All raw materials will be labeled and identified with clear and legible markings. This will include the name of the material, its batch or 'Lot number'. This will help with inventory tracking and identifying potential issues with a specific batch of material. For example, if there is a problem with a specific batch of raw materials, it can be easily traced back to the 'Lot Number' and date of receipt. Different raw materials are segregated and stored in designated areas, or can be considered to flow wrap in order to prevent contamination or confusion. Flammable raw materials are stored in a separate area from those that aren't to minimize the fire risk. Similarly, raw materials that are sensitive to light or moisture should be stored in a separate area. This also makes an easier to locate specific materials when needed.
3	Testing and inspection of materials	In this step, testing and inspection of materials is done in order to maintain the required quality in the product. It is necessary to have a well-defined quality control system to validate the quality of the various materials purchased and produced. Quality control is done through inspections and testing. The method used to test and inspect and may vary by product, but inspections help in verifying that the incoming components and materials meet the requirements of the final product. The methods of component or material testing include: testing physical properties and measurements.
4	Sheet steel marking	This is the next step of process after testing and inspection. Sheet marking is the process used by sheet metal fabricators to mark their parts during production for product identification in the field or for better efficiencies in the industry. The most common method of marking on steel sheet is by coining or stamping the mark into the sheet. Stamping eliminates secondary handling costs and ensures consistent marking. Marking can also be done using permanent ink.
5	Cutting and bending	After sheet marking the step of cutting and bending comes. Depending on the material, cutting can be done with scissors, remel, oxy-acetylene torch or industrial cutting tools. Bending is making the material into a different shape to fit around a corner or to add strength to a sheet of metal so that the edge is rigid.

6	Fabrication with grinding finish	Fabrication is the process of constructing products by combining typically standardized parts using one or more individual processes. For example, steel fabrication is the production of metal structures using a range of processes such as cutting, bending and assembling. Almost all metal fabrication includes a grinding step at some point. Basic grinding creates a smooth finish and may be important for achieving specific looks on the finished metal. Grinding is also the most common way to remove leftover metal, and metal burrs, and blunt unwanted sharp edges. Conversely, grinding is also a common process for sharpening metal and can create an impressive edge when required.
7	Mechanical housing inspection	Mechanical housing inspection includes all panels, housing trays and HVAC (heating, ventilating, and air conditioning). This includes gas piping, ductwork, furnaces, heat pumps or air conditioning condensing units. All of these must be inspected prior to covering them up in the structure of a home, or putting them into service.
8	Sheet steel housing treatment	Sheet metal fabrication is refers to the metal sheet processed into various specifications and shapes that need, which has many applications, such as auto or aerospace sheet metal fabrication. Sheet metal fabrication needs to go through methods and processes such as cutting and blanking, punching, bending and forming, and then splicing and forming, so as to obtain the sheet metal processed products we need.
9	Finish painting stoving	Stoving paint is designed to give excellent finish, gloss and color retention properties to the substrate. The product is specially designed to meet the harsh test specifications of the industry including color retention, gasoline resistance and scratch resistance.
10	Assembly, fitting and wiring	After painting, the parts of the product are assembled and fitted together and wiring is done where necessary.
11	Internal inspection	After painting and assembling, an internal inspection of the products is done. It may also be called an interior inspection or an inner inspection. These inspections are used to determine the condition of the inside of the asset and to identify any defects that may require further testing or maintenance.
12	Client's inspection	After internal inspection, the product is reviewed with detail to the Client for satisfaction.
13	Packing and dispatch marking	The packing process takes place in the warehouse and typically consists of choosing appropriate materials and an appropriate container to pack the products, weighing the package, and labeling it with the relevant invoice or packing slip.
14	Ready for delivery	After all these steps, the final product is ready to be delivered.

Annex 4.1: Linear Subsurface Soil Profile of the Project Area



Annex 4.2: Air Quality Monitoring at various Locations in the Project Area

Sr. No.	Location	Coordinates		Readings (Location)	Ambient Air Quality				Remarks
		Easting (m)	Northing (m)		PM_{10} ($\mu g/m^3$)	Time (AM/PM)	$PM_{2.5}$ ($\mu g/m^3$)	Time (AM/PM)	
1	MSI Engineering Services	E442527.93	N3498483.60	1st Reading (Centre)	116.8	3:00 PM	91.1	3:00 PM	Mud Road
	Dera Mehraj Din (Baba Kala)	E442439.30	N3498750.13	2nd Reading (500m Left)	155.5	2:50 PM	89.8	2:50 PM	Mud Road
	Shahveer Palace	E442555.91	N3498398.49	3rd Reading (500m Right)	109.6	1:18 PM	75.9	1:18 PM	Link Road
2	Lahore-Sialkot Motorway	E442599.68	N3498595.91	1st Reading (Centre)	107.4	2:04 PM	76.2	2:04 PM	Residential/Motorway
	Lahore-Sialkot Motorway	E442455.20	N3498766.67	2nd Reading (500m Left)	87.6	2:25 PM	67.6	2:25 PM	LHR-Sialkot Motorway
	Lahore-Sialkot Motorway	E442686.13	N3498506.76	3rd Reading (500m Right)	113.9	1:50 PM	82.2	1:50 PM	LHR-Sialkot Motorway
3	Sagian Road	E442206.48	N3498385.65	1st Reading (Centre)	186.5	3:30 PM	121.6	3:30 PM	Link Road
	Sagian Road	E442191.47	N3498529.83	2nd Reading (500m Left)	130.2	2:50 PM	108.1	2:50 PM	Link Road Sagian Road
	Sagian Road	E442242.59	N3498065.91	3rd Reading (500m Right)	192.1	3:40 PM	141.2	3:40 PM	Link Road

Annex 4.3: Noise Levels Monitoring at various Locations in the Project Area

Sr. No.	Location	Coordinates		Readings (Location)	Noise Testing (dB)				Remarks
		Easting (m)	Northing (m)		Reading 1	Reading 2	Reading 3	Mean Reading	
1	MSI Engineering Services	E442527.93	N3498485.46	1st Reading (Centre)	50.7	64.3	72.4	62.47	Mud Road
	Dera Mehraj Din (Baba Kala)	E442297.89	N3498621.60	2nd Reading (500m Left)	59.8	65.8	79.7	68.43	Mud Road
	Shahveer Palace	E442554.32	N349804.09	3rd Reading (500m Right)	49.9	59.5	70.3	59.90	Link Road
2	Lahore-Sialkot Motorway	E442607.64	N3498606.95	1st Reading (Centre)	49.7	52.0	58.1	53.27	Residential/Motorway
	Lahore-Sialkot Motorway	E442439.40	N3498768.60	2nd Reading (500m Left)	50.3	57.5	72.2	60.00	LHR-Sialkot Motorway
	Lahore-Sialkot Motorway	E442689.31	N3498510.44	3rd Reading (500m Right)	57.7	61.3	71.6	63.53	LHR-Sialkot Motorway
3	Sagian Road	E442212.76	N3498380.07	1st Reading (Centre)	57.9	63.4	77.5	66.27	Link Road
	Sagian Road	E442186.66	N3498518.77	2nd Reading (500m Left)	62.7	64.2	72.5	66.47	Link Road Sagian Road
	Sagian Road	E442269.36	N3498047.28	3rd Reading (500m Right)	66.5	69.2	79.5	71.73	Link Road

Annex 4.4: Water Quality Monitoring/LAB Tests of the Project Area

GOVERNMENT OF PAKISTAN Sr. No. PCSIR-LLC- 237215
Ministry of Science & Technology
Pakistan Council of Scientific & Industrial Research
Laboratories Complex, Lahore
FEROZEPUR ROAD, LAHORE 54600 - PAKISTAN
Doc# LLC/QM/FF/42 | Date: Jan. 01, 2020 | Rev # 00

UNICERT ISO 9001

TEST REPORT

Report No: FBRC/AS/ANAL./REP./ 980 **Date: April 03, 2024**

Name & Address of Client: M/s International Development Consultants (Regd.) Suite # 3, 11-Civic Centre, C-Block, Faisal Town, Lahore.

Request Ref. # : IDC/24/608 Dated: 20-03-2024 **Sheet No:** 1 of 1

Description of Sample: Ground Water **No. of Sample(s):** One
(MSI Engineering Services, Mehmood Booti Lahore, E442529.59, N3498498.39)

ILO Log # & Date: 980/ 22-03-2024 **Ref./Code # :** M-128/03, FWTL/127/03

Method used / Specifications: A.P.H.A., 2023 **Temp.** 23°C, **Humidity:** 42%

Statement of Non-compliance: Nil **Testing Date:** 25-03-24 to 02-04-24

RESULTS

Sr. #	Parameters Examined	Reported value
1.	Total coliforms (MPN/ 100 ml)**	Not detected
2.	pH at 25°C	7.51
3.	Total Alkalinity as $CaCO_3$ (meq./L)	4.00
4.	Total hardness as $CaCO_3$ (mg/L)	184.00
5.	Total dissolved solids (mg/L)	187.00
6.	Chloride as Cl^- (mg/L)	43.02
7.	Sulphate as SO_4^{2-} (mg/L)	15.30
8.	Conductivity at 25°C (µS/cm)	321.00
9.	Fluoride F^- (mg/L)	0.17
10.	Lead (mg/L)	<LoD*
11.	Cadmium (mg/L)	<LoD*
12.	Iron (mg/L)	<LoD*
13.	Total Nitrogen (mg/L)	0.24
14.	Color	Colorless
15.	Odor	Odorless
16.	Turbidity (NTU)	0.19
17.	Acidity (mg/L)	0.06

*Limit of Detection (LoD)= Lead 0.10mg/L, Cadmium 0.05mg/L, Iron 0.05mg/L
**Accredited scope

END

Terms and conditions over leaf

Prepared by: [illegible] KAUSER, Senior Scientific Officer, PCSIR Laboratories Complex, LAHORE-54600
TMR/ Section Incharge

DR. ASMA SAEED
Head
Food & Biotechnology Research Centre
P.C.S.I.R. Laboratories Complex
Lahore-54600
Head of the Centre

Counter signature
03-04-24
Director General

Log# 980 Date: 3/4/24 Sign

Direct No: 042-99230574; PABX No.042-99230688-95, Ext: 216-17, 363, Fax: 042-99230705
Email: ilo@pcsir-lhr.gov.pk; ilopcsirlhr@gmail.com; website: www.pcsir-lhr.gov.pk

Page 1 of 1
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GOVERNMENT OF PAKISTAN Sr. No. PCSIR-LLC- 237216
Ministry of Science & Technology
Pakistan Council of Scientific & Industrial Research
Laboratories Complex, Lahore
FEROZEPUR ROAD, LAHORE 54600 - PAKISTAN

Doc# LLC/QM/FF/42	Date: Jan. 01, 2020	Rev # 00

UNICERT ISO 9001

TEST REPORT

Report No: FBRC/AS/ANAL./REP./ 981 **Date: April 03, 2024**

Name & Address of Client: M/s International Development Consultants (Regd.) Suite # 3, 11-Civic Centre, C-Block, Faisal Town, Lahore.

Request Ref. # : IDC/24/608 **Dated: 20-03-2024** **Sheet No: 1 of 1**

Description of Sample: Surface Water **No. of Sample(s): One**
(Dera Mian Dawar Meraj, Mehmood Booti Lahore, E442558.99, N3498385.54)

ILO Log # & Date: 981/ 22-03-2024 **Ref./Code # : M-129/03, FWTL/128/03**

Method used / Specifications: A.P.H.A., 2023 **Temp. 23°C, Humidity: 42%**

Statement of Non-compliance: Nil **Testing Date: 25-03-24 to 01-04-24**

RESULTS

Sr. #	Parameters Examined	Reported value
1.	Total coliforms (MPN/ 100 ml)**	17
2.	pH at 25°C	7.23
3.	Total Alkalinity as $CaCO_3$ (meq./L)	4.20
4.	Total hardness as $CaCO_3$ (mg/L)	196.00
5.	Total dissolved solids (mg/L)	207.00
6.	Chloride as Cl^- (mg/L)	45.16
7.	Sulphate as SO_4^{2-} (mg/L)	16.30
8.	Conductivity at 25°C (µS/cm)	355.00
9.	Fluoride F^- (mg/L)	0.17
10.	Lead (mg/L)	<LoD*
11.	Cadmium (mg/L)	<LoD*
12.	Iron (mg/L)	<LoD*
13.	Total Nitrogen (mg/L)	0.29
14.	Color	Colorless
15.	Odor	Odorless
16.	Turbidity (NTU)	0.20
17.	Acidity (mg/L)	0.05

*Limit of Detection (LoD)= Lead 0.10mg/L, Cadmium 0.05mg/L, Iron 0.05mg/L
**Accredited scope

END

Terms and conditions over leaf

Prepared by:
DR. SHABANA KAUSER
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Lahore-54600
Head of the Centre

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03-04-24
Director General

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E-mail: ilo@pcsir-lhr.gov.pk; ilopcsirlhr@gmail.com; website: www.pcsir-lhr.gov.pk

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*****Computer Code*****

GOVERNMENT OF PAKISTAN
Ministry of Science & Technology
Pakistan Council of Scientific & Industrial Research
Laboratories Complex, Lahore
FEROZEPUR ROAD, LAHORE 54600 - PAKISTAN

Sr. No. PCSIR-LLC- 000456

Doc# LLC/QM/FF/42	Date: Jan. 01, 2020	Rev # 00

PNAC LAB 034 ISO17025

TEST REPORT

Report No. CEPS/MHK/190/24 **Date: 04-04-2024**

Name and Address of the Customer:	M/s International Development Consultants (Regd.), Suit # 3, 11-Civic Center, C-Block, Faisal Town, Lahore.		
Request Ref # and Date:	IDC/24/608 Dated: 20-03-2024	Sheet No.	One of one
Description of Sample:	Wastewater	No. of Sample:	One
ILO Log # and Date:	982 Dated: 22-03-2024	Ref/Code #	CEPS/190/2024
Method used Specs:	Standard Methods for the Examination of Water and Wastewater, 24th Edition, 2023	Temp. & Humidity:	23.3-24.7 ^{0}C 59.1-65.1 %
Statement of noncompliance:	Nil	Testing date:	25-03-2024 to 04-04-2024

RESULTS

Sr. No.	Parameters	Method #	Results	Units	NEQS
1.	pH value at 25 ^{0}C	4500- H^+- B	6.64	---	6-10
2.	COD	5220-D	188.0	mg/L	150mg/L
3.	BOD_5 at 20^{0}C	5210-B	113.0	mg/L	80mg/L
4.	*Dissolved Oxygen	---	2.65	mg/L	----
5.	Chlorides	4110-C	213.0	mg/L	1000 mg/L
6.	*Alkalinity	2320-B	290.0	mg/L	----
7.	Total Hardness	2340-C	256.0	mg/L	----
8.	*Lead	3111-A	Not Detected	---	0.5 mg/L
9.	*Cadmium	3111-A	Not Detected	---	0.1 mg/L
10.	*Iron	3500Fe-B	0.08	mg/L	8.0 mg/L
11.	*Total Nitrogen	4500 B-C	20.5	mg/L	----
12.	Electric Conductivity	2510-B	1205.0	mg/L	----
13.	Total Dissolved Solids	2540-C	711.0	mg/L	3500mg/L
14.	Total Suspended Solids	2540-D	140.0	mg/L	200 mg/L

*Parameters are not accredited for ISO-17025

♦---------- ♦ END ♦----------♦

Term and conditions over leaf

Prepared by:
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Head
Centre for Environmental Protection Studies
PCSIR Labs., Complex, Lahore

Counter signature
04-04-24

TM/ Section Incharge
Head of the Centre
Director General

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Computer Code*

Annex 5.1: Trees Plantation Plan

MSI Engineering Services Pvt. Ltd. is committed to implementing effective tree plantation practices to minimize environmental impact and ensure compliance with regulatory requirements. This plan outlines measures for managing tree plantation after the construction phases of the industry project. Under the project, plantation of trees (about 400) may be carried out for the reduction of noise, odor and air pollution. Plantation of trees may be around the project boundary wall, road side as well as other appropriate locations inside the proposed project. Plantation of trees plan is given in Table 1.

Therefore, there will be a need to restore and augment the populations after the project completion to enhance the biodiversity in the area and to provide more habitats for other species. This will enhance the site value for the species. The estimated cost for tree plantation is estimated as Rupees three hundred thousand.

Table 1: Tree Plantation Plan

Sr. No.	Local Name	Botanical Name	Number of trees
I.	**Grass**		
1	Fine Dhaka Grass	*Zoysia Matrella*	1500
2	Lemon grass	*Cymbopogon citratus*	4
3	Ulta Ashoka	*Polyalthia longifolia*	10
4	Gorman Gulab	*Rosa indica*	10
	Sub-total		-
II	**Ornamental plants**		
1	Panda plant	*Kalanchoe tomentosa*	153
2	Motia plant	*Jasminum sambac*	5
	Sub-total		158
III.	**Timber/ Wood Tree**		
1	Cone	*Wood tree*	3
2	Ghola grass	*Digitaria eriantha*	1
3	Cheer	*Pinus roxburghii*	8
5	Ulta soda	*Polyalthia longifolia*	2
	Sub-total		14
IV.	**Fruit Trees**		
1	Mitha	*Citrus limetta*	1
2	Mosambi	*Citrus limetta*	1
3	Cheeku	*Manilkara zapota*	1
4	Lychee	*Litchi chinensis*	2
5	Mango	*Mangifera indica*	2
6	Loquat	*Eriobotrya japonica*	2
7	Guava	*Psidium guajava*	1
8	Date	*Phoenix dactylifera*	2
9	Orange	*Citrus sinensis*	1
10	Fruiter	*Citrus sinensis*	1
11	White Fig	*Ficus citrifolia*	1
12	Black Fig	*Ficus carica*	1
13	China orange	*Citrus sinensis*	2
14	Golden Ficus	*Ficus benjamina*	100
15	Golden	*Ficus benjamina*	1
16	Marwa	*Origanum majorana*	100
17	China Marwa	*Origanum majorana*	2
18	Sowangana	*Moringa oleifera*	4
19	Kangni palm	*Cycas Revoluta*	3
	Sub-total		228
	Total		**400**

Site Selection

Identify suitable locations for tree plantation based on ecological conditions, soil type, and community needs. Prioritize areas near water bodies, degraded lands, or areas prone to erosion.

Plantation Plan

- Divide the 400 trees into species-specific i.e. Ornamental plants (panda plant and Motia plant), Timber/ Wood trees (Cone, ghola grass, cheer and ulta soda) and Fruit trees (Mitha, mosami, cheeku, lychee, mango, loquat, guava, date, orange, fruiter, white fig, black fig, china orange, golden ficus, golden, marwa, china marwa, sowangana and kangni palm) groups based on the site conditions.
- Plan for a mix of tree species to enhance resilience against diseases and pests.
- Calculate spacing between trees to ensure optimal growth conditions.
- Consider long-term maintenance requirements including watering, weeding, and protection from grazing animals.

Implementation Strategy

- Engage local communities in the tree planting process to ensure ownership and sustainability.
- Provide training on tree planting techniques and maintenance.
- Procure saplings from local nurseries to support the local economy and ensure native species are used.

Monitoring and Evaluation

- Establish monitoring protocols to assess the survival and growth rates of planted trees.
- Conduct periodic assessments to identify any issues or threats to the plantation.
- Adjust management strategies as necessary to ensure the long-term success of the plantation.

Annex 5.2: Health and Safety Plan

To achieve Health, Safety and Environment (HSE) preeminence, ensuring risk of harm levels to workers at minimum, associated people, assets and the environment where we work and operate. The purpose of this plan is to identify the potential impacts and to develop a mechanism for the better. This plan will meet the Project requirements for the improvement of HSE standards and needs. This plan shall be applicable to Project Sites. This document describes the HSE policy in line with the statutory requirements.

Roles and Responsibilities

- Designate safety officers or coordinators.
- Define responsibilities for all employees, supervisors, and management.
- Provide trainings to ensure all personnel are competent to perform their duties safely.

Health and Safety Procedures

- Provide SOPs for safe operation of equipment and performance of tasks.
- Develop an emergency response plan, including procedures for dealing with accidents, spills, fires, and natural disasters.
- Ensure the availability of first aid and medical services on-site.

Monitoring and Review/ Reporting

- Plan for regular inspections and audits to ensure compliance with health and safety standards.
- Establish a system for reporting and investigating incidents, including near misses.
- Implement health surveillance programs for workers exposed to specific hazards
- Records of health and safety performance, training, inspections, and incidents will be maintained.
- Health and safety performance will be regularly reported to relevant stakeholders and regulatory authorities.

Community Health and Safety

- Assess the potential health and safety impacts on local communities.
- Plan for engaging with local communities and other stakeholders regarding health and safety concerns.

Environmental Health Considerations

- Measures will be described to prevent environmental pollution and minimize health risks.
- Procedures for the safe handling, storage, and disposal of waste will be imposed.

Annex 5.3: Waste Management Plan

MSI Engineering Services Pvt. Ltd. is committed to implementing effective wastewater and waste management practices to minimize environmental impact and ensure compliance with regulatory requirements. This plan outlines measures for managing both wastewater and solid waste generated during the construction and operational phases of the industry project.

Wastewater Management

- Utilize the designated wastewater dumping site, ensuring proper containment and containment measures to prevent groundwater contamination.
- Implement measures to prevent accidental spills or leaks during wastewater disposal activities.

Waste Management

a. Solid Waste Management

- Implement a waste segregation system to separate scrap-sheets and other solid waste materials into recyclable and non-recyclable categories.
- Establish designated storage areas for recyclable materials and ensure proper handling and transportation to recycling facilities.
- Explore opportunities for reusing scrap-sheets within the facility or reselling them to external markets to minimize waste generation.

b. Domestic Waste

- Implement waste reduction measures, such as promoting the use of reusable containers and minimizing single-use plastics, to reduce the generation of domestic waste.
- Provide adequate waste bins and signage to encourage proper disposal of domestic waste by employees.
- Collaborate with local waste management authorities to ensure proper collection and disposal of domestic waste.

Monitoring and Compliance

- Conduct regular monitoring of wastewater quality and waste generation rates to assess the effectiveness of management practices and identify areas for improvement.
- Maintain records of wastewater discharge volumes, pollutant concentrations, and waste generation rates for reporting and regulatory compliance purposes.
- Implement corrective actions as necessary to address any non-compliance issues and prevent environmental harm.

Community Engagement and Communication

- Engage with local communities to raise awareness of wastewater and waste management practices and solicit feedback on potential environmental concerns.
- Maintain open communication channels with stakeholders to address any wastewater or waste management-related issues and demonstrate MSI Engineering Services' commitment to environmental stewardship.

Review and Improvement

- Regularly review and update the Wastewater and Waste Management Plan to incorporate lessons learned from monitoring and compliance activities, technological advancements, and changes in regulatory requirements.
- Continuously seek opportunities to improve wastewater and waste management practices through innovation and best practices in the industry.

Annex 5.4: Emergency Response Plan

Emergency response plan for the company involves considering various potential emergencies, including natural disasters, technical failures, cyber-attacks, and other emergencies that could impact operations. Here's a comprehensive outline to help you develop an effective plan:

Risk Assessment

- Identify potential emergencies specific to the industry (e.g., power outages, software/hardware failures, cyber-attacks).
- Evaluate the likelihood and potential impact of each risk.

Emergency Response Team

- Form an emergency response team with defined roles and responsibilities.
- Include representatives from key departments such as IT, HR, operations, security, and management.

Communication Plan

- Develop a communication strategy for notifying employees, customers, and stakeholders.
- Include alternative communication methods in case primary systems are down (e.g., SMS, social media).

Emergency Procedures

- Establish clear procedures for different types of emergencies (e.g., evacuation routes, shelter-in-place protocols).
- Conduct regular drills and training sessions.

Data Backup and Recovery

- Implement regular data backup protocols.
- Ensure off-site or cloud-based storage for critical data.
- Develop a disaster recovery plan for IT systems and data.

Business Continuity Plan

- Identify essential functions and processes that must continue during an emergency.
- Develop contingency plans for maintaining these functions (e.g., remote work capabilities, alternative suppliers).

Facility Security

- Install and maintain security systems (e.g., surveillance cameras, access controls).
- Ensure physical security measures are in place to protect against unauthorized access and vandalism.

Health and Safety

- Ensure compliance with occupational health and safety regulations.
- Maintain first aid kits, fire extinguishers, and other emergency equipment.
- Provide training on first aid, CPR, and the use of emergency equipment.

Cyber security Measures

- Implement robust cyber security protocols (e.g., firewalls, encryption, regular software updates).
- Educate employees on cyber security best practices and phishing scams.
- Have an incident response plan for cyber-attacks.

Supply Chain Management

- Identify critical suppliers and establish alternative supply options.
- Develop protocols for managing supply chain disruptions.

Review and Improvement

- Conduct regular reviews of the emergency preparedness plan.
- Update the plan based on new risks, changes in operations, and after-action reports from drills or actual emergencies.
- Engage employees in the review process to gather feedback and improve the plan.

Documentation

- Maintain detailed documentation of the emergency preparedness plan.
- Ensure all employees have access to the plan and understand their roles and responsibilities.

Insurance

- Review and update insurance policies to ensure adequate coverage for various types of emergencies.
- Include business interruption insurance to cover potential losses during an emergency.

Training and Education

- Provide ongoing training and education for employees on emergency procedures.
- Conduct orientation sessions for new employees and regular refresher courses for all staff.

Implementation Steps

a) **Initiate Planning Process:** Form a planning committee and assign responsibilities.
b) **Conduct Risk Assessment:** Identify and evaluate risks specific to the automation industry.
c) **Develop the Plan:** Create detailed procedures and protocols for each identified risk.
d) **Communicate the Plan:** Ensure all employees and stakeholders are aware of the plan.

e) **Conduct Drills and Training:** Regularly practice emergency procedures and update training materials.
f) **Review and Update:** Continuously improve the plan based on feedback and new information.

Annex 5.5: Drinking Water Supply and Sanitation Plan

Objectives

- Ensure the continuous supply of safe and potable drinking water.
- Promote effective sanitation practices.
- Prevent waterborne diseases.
- Educate the community on water conservation and sanitation practices.
- Establish a rapid response mechanism for water supply and sanitation issues.

Water Supply Management

a) Water Sources

- Identify and secure water sources.
- Regularly monitor water quality and quantity.
- Implement measures to protect water sources from contamination.

b) Water Treatment

- Use appropriate water treatment processes (filtration, chlorination or UV treatment).
- Maintain and monitor treatment facilities regularly.
- Ensure compliance with water quality standards.

c) Water Storage

- Construct and maintain storage facilities (tanks, reservoirs).
- Ensure storage facilities are protected from contamination.
- Regularly clean and disinfect storage units.

Sanitation Management

a) Sanitation Infrastructure

- Develop and maintain sanitation facilities (toilets, septic tanks, sewage systems).
- Regularly inspect and maintain sanitation infrastructure.

b) Waste Management

- Implement proper waste collection, segregation, and disposal systems.
- Promote recycling and composting to reduce waste.
- Prevent open defecation through community education and infrastructure provision.

c) Hygiene Promotion

- Conduct regular hygiene education programs.
- Provide access to soap, clean water, and sanitation facilities.
- Collaborate with health agencies to promote public health initiatives.

Community Involvement

a) Public Awareness Campaigns

- Conduct awareness campaigns on water conservation and sanitation.
- Educate the community about the importance of protecting water sources.
- Promote participation in water and sanitation programs.

Water Conservation Strategies

a) Efficient Water Use

- Promote the use of water-saving fixtures and appliances.
- Educate the community on water-saving practices.
- Implement water metering and pricing strategies to encourage conservation.

Monitoring and Evaluation

a) Regular Assessments

- Conduct regular assessments of water quality and sanitation facilities.
- Use standardized indicators to measure progress and identify areas for improvement.
- Involve independent auditors to ensure transparency and accountability.

b) Data Management

- Maintain accurate records of water supply, usage, and quality.
- Use data to inform decision-making and policy development.
- Share information with stakeholders to promote transparency and community trust.

Annex 7.1: Consultations with the Local Community

Pc. No.	Date	Location/ Venue	Category of Participant	No of Participants	Name of Main Participants	Contact No.	Main Concerns and Feedback
1	19/3/2024	Dera Mian Miraj, Mehmood Booti, Tehsil Shalimar District Lahore	Local Community	4	- Mr. Zubair S/o Fazal Rahim - Mr. Rafaqat S/o Makhan - Mr. Ali Ahmed S/o Muhammad Yasin - Mr. Ali Raza S/o Muhammad Naeem	0306-1080041 0300-9443652 0323-4777172 0328-4325286	➢ Community people are satisfied with the work done. ➢ Agricultural land is getting affected by construction of factories. ➢ Farmers are being affected financially due to loss of agricultural land.
2	20/3/2024	Mehmood Booti, Tehsil Baghbanpura District Lahore	Local Community	3	- Ms. Naseem W/o Rizwan - Ms. Parveen W/o Ms. Mushtaq Shamma W/o Afzal	0325-8062659	➢ Community people are satisfied with the work done. ➢ No issues with the surrounding industries.
3	20/3/2024	Baba Feroz Darbar, Tehsil Shalimar, District Lahore	Local Community	4	- Ms. Sumaira W/o Gullzar - Ms. Ayesha W/o Ghulam Abbas - Ms. Tayyaba D/o Muhammad Sarwar - Ms. Farah D/o Muhamad Ali	0304-4745081 0308-4862887 0308-4862887	➢ Community people are satisfied with the work done. ➢ Main concern is carbon. They were disturbed due to surrounding industry polluting the environment with the carbon but now carbon polluting factory is closed. ➢ No problem with surrounding industries ➢ Problem basically is with the pollution ➢ Due to RUDA's work, people are satisfied.
4	20/3/2024	Mehmood Booti, Tehsil Shalimar, District Lahore	Local Community	6	- Mr. Muhammad Younas S/o Muhammad Arif - Mr. Abdul Majeed S/o Nabi Bukhsh - Mr. Ghulam Murtaza S/o Mehtab Din - Mr. Muhammad Azeem S/o Muhammad Zameer - Mr. Babar Hussain S/o Muhammad Saleem - Mr. Muhammad Ashfaq S/o Abdul Rasheed	0302-0476373 0347-4280081 0308-5917673 0328-4043940	➢ Community people are satisfied with the work done. ➢ Profession of farming is being affected due to industrial construction. ➢ Livestock is also in danger due to the industrial area in the surroundings. ➢ Most of the people of this area are dependent on agricultural land and livestock so it's major concern for them. ➢ The bumpy road condition is now way better due to construction of industrial road.
5	20/3/2024	Sagian, Tehsil Baghbanpura, District Lahore	Local Community	4	- Mr. Muhammad Dilawar S/o Ashraf Ali - Mr. Dilshad S/o Dilbar Hussain - Mr. Abdul Sattar S/o Noor Muhammad - Mr. Sadiq Ali S/o Allah Ditta	0326-1913262 0306-4381684 0322-0919082	➢ Community people are satisfied with the work done. ➢ Construction of factories is responsible for decline in agricultural practices and livestock number. ➢ RUDA didn't pay people in Ravi area. ➢ The Government needs to introduce some new scheme for people who are old and are dependent on agriculture for survival.

Annex 7.2: Signed copy of Consultations with the Local Community & Stakeholders

MSI Engineering Services
(Electrical, Mechanical, Switchgear & Automation), Lahore
STAKEHOLDER'S CONSULTATIONS

LIST OF PARTICIPANTS

ID# [ ]
Date: 20 / 3 / 2024

Location/Village: Sagian Union Council: _____

Tehsil: Baghbanpura District: Lahore

Sr No	Name & Father's Name of the Participant	Occupation	Contact No.	Signature/ Thumb Impression
1-	Muhammad Dilawar S/O Ashraf Ali	Farming	0326-1913262	
2-	Sadiq Ali S/O Allah Ditta	Farming		
3-	Abdussattar S/O Noor Muhammad.	Farming	0322-0919082	
4-	Dilshad S/O Dilbar Hussain	Farming.	0306-4381684	

MSI Engineering Services
(Electrical, Mechanical, Switchgear & Automation), Lahore

(2)

STAKEHOLDER'S CONSULTATIONS

LIST OF PARTICIPANTS

ID# [ ]
Date: 20 / 3 / 2024

Location/Village: Mehmood Booti Union Council: _____

Tehsil: Baghban pura District: Lahore

Sr No	Name & Father's Name of the Participant	Occupation	Contact No.	Signature/ Thumb Impression
1-	Muhammad Younas S/o Muhammad Arif.	Livestock	0302-0476373	
2-	Abdul Majeed S/o Nabi Bukhsh	Labor	0347-4280081	
3-	Ghulam Murtaza S/o Mehtab Din	Labor	0308-5917673	
4-	Muhammad Ashfaq S/o Abdul Rasheed.	Labor		
5-	Babar Hussain S/o Muhammad Saleem	Labor		
6-	Muhammad Azeem S/o Muhammad Zameer		0328-4043940	

MSI Engineering Services
(Electrical, Mechanical, Switchgear & Automation), Lahore

(3)

STAKEHOLDER'S CONSULTATIONS

LIST OF PARTICIPANTS

ID# [ ]

Date: 20/3/2024

Location/Village: Baba Feroz Darbar Union Council: _____

Tehsil. Baghban pura District: Lahore

Sr No.	Name & Father's Name of the Participant	Occupation	Contact No.	Signature/ Thumb Impression
1	Sumaira w/o Gullzar	house wife	0304-4745081	
2	Ayesha w/o Ghulam Abbas	house-wife	–	
3	Farah d/o Muhamad Ali	student	0308-4862887	Farah
4	Tayaba d/o Muhammad Sarwar	Student	0308-4862 887	Tayyaba

MSI Engineering Services
Electrical Mechanical Switchgear & Automation) Lahore

(4)

STAKEHOLDERS CONSULTATIONS

LIST OF PARTICIPANTS

ID# [ ]
Date: 19/3/2024

Location/Village: Dera Mian Miraj, Mehmood Booti Union Council: ____________

Tehsil: Baghbanpura District: Lahore

Sr No.	Name & Father's Name of the Participant	Occupation	Contact No.	Signature/ Thumb Impression
1-	Zubair S/o Fazal Rahim	Labor	0306-1080041	[signature]
2-	Rafaqat S/o Makhan	Labor	0300-9443652	[signature]
3-	Ali Ahmed S/o Muhammad Yasin	Labor	0323-4777172	[signature]
4-	Ali Raza S/o Muhammad Naeem	Labor	0328-4325286	Ali Raza

MSI Engineering Services
(Electrical, Mechanical, Switchgear & Automation), Lahore

(5)

STAKEHOLDER'S CONSULTATIONS

LIST OF PARTICIPANTS

ID# [ ]

Date: 20 / 3 / 24

Location/Village: Mehmood Booti Union Council: _____

Tehsil: Baghban Pura District: Lahore

Sr. No	Name & Father's Name of the Participant	Occupation	Contact No.	Signature/ Thumb Impression
1-	Naseem w/o Rizwan	house wife	03258062659	
2-	Parveen w/o Mushtaq	house wife		
3	Shamma w/o Afzal	house wife		