

ESTABLISHMENT OF PAPER IMPREGNATION AND LAMINATED MDF MANUFACTURING UNITS

By

M/S SHAHEEN WOOD PRIVATE LIMITED

Plot No. 43-A, Plot No. 44-B, Multan Industrial Estate,
Phase-I, Multan.

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

Prepared By



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GLOSSARY

Air Quality	Measurement of the pollutants in the air; a description of healthiness and safety of the atmosphere.
Area	Area is the quantity that expresses the extent of a two-dimensional figure or shape, or planar lamina, in the plane.
Compensation	Includes cash payment, deferred payment, a bond, an insurance policy, stipend, payment in kind, rendition of services, grant of privileges and disturbance money, entitlement to special treatment by government and semi government entities, grant of alternative land, grant of import licenses and business, trade and commercial facilities in addition to the rehabilitation and resettlement of an affected person.
Consultation	Consultation refers to two-way transfer of information or joint discussion between project staff and the affected population. Systematic consultation implies a sustained and rigorous sharing of ideas. Bank experience shows that consultation often yields the best resettlement alternatives, fruitful procedures for continued participation, and independent information on actual conditions for implementation.
Coordinates	Each of a group of numbers used to indicate the position of a point,
Contaminate	line, or plane to make impure, pollute
Disclosure	The action of making new or secret information known
Disruption	Disturbance or problems which interrupt an event, activity, or process.
Environmental Management	Attempt to control human impact on and interaction with the environment in order to preserve natural resources
Evaluation	The making of a judgment about the amount, number, or value of something; assessment.
Geology	A science that studies rocks, layers of soil, etc., in order to learn about the history of the Earth and its life
Ground Water	Aquifers currently being used as a source of drinking water or those capable of supplying a public water system. They have a total dissolved solid content of 10,000 milligrams per liter or less, and are not "exempted aquifers.
Hazardous	Substance or material, which could adversely affect the safety of the public, handlers or carriers during transportation
Impact	Effect on someone or something
Land Acquisition	The process whereby a person is compelled by a public agency to cede all or part of the land a person owns or possesses, to the ownership and possession of that agency, for public purpose in return for compensation.
Mitigation	The action of reducing the severity, seriousness, or painfulness of something
Occupational Health	Maintenance of the highest degree of physical, mental and social well-being of workers in all occupations by preventing departures from health, controlling risks and the adaptation of work to people, and people to their jobs
Project Area	The area specified by the funding and/or implementing agency according to the Official Gazette Notification and includes the areas within the administrative limits of the Federal or a Provincial

	Government.
Proponent	A person who advocates a theory, proposal, or course of action.
Neutraceutical	Neutraceuticals are products derived from food sources that provide both nutrition and medicinal benefits. Learn about their history, how they work, their types, and their benefits for health and disease prevention.
Rehabilitation	Include all compensatory measures to re-establish; at least lost incomes, livelihoods, living and social systems. It does not include the payment of compensation for required assets.
Resettlement	Means all measures taken to mitigate any and all adverse impacts, resulting due to execution of a project on the livelihood of the project affected persons, their property, and includes compensation, relocation and rehabilitation.
Social Environment	It includes the culture that the individual was educated or lives in, and the people and institutions with whom they interact.
Scope	The extent of the area or subject matter that something deals with or to which it is relevant
Stakeholders	Include affected persons and communities, proponents, private and public businesses, NGOs, host communities and EPA.
Topography	Details of the surface features of land. It includes the mountains, hills, creeks, and other bumps and lumps on a particular hunk of earth.

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EXECUTIVE SUMMARY

In Pakistan, the wood-based manufacturing and surface lamination industry is experiencing significant growth, with several prominent manufacturers leading the market. Laminated Medium Density Fiberboard (MDF) and impregnated decorative papers, which are essential raw materials for modern furniture, interior paneling, and architectural finishes, are increasingly sought after for their durability, aesthetic appeal, and cost-effectiveness.

The demand for laminated MDF products in Pakistan is on the rise, driven by increasing urbanization, commercial real estate development, and changing interior design preferences among consumers. Modern consumers and commercial builders are actively seeking high-quality, factory-finished laminated boards for efficient interior construction. This trend is reflected in the growing number of specialized manufacturing facilities entering the market and expanding their processing capacity. Overall, the wood processing and surface finishing sector in Pakistan is poised for continued growth, with established units and new ventures contributing to a diverse and industrial manufacturing landscape.

A comprehensive environmental monitoring plan will be implemented during the construction and operational phases of the project. Air quality and dust emissions will be monitored around major MDF processing and dust-generating areas. Noise levels will be periodically monitored at the workplace and project boundary to ensure compliance with applicable standards. Wastewater, where generated, will be monitored through periodic sampling and analysis to ensure proper treatment and disposal. Solid waste generation, segregation, storage and disposal practices will be regularly inspected by the EHS staff. Occupational health and safety practices, including PPE use, fire safety and emergency preparedness, will also be regularly monitored and documented.

The proposed project for the commissioning of its objective and construction requires fulfilling the legal requirements of the Punjab Environmental Protection Act (amended act 2012), Section 12, for which this Environmental Impact Assessment (EIA) report is being submitted.

i- TITLE AND LOCATION OF PROJECT:

Establishment of Paper Impregnation and Laminated MDF Manufacturing Units by M/S Shaheen Wood Private Limited.

Location: Plot No. 43-A and Plot No. 44-B, Multan Industrial Estate, Phase-I, Multan.

GPS Coordinates: 30°07'27.6"N 71°23'24.5"E

PROJECT PROPONENT

Proponent: Ahmad Irfan

Address: House No.43, Street No.3, Mohalla Askari Colony Phase 1, Multan cantt. Tehsil and District Multan.

NAME OF ORGANIZATION PREPARING REPORT:

Integrated Environment Consultants

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ii. BRIEF OUTLINE OF THE PROJECT

The proposed project involves the Establishment of Paper Impregnation and Laminated MDF Manufacturing Units by M/S Shaheen Wood Private Limited at Plot No. 43-A and Plot No. 44-B, Multan Industrial Estate, Phase-I, Multan. The project covers a total area of approximately 5.5 acres, comprising 3 acres at Plot No. 43-A and 2.5 acres at Plot No. 44-B. The facility will undertake MDF production, paper impregnation, and lamination of MDF panels.

iii. PROJECT IMPACTS AND RECOMMENDATIONS FOR THEIR MITIGATION

Impact assessment is an essential component of the proposed project as it provides a systematic basis for identifying and evaluating the potential environmental, social, health and safety impacts associated with the construction and operation of the Paper Impregnation and Laminated MDF Manufacturing Units. The assessment helps in identifying potential adverse impacts at an early stage and provides appropriate measures to avoid, minimize, control and manage such impacts. At the same time, the project is expected to generate positive economic and employment opportunities through industrial development and utilization of local services. The proposed mitigation measures are intended to ensure that the project is implemented and operated in an environmentally responsible manner and in compliance with applicable environmental requirements.

Impacts and Mitigation Measures of Construction and Operational Phase

Possible Impact	Impact Magnitude	Proposed Mitigation Measures
Construction Phase		
Dust emissions likely to occur during excavation, earthwork, movement of construction machinery, loading/unloading of construction materials and transportation of construction waste.	Minor / Short Term	- Water shall be sprinkled on active construction areas and exposed surfaces when necessary. - Trucks transporting soil, sand and other loose materials shall be properly covered. - Vehicle speed shall be controlled within the construction site. - Construction materials shall be stored properly to minimize windblown dust. - Construction waste shall be collected and transported to designated disposal locations. - Appropriate PPE, including dust masks, shall be provided to workers.
Potential degradation of soil and water quality due to construction activities, improper disposal of waste and accidental release of fuels or other substances.	Minor / Short Term	- Construction waste shall be properly collected and disposed of at designated locations. - Wastewater generated from construction activities and workers shall be appropriately managed. - Fuel, lubricants and other potentially hazardous materials shall be stored in designated areas. - Accidental spills shall be immediately contained and cleaned. - Construction materials and wastes shall not be disposed of in open areas, drains or water channels.
Oil and fuel spills from construction machinery, equipment and vehicles.	Minor / Short Term	- Construction machinery and vehicles shall be regularly inspected and maintained. - Refueling and maintenance activities shall preferably be carried out at designated areas. - Spill control materials shall be available at the construction site. - Any accidental oil or fuel spill shall be contained and cleaned immediately. - Used oil and oil-contaminated materials shall be collected and disposed of

**Establishment of Paper Impregnation &
Laminated MDF Manufacturing Units by M/s Shaheen Wood Pvt. Ltd.
Environmental Impact Assessment (EIA)**

Possible Impact	Impact Magnitude	Proposed Mitigation Measures
		through appropriate arrangements.
Noise pollution due to operation of construction machinery, vehicles, material handling equipment and incoming/outgoing vehicles.	Minor / Short Term	- Construction machinery shall be properly maintained to minimize unnecessary noise. - Construction activities shall preferably be carried out during appropriate daytime hours. - Unnecessary use of vehicle horns and prolonged idling of vehicles shall be avoided. - Portable barriers may be installed around particularly noisy stationary equipment where required. - Workers exposed to high noise levels shall be provided with appropriate hearing protection.
Workers' accidents and occupational hazards during construction activities.	Moderate / Short Term and Reversible	- Appropriate and adequate PPE shall be provided to all construction workers. - Proper use of PPE shall be enforced at the construction site. - Only trained and authorized personnel shall operate machinery and equipment. - Tools, equipment and machinery shall be maintained in safe working condition. - Warning signs, barricades and restricted-access areas shall be provided where necessary. - First-aid facilities and emergency response arrangements shall be maintained at the site.
Operational Phase		
Solid waste generation during MDF production, paper impregnation, lamination, trimming, packaging and other operational activities.	Moderate / Long Term	- MDF off-cuts, trimming waste, rejected panels, paper waste and packaging materials shall be collected and segregated at source. - Reusable and recyclable materials shall be recovered and reused/recycled where practicable. - Wood/MDF dust and process residues shall be collected through an appropriate dust collection system.

**Establishment of Paper Impregnation &
Laminated MDF Manufacturing Units by M/s Shaheen Wood Pvt. Ltd.
Environmental Impact Assessment (EIA)**

Possible Impact	Impact Magnitude	Proposed Mitigation Measures
		- Waste shall be stored in designated areas and shall not be allowed to accumulate in production areas. - Non-recyclable waste shall be disposed of through appropriate authorized disposal arrangements. - Workers shall be trained in waste segregation and waste minimization practices.
Dust and particulate emissions from wood handling, chipping, screening, refining, MDF processing, sanding, cutting and edge trimming operations.	Moderate / Long Term	- Dust-generating equipment shall be provided with suitable dust extraction/local exhaust ventilation systems. - Dust collection systems and the sand-dust silo shall be properly operated and maintained. - Dust-generating transfer points shall be enclosed where practicable. - Regular housekeeping shall be undertaken to prevent accumulation of wood/MDF dust. - Appropriate respiratory and eye protection shall be provided to workers in dust-generating areas. - Dust collection equipment shall be periodically inspected and maintained.
Air emissions/fumes associated with drying, hot pressing, resin application, paper impregnation and operation of standby power equipment, where applicable.	Moderate / Long Term	- Adequate ventilation shall be provided in production and resin-handling areas. - Drying and hot-pressing equipment shall be properly operated and maintained. - Appropriate exhaust/ventilation arrangements shall be provided at relevant emission sources. - Standby generator, if operated, shall be properly maintained and provided with an appropriate exhaust arrangement. - Environmental monitoring shall be undertaken where required under applicable regulatory requirements.
Release of resin and chemical vapors during resin blending, chemical handling,	Moderate / Long Term	Resin and chemical handling shall be carried out in designated and adequately ventilated areas.

**Establishment of Paper Impregnation &
Laminated MDF Manufacturing Units by M/s Shaheen Wood Pvt. Ltd.
Environmental Impact Assessment (EIA)**

Possible Impact	Impact Magnitude	Proposed Mitigation Measures
paper impregnation and drying/B-staging operations.		- Chemical containers shall remain properly closed when not in use. - Safety Data Sheets (SDS/MSDS) shall be maintained for chemicals used at the facility. - Workers shall be trained in safe chemical handling procedures. - Appropriate PPE shall be provided to workers involved in chemical handling. - Local exhaust ventilation shall be provided where required to control workplace exposure.
Wastewater generation from process activities, including washing/process operations, and domestic wastewater generated by workers and staff.	Minor / Long Term	- Process wastewater, where generated, shall be collected and appropriately managed according to its characteristics. - Domestic wastewater shall be managed through an appropriate septic tank/treatment system or approved drainage arrangement. - Untreated industrial wastewater shall not be discharged into open land, stormwater drains or water bodies. - Wastewater quality shall be monitored periodically where applicable to ensure compliance with relevant environmental standards. - Water conservation and reuse/recycling practices shall be adopted wherever technically feasible.
Noise pollution due to MDF processing machinery, chippers, refiners, hot presses, sanding/cutting equipment, compressors, pumps and standby generator.	Moderate / Long Term	- Noise-generating machinery shall be properly maintained and lubricated. - Appropriate acoustic enclosures/barriers shall be provided for major noise sources where necessary. - Preventive maintenance shall be carried out to minimize excessive vibration and mechanical noise. - Workers exposed to elevated noise levels shall be provided with suitable hearing protection. - Noise levels shall be monitored at relevant workplace and project boundary locations as required.
Potential soil and water contamination due to accidental leakage or spillage of	Minor / Long Term	Resins, glues and other chemicals shall be stored in designated and secure areas.

**Establishment of Paper Impregnation &
Laminated MDF Manufacturing Units by M/s Shaheen Wood Pvt. Ltd.
Environmental Impact Assessment (EIA)**

Possible Impact	Impact Magnitude	Proposed Mitigation Measures
melamine resin, glue, wax and other chemicals.		• Suitable secondary containment/spill-control arrangements shall be provided where necessary. • Chemical containers and handling systems shall be regularly inspected for leakage. • Spill kits and absorbent materials shall be readily available. • Workers shall be trained in chemical handling and spill-response procedures. • Chemical-contaminated waste shall be separately collected and appropriately managed.
Fire hazards associated with MDF/wood dust, electrical equipment, hot pressing, heating systems and chemical/resin handling.	Moderate / Long Term	• Suitable fire detection and firefighting systems shall be installed throughout the facility. • Appropriate fire extinguishers shall be provided at accessible locations. • Accumulation of MDF/wood dust shall be minimized through effective dust extraction and housekeeping. • Electrical installations shall be properly maintained and periodically inspected. • Emergency exits and evacuation routes shall be clearly marked and kept unobstructed. • Workers shall receive fire safety and emergency response training. • Periodic emergency drills shall be conducted.
Occupational health hazards due to exposure to wood/MDF dust, resin/chemical vapors, noise, heat and mechanical equipment.	Moderate / Long Term	• Engineering controls including dust extraction, enclosure and ventilation shall be implemented. • Appropriate PPE shall be provided and its use strictly enforced. • Workers shall be trained in safe operation of machinery and chemical handling. • Adequate ventilation shall be maintained in production and chemical-handling areas. • Safety signs and operating procedures shall be displayed in relevant work areas.

**Establishment of Paper Impregnation &
Laminated MDF Manufacturing Units by M/s Shaheen Wood Pvt. Ltd.
Environmental Impact Assessment (EIA)**

Possible Impact	Impact Magnitude	Proposed Mitigation Measures
		• Appropriate occupational health monitoring shall be undertaken where required.
Generation of packaging waste, rejected MDF panels, impregnated paper waste and other process-related waste.	Minor / Long Term	• Waste shall be segregated into recyclable, reusable and non-recyclable categories. • Paper, cardboard, plastic and other recyclable materials shall be recovered where feasible. • Rejected MDF and paper materials shall be reused, recovered or appropriately disposed of where practicable. • Waste storage areas shall be properly maintained and kept organized. • Waste generation shall be minimized through efficient production and material handling practices.
Traffic and transportation impacts due to movement of raw materials, chemicals, finished products and waste.	Minor / Long Term	• Vehicle movement shall be managed through designated internal routes and loading/unloading areas. • Drivers shall comply with site speed limits and safety requirements. • Vehicles transporting loose materials or waste shall be properly covered where necessary. • Loading and unloading shall be carried out in designated areas. • Unnecessary vehicle idling and horn use shall be avoided.

1 INTRODUCTION

Laminated medium-density fiberboard (MDF) and impregnated decorative papers play a crucial role in the manufacturing and construction sector, providing essential materials for various applications including modern furniture production, interior paneling, commercial cabinetry, and architectural joinery. They provide durable surface characteristics that enhance moisture resistance, structural integrity, and aesthetic finish, which have become increasingly important for modern, cost-effective interior construction. There is a growing awareness among commercial builders, furniture manufacturers, and architectural designers in Pakistan regarding high-grade engineered wood products, leading to increased demand for paper impregnation and MDF lamination facilities. Industrial consumers are more inclined to use pre-laminated engineered wood boards to streamline manufacturing processes and ensure consistent surface quality. Environmental and urban planning authorities are increasingly emphasizing sustainable industrial practices and industrial estate zoning for processing units, recognizing their operational efficiency alongside structured environmental compliance. This trend underscores the integration of specialized wood-processing operations within formal industrial zones under strict regulatory oversight.

1.1 Economic Growth

Industry Growth: The engineered wood and decorative lamination industry in Pakistan is expanding rapidly, with several processing and impregnation facilities entering the market. This growth contributes to the national economy by generating direct and indirect employment, fostering technological innovation in industrial wood processing, and encouraging local production of high-grade laminated panels to reduce reliance on imported finishing materials.

Regulatory Framework: While the wood processing sector continues to expand, strict regulatory compliance is essential to ensure sustainable environmental management and occupational safety. Standardized regulatory oversight under the Punjab Environmental Protection Agency (Punjab EPA) enhances environmental compliance, promotes resource efficiency, and minimizes industrial emissions, thereby supporting responsible industrialization.

Market & Trade Potential: As the demand for processed wood materials, interior paneling, and laminated furniture components rises across regional markets, Pakistan has the opportunity to strengthen its domestic manufacturing capability. By adhering to international quality standards, advanced surface impregnation techniques, and environmental performance benchmarks, local manufacturers can optimize production efficiency and serve expanding market demands.

The proposed project aims to fulfill its objectives through construction and operation necessitating compliance with the legal regulations specified in Punjab Environmental Protection Act 2012, Section 12. In accordance with these requirements, this Environmental Impact Assessment (EIA) is being submitted.

1.2 Purpose of the Report

As per the Punjab Environmental Protection Act (PEPA), Section 12, which covers Initial Environmental Examination and Environment Impact Assessment, no project proponent is allowed to initiate construction or operations without filing the necessary documentation with the designated Government Agency under the Provincial Environmental Agencies. If the project is anticipated to cause adverse environmental effects, it necessitates an environmental impact assessment. Subsequently, approval must be obtained from the Government Agency. This requirement set forth by the Government of Punjab mandates the preparation of this Environmental Impact Assessment (EIA) Report to secure Environmental Approval (EA) from the Environmental Protection and Climate Change Department (EPA), Government of Punjab, Lahore.

This report provides comprehensive information and data on the environmental, economic, and social impacts of the project, enabling its assessment and justification that the project will comply with the requirements of environmentally sustainable practices during both installation and operation stages, as required by the Punjab Environmental Protection Act, 2012, the Punjab Environment Quality Standards, and the rules and regulations thereof.

1.3 Identification of Project and Proponent

Establishment of Paper Impregnation and Laminated MDF Manufacturing Units by M/S Shaheen Wood Private Limited

Location: Plot No. 43-A and Plot No. 44-B, Multan Industrial Estate, Phase-I, Multan.

Project Proponent

Proponent: Ahmad Irfan

Address: House No.43, Street No.3, Mohalla Askari Colony Phase 1, Multan cantt. Tehsil and District Multan.

1.4 Details of Consultants

Integrated Environment Consultants

Head Office : 218, Upper Mall Scheme, Lahore, Pakistan.

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1.5 Brief Description of Nature Size and Location of Project

The project involves establishing Paper Impregnation and Laminated MDF Manufacturing Units at Multan, spanning a total land area of 5.5 Acres (Plot No. 43-A measuring 3.0 Acres and Plot No. 44-B measuring 2.5 Acres) at Multan Industrial Estate, Phase-I, Multan, Punjab, with a total project cost of PKR 35 Million.

1.6 List of Names, Qualifications and Roles of Team Members Carrying out the EIA Study

The proponent has assigned the task of preparing EIA report to M/S Integrated Environment Consultants, Lahore. The EIA study of the proposed project has been conducted according to Environmental Assessment Procedures, 1997, Review of IEE and EIA Regulation 2022 as prescribed by the Federal Environmental Protection Agency (Pak EPA), Government of Pakistan. The study team of M/S Integrated Environment Consultants which completed the EIA report consists of following expert

Table 1-1 Members Completed EIA Process

Name	Qualification	Status in Project
Mr. Ahtasham Raza	M.Phil (Env. Sciences) GC University, Lahore	Project Incharge
Mr. Adnan Sharif	BS (Env. Sciences) Diploma in Environmental Law - Punjab University	Team Leader
Mr. Mehmood Amjad	BS (Hons) Environmental Sciences NFC.IET. Multan	Monitoring In charge
Mr. Muhammad Zain	BS (Hons) Environmental Sciences GC University, Lahore.	Environmentalist
Mr. Balal Ahmad	BS (Hons.) Chemistry University of Central Punjab, Lahore.	Chemist

*Only the main roles of the team members are given. However, their role was not restricted to these, rather it also includes many other studies in their respective fields in the context of this EIA study

2 SCREENING OF THE PROJECT

Based on the Punjab Environmental Protection Act 2012 and the Review of IEE & EIA Regulations, 2022 for filing, reviewing, and approving environmental assessments, the present project is classified under Schedule II Series B (5). Following list shows the projects included in Series B.

B. Manufacturing and Processing

1. Cement Plant
2. Chemical Manufacturing Unit, including Pharmaceutical and Cosmetics.
3. Sugar Mills and Distilleries
4. Food processing industries including beverages, milk, and dairy products with total cost more than Rs. 200 Million.
5. Paper and Paperboard, paper pulping, paints, and dyes.
6. Textile units comprising of dyeing & printing.
7. Pesticides and fertilizers manufacturing units.
8. Poultry waste processing units/ rendering units.
9. Tannery and leather Units
10. Rubber Projects with total cost more than Rs. 100 Million.
11. Battery Manufacturing and Recycling Plant
12. Ceramics and Glass Units
13. Electro-plating and nickel/chrome plating including Surgical Units
14. Cutlery Units
15. Slaughter House
16. Iron and Steel Rolling Mills
17. Steel Furnace
18. Smelting Plant
19. Auto-mobile manufacturing and assembling units
20. Resource Recovery Units

3 SCOPING OF THE PROJECT

Scoping is a critical initial phase in the EIA process, serving as a roadmap for the comprehensive evaluation of potential environmental effects associated with the proposed industrial development. It is pivotal in defining the boundaries, objectives, and methodology of the EIA study. The scoping process allows for the identification and prioritization of key environmental aspects associated with resin blending, paper impregnation, and MDF lamination activities, ensuring that the assessment focuses on the most relevant operational and site-specific issues. This early-stage engagement with relevant stakeholders, including environmental regulatory authorities, industrial estate management, local communities, and technical experts, promotes transparency and inclusivity in decision-making. By clearly delineating the temporal, spatial, and technical scope of the project at Plot No. 43-A and Plot No. 44-B, Multan Industrial Estate, Phase-I, the EIA process becomes more efficient, cost-effective, and targeted, streamlining subsequent baseline data collection, impact prediction, and mitigation planning. Ultimately, scoping enhances the overall technical rigor of the EIA, enabling a thorough examination of potential impacts such as airborne dust, VOC emissions, solid waste management, and occupational safety and facilitating informed regulatory decision-making in support of sustainable industrial practices.

3.1 Spatial and Temporal Boundaries of Environmental Assessment

Spatial boundaries define the geographical extent of the assessment, allowing for the identification and consideration of potential impacts on surrounding industrial surroundings, local ecology, and nearby communities in the vicinity of Plot No. 43-A and Plot No. 44-B, Multan Industrial Estate, Phase-I, Multan. A precise delineation of these boundaries—encompassing the 5.5-acre site footprint, immediate industrial plot boundaries, and the broader zone of influence within the industrial estate—is crucial for capturing both direct effects (such as localized noise and fugitive dust emissions) and indirect environmental factors. Simultaneously, temporal boundaries establish the timeframe over which impacts are assessed, enabling the evaluation of short-term construction activities and long-term operational processes associated with paper impregnation and MDF lamination. This consideration is vital for understanding the dynamic nature of industrial emissions, resource utilization, and waste stream management over the lifecycle of the facility. By addressing both spatial and temporal boundaries, the Environmental Impact Assessment provides regulatory authorities with a clear, site-specific understanding of M/S Shaheen Wood (Pvt.) Ltd.'s potential footprint, supporting the implementation of targeted mitigation measures and sustainable industrial development.

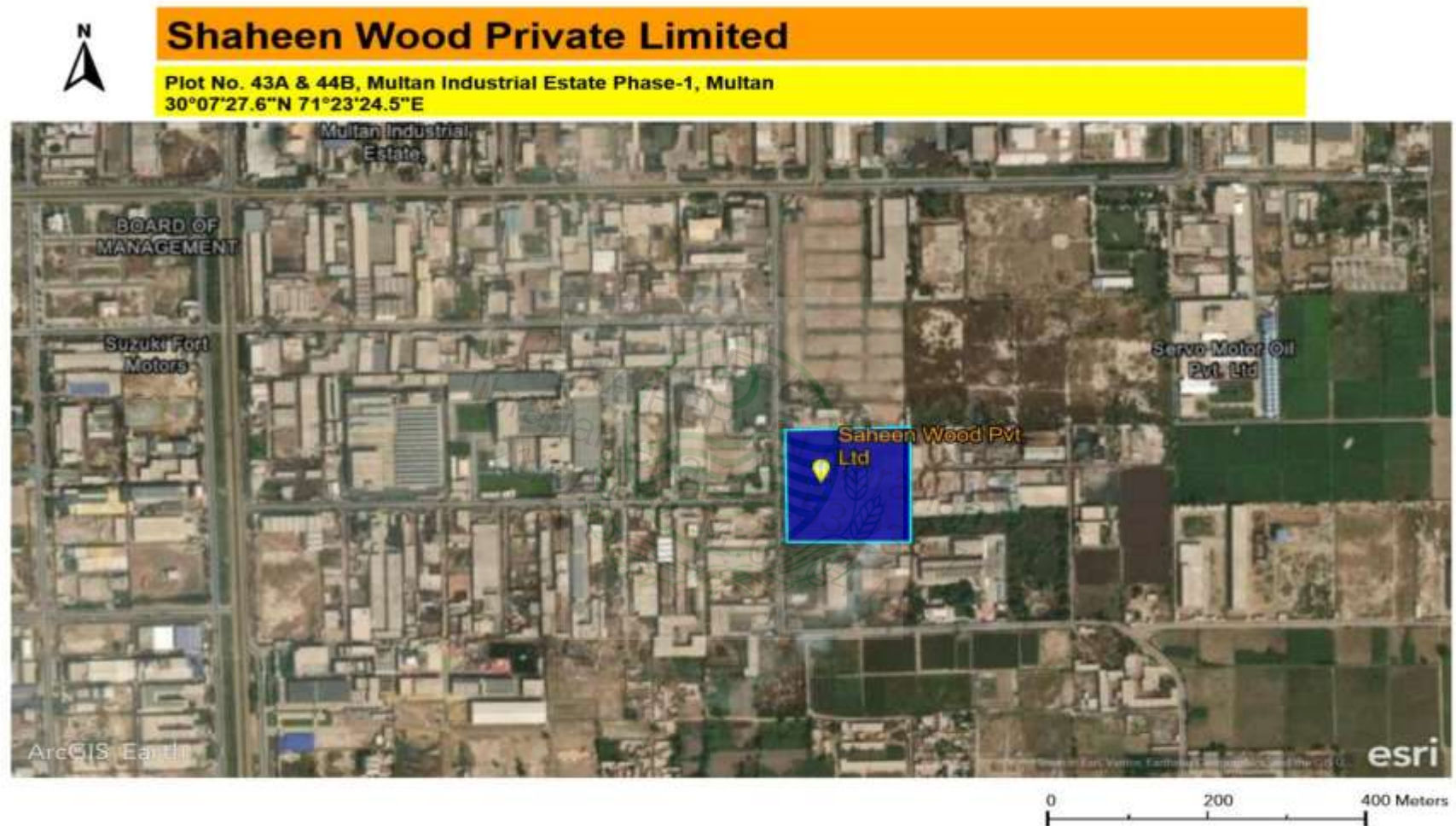


Figure 3-1: Spatial and Temporal Boundaries of the Proposed Project

3.2 Important Issues and Concerns Raised During Consultation

The EIA for the proposed project incorporates a meticulously planned two-stage consultation process, with a primary focus on one-on-one meetings. During the initial stage, targeted consultations were directed at engaging with local government authorities, affected individuals, and communities in close proximity to the project site. The primary objective of this stage was to comprehensively assess both short-term and long-term impacts anticipated from the early stages of project development. By soliciting insights and perspectives from key stakeholders, including local residents and authorities, the goal was to gain a nuanced understanding of potential environmental, social, and economic implications.

The second stage of consultations, if deemed necessary, is designed to adopt a more expansive approach through public participation. This phase aims to facilitate a broader outreach to the public, fostering a comprehensive engagement process to capture additional feedback, concerns, and insights from a diverse cross-section of the community. This inclusive approach ensures that a wide range of stakeholders has the opportunity to contribute their perspectives, concerns, and suggestions, thereby enriching the EIA process and refining it in accordance with the valuable input received from the community.

3.3 Significant Impacts and Factors to be Determined

The construction and establishment of paper impregnation and laminated MDF manufacturing units involve various significant impacts and factors that necessitate thorough consideration and planning for successful implementation. Firstly, regulatory compliance stands as a paramount concern, with adherence to stringent safety, environmental, and quality standards—under the Punjab Environmental Protection Act 1997 (Amended 2012) and applicable Punjab Environmental Quality Standards (PEQS)—being imperative for obtaining necessary permits and environmental approvals. Additionally, selecting an appropriate industrial site is crucial, considering factors such as proximity to transportation networks, direct availability of industrial utilities within Multan Industrial Estate, Phase-I, and full compliance with industrial estate zoning regulations. Environmental Impact Assessments must be conducted to identify and mitigate potential environmental impacts associated with site development, civil construction, machinery installation, and plant operation. Engaging with industrial estate management, local authorities, and stakeholders ensures transparency, addresses environmental concerns, and fosters positive relationships. Technological requirements, skilled workforce development, wood/paper supply chain management, fire and occupational health risk management, and financial planning are also critical considerations to ensure efficient plant operations and long-term sustainability. By meticulously addressing these factors, M/S Shaheen Wood (Pvt.) Ltd. can navigate the setup process effectively and establish a manufacturing facility that contributes positively to the industrial sector while mitigating potential environmental risks and operational impacts.

3.4 Development of an Environmental Management Plan

The EIA of a paper impregnation and laminated MDF industry is a critical process that evaluates potential environmental effects associated with the construction and

operation of the facility. An Environmental Management Plan (EMP) plays a significant role within the EIA framework, serving as a roadmap for identifying, mitigating, and managing environmental impacts throughout the project lifecycle. In the context of a paper impregnation and MDF lamination industry, the EMP holds particular importance due to the unique environmental challenges and risks inherent in resin processing and panel lamination operations.

Firstly, the paper impregnation and MDF lamination industry utilizes resins, paper rolls, and wood panels in its manufacturing processes, posing risks of air emissions, localized dust pollution, soil contamination, and solid waste generation. An EMP helps identify these potential environmental impacts and specifies measures to minimize or eliminate them. This may include implementing pollution control technologies, such as industrial dust extraction systems, local exhaust ventilation, wastewater management through septic tank, and hazardous waste containment practices, to ensure compliance with environmental regulations and protect surrounding ecosystems and communities.

Secondly, wood panel lamination and impregnation facilities are subject to stringent regulatory requirements aimed at safeguarding public health and the environment. An EMP provides a framework for ensuring regulatory compliance by outlining specific monitoring, reporting, and mitigation measures to address environmental concerns identified during the EIA process. This helps manufacturing companies demonstrate their commitment to environmental stewardship and sustainability, thereby enhancing their reputation and credibility with regulatory authorities, stakeholders, and the public.

Moreover, an effective EMP contributes to the overall sustainability and long-term viability of the paper impregnation and laminated MDF industry by promoting resource efficiency, waste minimization, and responsible environmental management practices. By integrating environmental considerations into the design, construction, and operation of processing facilities, companies can minimize their ecological footprint, reduce operational risks, and enhance operational efficiency. This not only helps protect the environment and occupational health but also ensures the continued success and profitability of the manufacturing unit in the long run.

These key parts of the EMP include a clear description of the project, an outline of potential environmental impacts and risks, specific mitigation measures tailored to address these impacts, a comprehensive monitoring and reporting system to track environmental indicators, protocols for emergency response and contingency planning, details on stakeholder engagement and communication strategies, and a framework for ongoing review and updates to ensure the plan's adaptability and effectiveness over the course of the project. Together, these components form a comprehensive EMP designed to guide environmental practices, minimize adverse impacts, and maintain compliance with regulations and best practices in environmental management.

4 ALTERNATIVES OF THE PROJECT

The consideration of alternatives in an EIA provides a comprehensive understanding of the potential impacts associated with various project options. Evaluating alternatives allows decision-makers to assess not only the environmental implications but also the social and economic consequences of different project scenarios. This process aids in identifying the most sustainable and least impactful option, promoting responsible decision-making. Alternatives analysis helps to avoid or minimize adverse effects, contributing to the overall goal of sustainable development. In essence, the careful examination of alternatives in an EIA serves as a robust decision-support mechanism, guiding the selection of projects that align with environmental conservation, community well-being, and long-term sustainability. No **technology/design alternative** has been identified that would provide greater overall benefits than the proposed project design and production arrangement. Similarly, no **environmental alternative** has been identified that would offer better environmental performance while meeting the project objectives. From an **economic perspective**, the proposed project is considered the most feasible option in terms of investment, production requirements, resource utilization and expected benefits. Therefore, the proposed project configuration is considered the most suitable and viable alternative for implementation.

4.1 Project Alternatives

- No project option/worst scenario option.
- Site Alternative

4.2 No Project Option/Worst Scenario Option

Analysis

➤ Strength and Opportunities

The paper impregnation and laminated MDF industry offers a multitude of benefits, including enhanced industrial manufacturing outcomes, better material utilization in construction and interior finishing, cost savings, and regional economic growth. This sector significantly contributes to industrial development by creating skilled and unskilled jobs and adding to the manufacturing economy. Moreover, wood-processing and lamination companies play a crucial role in advancing surface treatment technologies, resin application methodologies, and product engineering, leading to advancements in wood science and building materials that positively impact commercial and residential interior construction. Additionally, careers in the engineered wood and paper impregnation industry provide opportunities for technological innovation, access to modern production machinery, competitive compensation, career stability, technical skill development, industrial trade exposure, and a strong commitment to environmental compliance and sustainable resource management.

➤ Weakness and Threats

If a paper impregnation and laminated MDF manufacturing unit is not established, several disadvantages can arise. Firstly, the lack of a local surface impregnation and panel lamination facility can lead to limited access to essential processed building

materials, potentially affecting interior construction and furniture manufacturing outcomes across the region. Without a local processing unit, a region may become dependent on imported or distant-sourced laminated boards and surface papers, which can be costly and may not always meet local industrial specifications efficiently. Additionally, the absence of such a unit can result in a lack of employment opportunities in the specialized wood-processing sector, hindering economic growth and industrial development within the region. Furthermore, without a local manufacturing industry, there may be challenges in ensuring product quality control, efficient supply chain turnarounds, and timely access to innovative interior material options, impacting both construction practices and the overall industrial economy of the area

4.3 Conclusion

Having a paper impregnation and laminated MDF manufacturing unit in an industrial area offers numerous advantages that positively impact both local industry and the region as a whole. Firstly, it ensures easier access to high-grade laminated panels and impregnated surface materials, improving interior construction outcomes and product durability. By having a local paper impregnation and board lamination facility, regional markets can reduce their reliance on imported finished panels, leading to cost savings and a more tailored approach to local furniture and architectural needs. Moreover, the establishment of the manufacturing unit creates job opportunities, stimulating economic growth and enhancing the socio-economic fabric of the community. Additionally, having a processing unit locally promotes industrial efficiency, fosters material innovation, and ensures environmental regulatory compliance, all of which contribute to advancing manufacturing standards and promoting a sustainable industrial sector. Overall, a paper impregnation and laminated MDF manufacturing unit not only enhances industrial material accessibility but also boosts economic prosperity and fosters regional manufacturing advancement, making it a valuable asset for any industrial locality.

5 DESCRIPTION OF THE PROJECT

5.1 General

The "Description of the Project" chapter within an EIA serves as the foundational narrative that intricately outlines the key facets of the proposed project. This pivotal section provides a comprehensive overview, delineating the project's purpose, scope, location, design, and methodologies. It lays the groundwork for the subsequent environmental evaluation by offering a detailed understanding of the project's intricacies, helping stakeholders, authorities, and the public grasp the potential implications. In essence, this chapter acts as the entry point, guiding readers through the project's fundamental characteristics and setting the stage for the thorough analysis of its environmental, social, and economic impacts in the subsequent sections of the EIA.

5.2 Objectives of the Project

M/S Shaheen Wood (Pvt.) Ltd. aims to manufacture products that support modern furniture manufacturing, interior architecture, and commercial construction by providing high-quality laminated MDF panels and impregnated decorative papers. The company focuses on utilizing process technology for paper impregnation and hot-press lamination to deliver durable, moisture-resistant, and aesthetically finished engineered wood products. This is particularly relevant given the rising demand for factory-finished surface materials and structural paneling within the regional interior and construction sectors.

5.3 Location and Layout of the Project

The project is located at Plot No. 43-A and Plot No. 44-B, Multan Industrial Estate, Phase-I, Multan.

5.3.1 GPS Coordinates

30°07'27.6"N 71°23'24.5"E

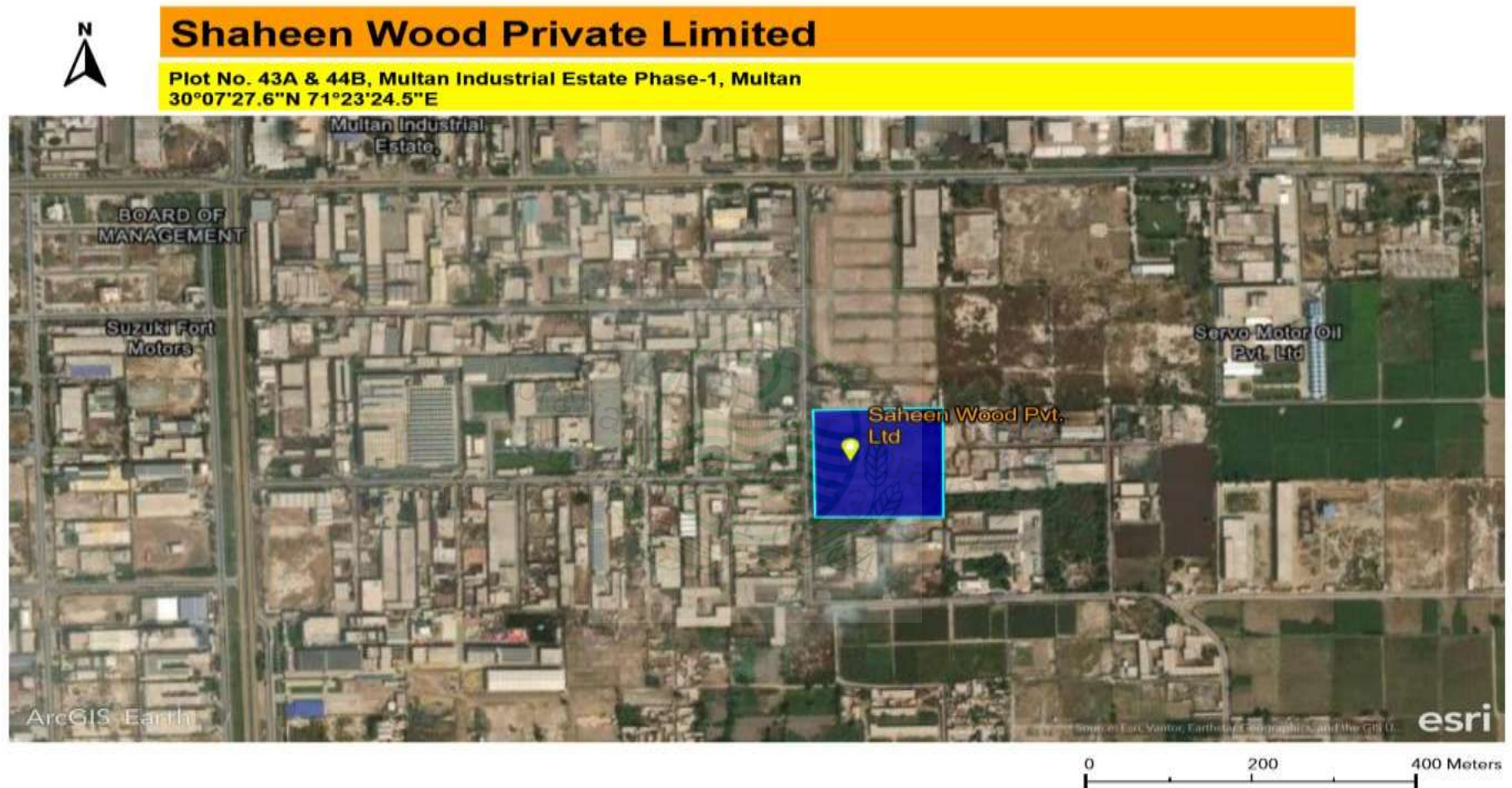


Figure 5-1: Location of the Proposed Project



5.4 Products

The primary end product of the facility will be high-quality Laminated MDF (Melamine-Faced MDF) panels, produced by thermally fusing melamine-resin impregnated decorative paper onto raw MDF boards under controlled heat and pressure.

5.5 Water Usage and Sources

The estimated water requirement for the proposed facility may be taken as approximately 5,000–7,000 gallons per day, mainly for domestic use, sanitation, cleaning and other operational requirements. The water source is groundwater through a tube well, subject to availability and regulatory approval, with industrial-estate water supply as a possible supplementary source.

5.6 Energy requirements

Electricity will be provided by MEPCO for the daily operations. In case of emergency or load shedding generators back up will be installed.

5.7 Machinery Required

5.7.1 Paper Impregnation Operations

- **Resin Blending & Preparation Tank:** Heavy-duty mixing vessel equipped with mechanical agitators and temperature controls used to prepare liquid melamine-formaldehyde (MF) resin formulations.
- **Paper Unwinding Station:** Automated roll unwinding unit designed to hold, center, and continuously feed decor or kraft paper into the impregnation line under controlled tension.
- **Resin Impregnation Bath:** Precision dipping and roller tank system where continuous paper sheets are fully immersed and saturated with liquid melamine resin.
- **Air Dryer / B-Staging Convection Tunnel:** Multi-zone hot air drying tunnel that precisely evaporates resin solvents, semi-curing the impregnated resin into a stable "B-stage" state.
- **Paper Cooling Roller Unit:** Chilled roller assembly designed to rapidly reduce paper temperature immediately after leaving the dryer to stabilize the resin film.
- **Automatic Rotary Cut-to-Size Paper Cutter:** High-precision motorized rotary shearing machine that cuts the continuous web of impregnated paper into standard sheet lengths.
- **Hydraulic Stacking Table:** Height-adjustable receiving table that neatly collects, aligns, and stacks cut impregnated paper sheets for transfer to the lamination line.

5.7.2 MDF Panel Lamination Operations

- **Raw MDF Panel Feeding Table:** Automated conveyor and roller table system used to position raw medium-density fiberboard (MDF) sheets for surface preparation and lamination.

- **Paper Lay-up Station:** Alignment station where top and bottom layers of melamine-impregnated decorative paper are manually or automatically assembled onto raw MDF panels.
- **Short-Cycle Hydraulic Hot Press Machine:** High-pressure thermo-hydraulic press that applies controlled heat and tonnage to fuse impregnated paper onto the MDF substrate permanently.
- **Automatic Edge Trimming Saw Unit:** Precision dual-saw trimming assembly that cuts off excess resin overhang and squares panel edges after hot pressing.
- **Star Cooler / Cooling Wheel Unit:** Rotating wheel structure designed to hold hot laminated panels separately, allowing uniform air cooling to prevent board warping.
- **Board Inspection & Automatic Stacker:** Optical quality inspection roller line paired with a heavy-duty hydraulic vacuum lifter/stacker for sorting finished laminated panels.

5.7.3 Environmental & Auxiliary Equipment

- **Sand-Dust Silo Tank Collection System:** High-capacity cyclone filter and closed storage tank unit designed to extract, collect, and store operational wood dust and sanding waste safely.
- **Industrial Forklifts & Jack Trolleys:** Heavy-duty material handling equipment used for moving raw timber panels, resin drums, and finished product pallets across production halls.

5.7.4 Quality Control & Testing Laboratory

- **Laboratory Hot Press Unit:** Scale model hydraulic hot press used for testing resin cure rates, pressing cycles, and surface bonding strength before full-scale production.
- **Viscometer & pH Meter Set:** Precision analytical instruments used to test resin batch viscosity, chemical composition, and pH balance prior to impregnation.
- **Digital Moisture Analyzer & Hot Air Oven:** Thermal testing equipment used to measure and control raw paper moisture levels and resin solid content.

5.8 Production Process

5.8.1 MDF Production Process

The raw MDF manufacturing line transforms raw timber logs and wood residues into dense, uniform engineered wood panels suitable for lamination.

5.8.1.1 Debarking and Chipping

Raw timber logs are fed into a mechanical debarker to remove outer bark, which can contaminate board quality. The debarked logs pass into a high-capacity rotary drum chipper that reduces timber into uniform wood chips.

5.8.1.2 Chip Washing and Screening

Wood chips are passed through vibrating screens to eliminate oversized pieces and fine dust. The screened chips undergo washing in a hydro-cyclone washer to remove sand, stones, and grit, protecting downstream refining machinery from excessive wear.

5.8.1.3 Refining and Pulp Making (Defibration)

Washed chips enter a pressurized digester where high-pressure steam softens the natural lignin binding the wood fibers. The softened chips pass through a disc refiner (defibrator), which mechanically separates them into fine, uniform cellulosic wood pulp.

5.8.1.4 Glue Blending and Resin Addition

The hot wood pulp stream is injected with thermosetting synthetic resins (such as urea-formaldehyde or melamine-fortified resin), paraffin wax emulsion (for moisture resistance), and minor curing additives inside a continuous blow-line blender.

5.8.1.5 Flash Drying and Mat Forming

Resin-coated fibers are pneumatically conveyed through a high-velocity heated flash dryer tube to reduce moisture content to target production levels. The dried fibers are then air-laid continuously onto a moving mesh belt by a mechanical mat former, creating a thick, uniform mat of wood fiber.

5.8.1.6 Pre-Pressing and Main Hot Pressing

The thick fiber mat passes through a continuous pre-press to expel entrapped air and consolidate thickness. The pre-pressed mat enters a multi-opening or continuous hydraulic hot press operating under high temperature and pressure, fully curing the resin binder and consolidating the fibers into raw MDF sheets.

5.8.1.7 Cooling, Sanding, and Trimming

Hot MDF panels exit the press onto a rotating star cooler to equalize board temperature and relieve thermal stresses. Once cooled, the broad panels pass through a high-precision multi-head sanding machine to achieve exact thickness tolerances and smooth surface finish, followed by edge-trimming saws that cut the panels to standard dimensional sizes.

5.8.2 Paper Impregnation Process

The impregnation line converts plain decorative or kraft paper into resin-saturated, semi-cured surfacing sheets for lamination.

Paper Unwinding Jumbo rolls of decorative printed paper or plain kraft paper are mounted onto a dual-arm automatic unwinding station that maintains constant web tension and alignment to prevent tearing or wrinkling.

Resin Impregnation Bath The paper web passes through a dipping tank containing liquid melamine-formaldehyde (MF) or urea-formaldehyde (UF) resin mixed with

catalysts, wetting agents, and release agents. Roller press nips ensure complete resin penetration throughout the paper cross-section.

Drying and B-Staging (Convection Tunnel) The saturated paper web travels through a multi-zone hot air convection dryer. In this tunnel, volatile solvents and water evaporate while the resin undergoes partial polymerization into a stable, non-tacky "B-stage" state.

Cooling Rollers Upon exiting the drying tunnel, the warm paper web runs over internal water-chilled cooling cylinders to arrest thermal curing immediately and stabilize the semi-cured resin film.

Cut-to-Size shearing A high-speed rotary cutter synchronizes with line speed to shear the continuous web into discrete paper sheets matching the exact dimensions of the target MDF panels.

Stacking and Storage Cut impregnated sheets are neatly stacked onto hydraulic lift tables using automatic air-float stackers. Stacks are wrapped in moisture-barrier film and stored in climate-controlled cleanrooms to prevent premature curing before pressing.

5.8.3 Lamination Process

The lamination line fuses the semi-cured impregnated paper onto the raw MDF core to produce the final decorative panel.

5.8.3.1 Raw Board Feeding and Cleaning

Raw MDF panels are loaded onto an automated vacuum feeder line. High-efficiency rotary brush units and air knives remove surface dust particles that could cause surface blemishes or bonding defects.

5.8.3.2 Paper Lay-Up Station

Impregnated paper sheets are placed onto both top and bottom surfaces of the cleaned MDF panel. This layout can be performed manually or via high-precision mechanical suction alignment arms to ensure perfect square alignment.

5.8.3.3 Short-Cycle Hot Press Lamination

The assembled sandwich (paper/MDF/paper) moves into a short-cycle hydraulic press. Under elevated temperatures (190 °C to 210 °C) and high hydraulic pressure (20-30 kg/cm²), the B-stage resin liquefies, flows into the MDF surface pores, and fully cross-links (C-stage) within 15-30 seconds.

5.8.3.4 Edge Trimming and Beveling

Upon press release, automated inline edge-trimming saws trim away excess cured resin overhang and flash, producing straight, squared board edges.

5.8.3.5 Cooling and Off-Line Conditioning

Laminated boards pass onto a star cooling wheel, allowing gradual heat dissipation to eliminate internal board stresses and prevent panel warping.

5.8.3.6 Quality Inspection and Automatic Stacking

Cooled laminated boards undergo visual and optical surface inspection for color consistency, press-plate texture fidelity, and surface defects. Passed boards are automatically picked and stacked onto pallets by vacuum lifters, ready for banding and warehouse distribution.

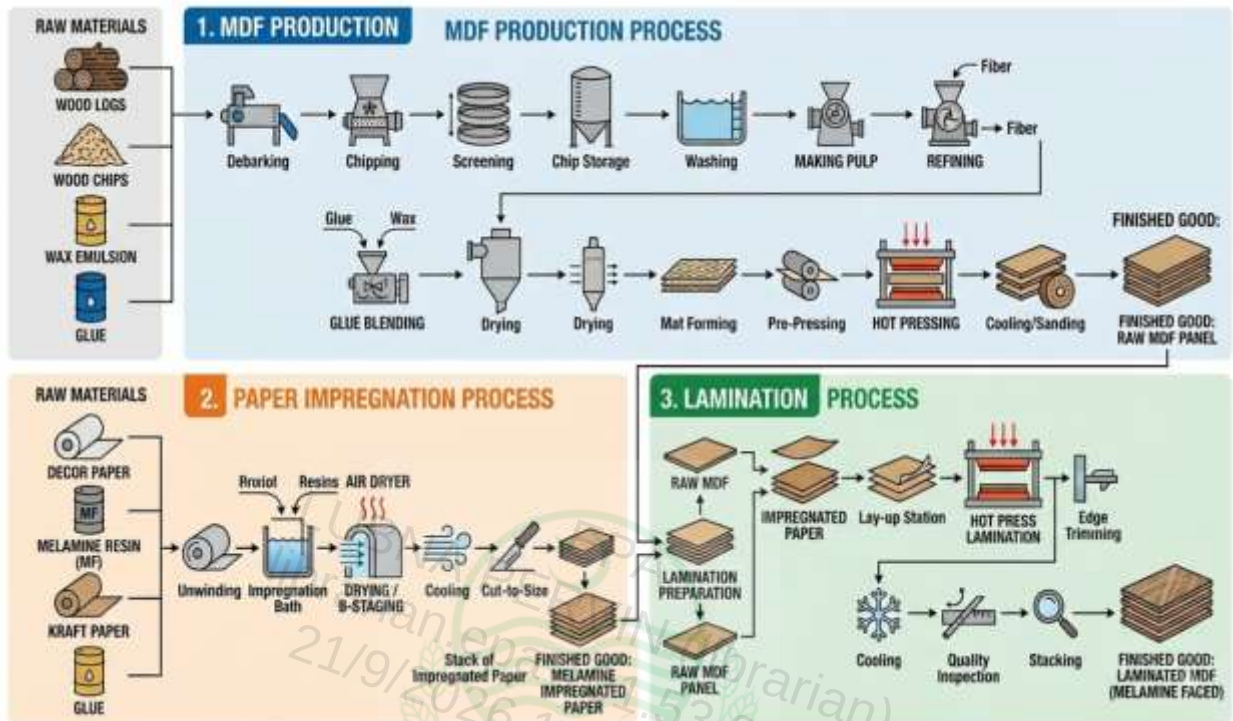


Figure 5-3: Paper Impregnation and Laminated MDF Production Process

5.9 Description of Employment

Table 5-1: Description of Employment

	Male Skilled	Male Unskilled	Female Skilled	Female Unskilled	Total Employees
Year-1	15	20	3	2	40
Year-2	15	20	3	2	40
Year-3	20	24	5	3	52
Year-4	22	26	6	4	58
Year-5	25	30	7	5	67

5.10 Hours of Operation

The daily hours of operation span an eight-hour window.

5.11 Current land Use

The land designated for the paper impregnation and laminated MDF manufacturing unit is open and classified as industrial land, located within an established industrial

estate. The site is suitable for the establishment of the manufacturing facility without conflicting with local agricultural practices or land use regulations.

5.12 Area of the Project

The total area of the proposed project site is **5.5 acres** (comprising Plot No.43-A measuring 3 acres and Plot No. 44-B measuring 2.5 acres.

5.13 Road Access

The project site at Plot No. 43-A and Plot No. 44-B in Multan Industrial Estate, Phase-I, is accessible via the main Multan Industrial Estate arterial network, which connects directly to the Multan southern bypass road. The access roads within the industrial estate and leading to the highway are fully paved, heavy-duty, and in good condition, facilitating excellent transport connectivity for commercial heavy vehicles.

5.14 Cost of the Project

The total estimated capital cost for the establishment of the paper impregnation and laminated MDF manufacturing unit by **M/S Shaheen Wood (Pvt.) Ltd.** is **PKR 35 Million**.

5.15 Schedule of Implementation

The outlined project implementation schedule is intended to be followed, contingent upon smooth execution as per the plan and the absence of significant obstacles. The implementation stages of the project activity include:

1st Stage

The stage –1 comprises the onsite contouring studies and soil investigations and the finalization of designs.

2nd Stage

The stage –2 comprises the following task:

- Digging the ground to lay foundation and starting to build or put together the structure.
- Building support structures and foundation work.
- Beginning construction, electrical and mechanical tasks.
- Establishing essential infrastructure.
- Fitting of instrumentation

3rd Stage

The stage –3 comprises the following task

- Commercial building civil structure erection completion.
- Completion of the basic infrastructures water supply system, electricity supply etc.

4th Stage

The last stage will be the commencement of regular use of the unit.

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6 DESCRIPTION OF ENVIRONMENT

6.1 General

The chapter on the "Description of the Environment" in an EIA serves as a comprehensive canvas depicting the intricate web of ecosystems, communities, and natural resources that could be influenced by the proposed project. This crucial section meticulously outlines the existing environmental conditions of the project area, including but not limited to flora, fauna, air and water quality, soil composition, and human settlements. By providing a detailed snapshot of the baseline environmental conditions, this chapter becomes the benchmark against which potential impacts are measured. This exploration of the existing environment not only aids in identifying sensitive receptors but also sets the stage for a thorough analysis of how the project might interact with and potentially alter the delicate balance of the surrounding ecology. Consequently, the "Description of the Environment" chapter is indispensable for understanding the context in which the proposed project is situated, facilitating a holistic evaluation of its potential environmental implications.

6.2 History

Multan, one of the oldest cities in South Asia, boasts a rich and diverse history spanning thousands of years. Known as the "City of Saints," Multan has been a significant cultural, religious, and commercial hub. Its history dates back to ancient times when it was a prominent center of the Indus Valley Civilization. The city was later conquered by Alexander the Great in 326 BCE, becoming part of the Hellenistic world. Throughout the centuries, Multan experienced various invasions and rule by different empires, including the Maurya, Gupta, and Kushan empires. In the early Islamic period, Multan became a major center of the

Islamic world after being conquered by Muhammad bin Qasim in 712 CE. The city flourished under the Ghaznavids, Ghurids, and later the Delhi Sultanate and the Mughal Empire, which left a profound architectural and cultural legacy. Multan's strategic location made it a coveted prize for successive empires, including the Sikhs and the British in the 19th century. Today, Multan is renowned for its historical monuments, Sufi shrines, and rich cultural heritage, reflecting its storied past and diverse influences.



Figure 6-1: District Map

6.3 Land Use

Land use in Multan is a mix of urban, agricultural, and commercial areas, reflecting the city's historical significance and contemporary growth. The fertile alluvial plains surrounding the city are primarily used for agriculture, with major crops including wheat, cotton, sugarcane, and various fruits and vegetables, particularly mangoes, for which the region is famous. Irrigation systems, fed by the Chenab River, play a crucial role in supporting this agricultural activity.

The urban area of Multan encompasses residential neighborhoods, commercial centers, and industrial zones. The city is expanding with modern infrastructure, including educational institutions, healthcare facilities, and transportation networks. Historical and cultural landmarks, such as ancient forts, mosques, and shrines, are integral parts of the urban landscape, attracting both local and international tourists.

In addition to agriculture and urban development, there are areas designated for parks and recreational activities, providing green spaces within the city. The ongoing expansion and development projects aim to balance the preservation of Multan's historical heritage with the needs of a growing population, ensuring sustainable and efficient land use.

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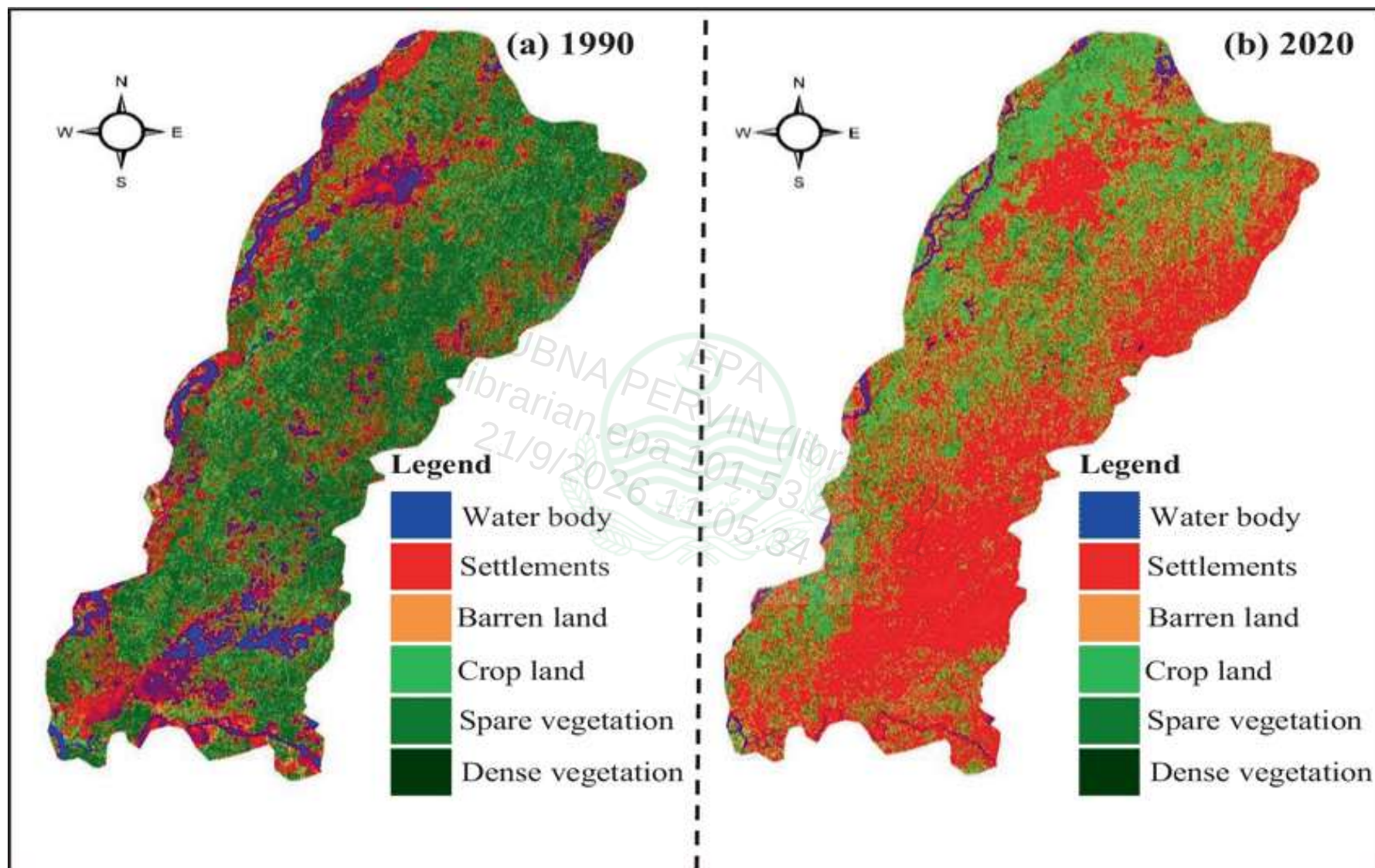


Figure 6-2: Land Use Map

6.4 Topography

Multan, situated at approximately 30.1575° N latitude and 71.5249° E longitude, stands at an elevation of around 125 meters (400 feet) above sea level. The city's landscape is predominantly flat with a slight southern slope, part of the alluvial plains of the Indus River, which contributes to its fertile soil. Near the Chenab River, a major river in the Punjab region, Multan benefits significantly from its presence, influencing agriculture and irrigation. The city experiences a hot desert climate (Köppen BWh), with scorching summers reaching over 40°C (104°F) and mild winters with temperatures dropping to about 4°C (39°F) at night. Annual rainfall is minimal, averaging around 186 mm (7.3 inches), mainly during the monsoon season from July to September. The soil, primarily alluvial from the Chenab River's flooding, is highly fertile, supporting crops like wheat, cotton, and sugarcane. Despite the arid climate, irrigation has transformed the landscape, enabling extensive agricultural activities, particularly the cultivation of mango orchards.

To the North and East: The landscape is dominated by agricultural fields and rural settlements.

To the South and West: The terrain becomes more arid, with patches of desert and scrubland.

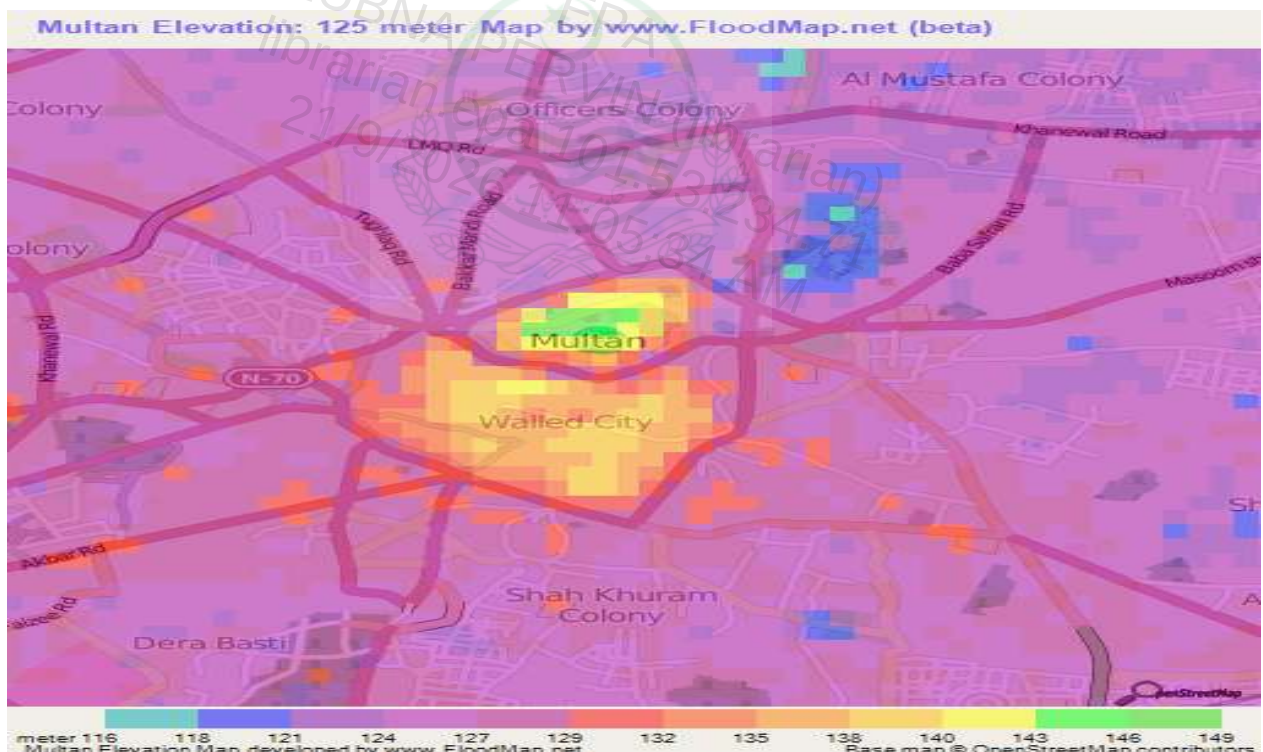


Figure 6-3: Topography of the Project Area

6.5 Soils

The soil in Multan is predominantly alluvial, deposited by the flooding of the nearby Chenab River. This alluvial soil is highly fertile, making it ideal for agriculture. The fertility of the soil supports a variety of crops, including wheat, cotton, and sugarcane, which are staples of the region's agricultural output. The presence of the river has

historically provided essential nutrients and water, enhancing the soil's productivity. Despite the region's arid climate, extensive irrigation systems have been developed to maximize the agricultural potential of this fertile soil, transforming the landscape into a patchwork of cultivated fields and orchards, notably mango groves, which thrive in the nutrient-rich earth.

6.6 Climate

6.6.1 Average Temperature

Multan experiences a hot desert climate, characterized by extreme temperatures, particularly during the summer months. On average, summer temperatures in Multan can soar above 40°C (104°F), with peak temperatures often reaching even higher levels, making it one of the hottest cities in Pakistan. The winter season, in contrast, is mild, with average daytime temperatures ranging from 15°C to 20°C and nighttime temperatures occasionally dropping to around 10°C. The transitional seasons of spring and autumn are brief, with temperatures gradually shifting from the extreme heat of summer to the mild coolness of winter and vice versa. The significant temperature variations between seasons highlight the city's arid climate, with long, scorching summers and short, relatively pleasant winters.

Table 6-1: Climatic Conditions of Project Area

Month	Day	Night	Rainy Days
	Temperature (°C)		
January	21	10	1
February	25	12	2
March	31	18	3
April	37	24	3
May	42	29	4
June	43	32	4
July	41	33	9
August	39	31	8
September	39	28	4
October	36	23	2
November	29	17	1
December	24	12	1

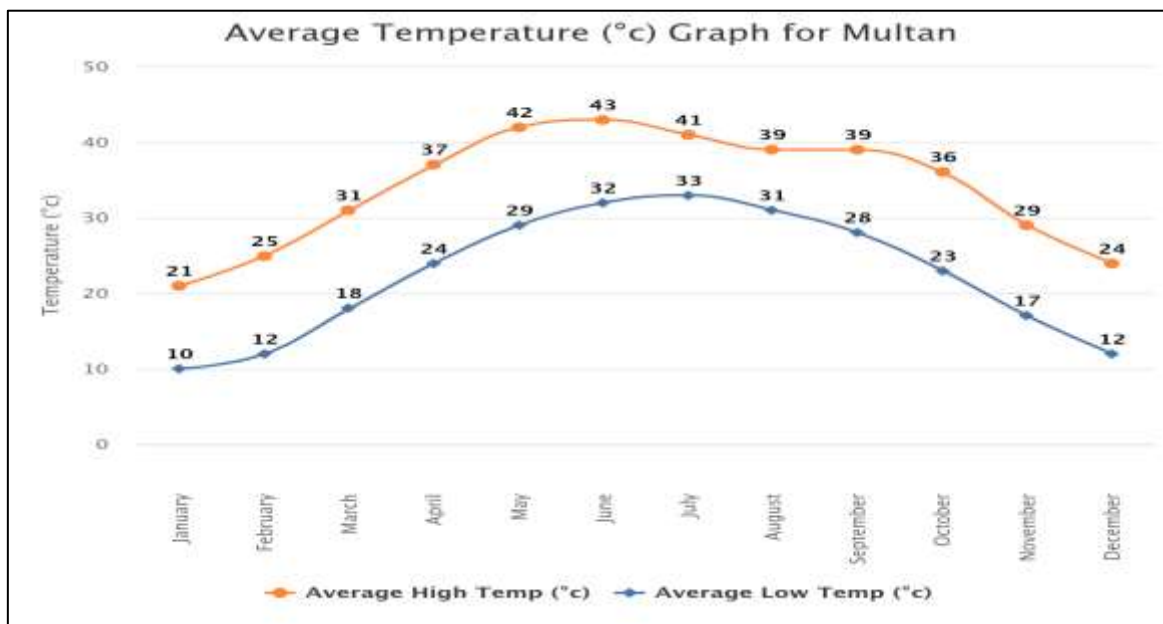


Figure 6-4: Average Temperature of the Project Area

6.6.2 Average Rainfall

Multan receives an average annual rainfall of approximately 186 mm (7.3 inches), indicative of its arid climate. The majority of the rainfall occurs during the monsoon season, which spans from July to September, contributing to short but intense bursts of precipitation. Outside of the monsoon period, rainfall is scarce, and the region often experiences long dry spells. This limited and highly seasonal rainfall pattern necessitates reliance on irrigation from the Chenab River and other sources to support agricultural activities. The sparse rainfall, combined with high temperatures, underscores the challenges of water management and the importance of efficient irrigation systems in sustaining both urban and rural livelihoods in Multan.

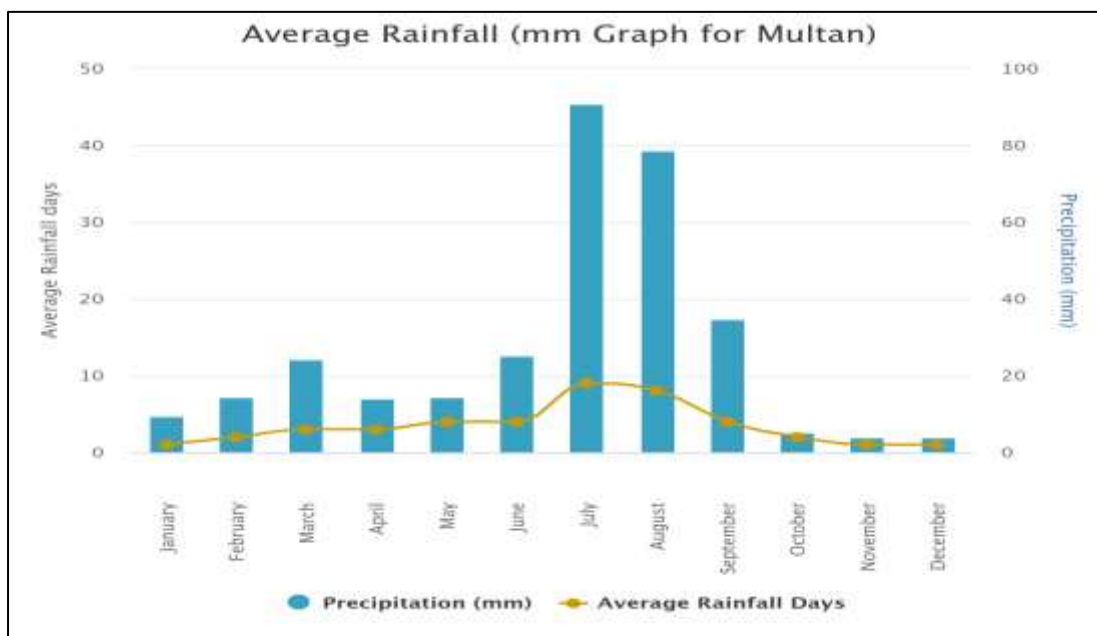


Figure 6-5: Average Rainfall of the Project Area

6.6.3 Average Sun Hours

Multan enjoys abundant sunshine throughout the year, reflecting its arid climate. On average, the city receives approximately 3,200 to 3,500 hours of sunlight annually. During the peak summer months, from May to August, the sun shines for up to 11-13 hours per day, contributing to the extremely high temperatures characteristic of the region. Even in winter, from November to February, the city typically experiences 8-10 hours of sunlight daily. This high amount of sunshine supports agricultural activities, particularly the growth of sun-loving crops like wheat and cotton, and facilitates solar energy initiatives, which are increasingly important in the region's energy landscape. The consistent and intense sunlight is a defining feature of Multan's weather patterns, influencing both the natural environment and human activities.

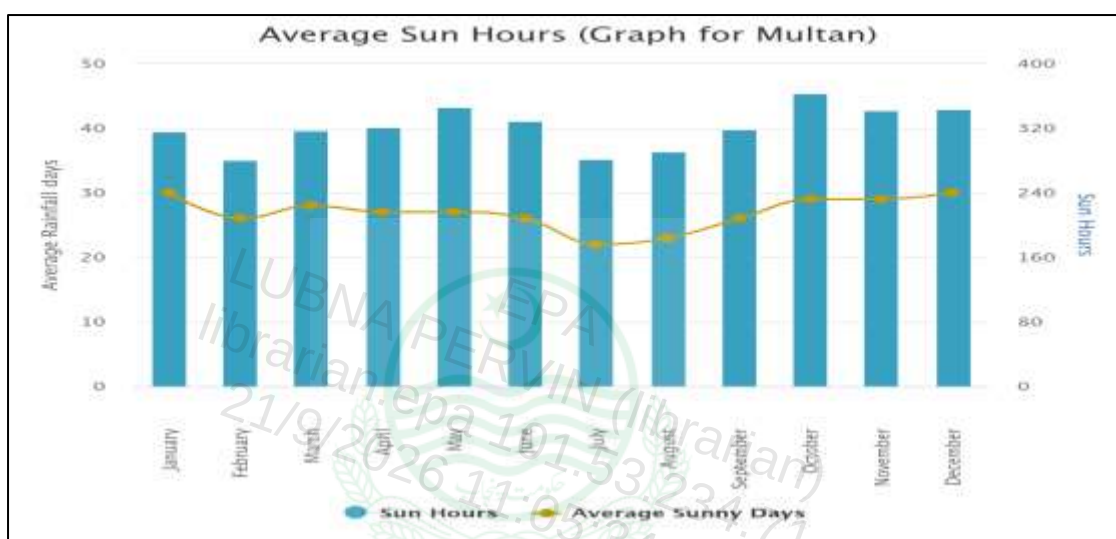


Figure 6-6: Average Sun Hours

6.7 Seismicity

Multan is located in a region that is relatively less prone to seismic activity compared to other parts of Pakistan, such as the northern and western regions, which lie closer to major tectonic boundaries. The city is situated on the stable part of the Indo-Gangetic Plain, away from the more active seismic zones associated with the collision of the Indian and Eurasian plates. While Multan does experience occasional minor tremors, significant earthquakes are rare.

6.8 Water Resources

Multan is renowned for its abundant water resources, which play a vital role in sustaining agriculture and livelihoods in the region. The city is strategically located near several major rivers and canals, including the Chenab River and its various distributaries. These water bodies serve as crucial sources of irrigation, facilitating the cultivation of crops throughout the year. Additionally, Multan benefits from a well-established canal irrigation system, which efficiently distributes water to agricultural lands, ensuring optimal crop growth and productivity. The availability of such extensive water resources underscores Multan's importance as an agricultural hub and highlights its capacity to support diverse agricultural activities.

6.9 Flora

The project site showcases a diverse floral landscape that reflects the region's rich agricultural heritage. Known for its fertile soil and favorable climate, Multan supports a variety of flora that contributes to its vibrant ecosystem. The project site features a mix of indigenous plant species, cultivated crops, and ornamental plants, creating a visually appealing environment. From lush greenery to colorful blooms, the floral diversity not only enhances the aesthetic appeal of the area but also plays a crucial role in supporting local biodiversity. The integration of native plants and carefully selected species not only enhances the ecological balance but also promotes sustainable landscaping practices.

Figure 6-7: Flora of the Project Area

Sr. No.	Local Name	Scientific Name
Crops		
1	Cotton	<i>Gossypium hirsutum</i>
2	Mango	<i>Mangifera indica</i>
3	Rice	<i>Oryza sativa</i>
4	Guava	<i>Psidium guajava</i>
Trees		
1	Indian Laurel	<i>Ficus microcarpa</i>
2	Shisham	<i>Dalbergia sissoo</i>
3	Kikar	<i>Vachellia nilotica</i>
4	Jamun	<i>Syzygium cumini</i>
5	Neem	<i>Azadirachta indica</i>
6	Siris	<i>Albizia lebbek</i>
Medicinal Plants		
1	Rubber bush	<i>Calotropis procera</i>
2	Field sow-thistle	<i>Sonchus arvensis</i>
3	Goosefoot	<i>Chenopodium album</i>

6.10 Fauna

The Multan Region, located in the southern part of Punjab Province, Pakistan, is part of the Indus Plain. This region experiences a hot arid climate with scarce rainfall. Despite these conditions, the Multan Region still supports a variety of fauna.

Birds: The region is a haven for a variety of bird species due to the presence of the Indus River and some canal systems. Common birds include eagles, kites, hawks, falcons, vultures, owls, herons, egrets, kingfishers, mynas, and a variety of songbirds.

Mammals: Jackals, foxes, mongoose, and rodents are some of the mammals found in the region. There are also reports of wild boars and hedgehogs.

Reptiles: Snakes, including the Indian cobra and vipers, as well as lizards are present in the region.

Insects: The region has a variety of insects, including butterflies, moths, bees, and flies.

6.11 Socio-Economic Conditions

The agricultural activities in the project area are integral to its economic and social fabric, benefiting from the fertile lands and favorable climatic conditions. The vicinity is primarily dedicated to farming, with a focus on crops such as cotton, rice, mangoes, and guavas, reflecting the region's agricultural diversity. Farmers here engage in modern farming techniques, including irrigation from nearby water resources like the Miani distributary, ensuring consistent yields and quality produce. Beyond agriculture, the area supports essential facilities such as markets for trading agricultural products, healthcare facilities for the well-being of residents and workers, warehouses for storage, and restaurants serving local cuisine. This integration of agricultural production with essential services not only sustains livelihoods but also fosters a thriving community and economic development in the project area.

6.12 Quality of life

The quality of life in the project area is marked by a blend of rural tranquility and essential urban amenities, fostering a balanced and fulfilling lifestyle. Residents benefit from the serenity of agricultural surroundings, characterized by expansive fields and a clean, natural environment conducive to relaxation and outdoor activities. Access to healthcare facilities ensures timely medical attention, contributing to overall well-being and peace of mind. The presence of local markets offers convenient access to fresh produce and household necessities, supporting a healthy lifestyle. Additionally, recreational opportunities in the form of parks or community spaces provide avenues for social interaction and leisure. Overall, the project area strikes a harmonious balance between agricultural productivity and modern conveniences, enhancing the quality of life for its inhabitants through a sustainable and enriching environment.

6.12.1 Demographic Survey

As of 2023, the Multan District has an estimated population of over 5.3 million. There's a significant urban population with around 43% residing in urban areas like Multan city itself.

Table 6-2: Area Population by Sex, Sex Ratio, Population Density, Urban Proportion, Household Size, and Annual Growth Rate

ADMIN - UNIT	AREA (SQ. KM.)	POPULATION - 2017								POPULATION 1998	1998-2017 AVERAGE ANNUAL GROWTH RATE
		ALL SEXES	MALE	FEMALE	TRANS- GENDER	SEX RATIO	POPULATION DENSITY PER SQ. KM.	URBAN PROPORTION	AVERAGE HOUSEHOLD SIZE		
1	2	3	4	5	6	7	8	9	10	11	12
MULTAN DISTRICT	3,720	4,746,166	2,435,195	2,310,408	563	105.40	1275.85	43.38	6.17	3,116,851	2.23
RURAL		2,687,246	1,375,395	1,311,553	298	104.87			6.20	1,802,103	2.12
URBAN		2,058,920	1,059,800	998,855	265	106.10			6.12	1,314,748	2.38
JALALPUR PIRWALA TEHSIL	978	554,971	281,167	273,759	45	102.71	567.46	12.15	6.13	364,716	2.23
RURAL		487,518	247,132	240,350	36	102.82			6.14	332,497	2.03
URBAN		67,453	34,035	33,409	9	101.87			6.05	32,219	3.96
MULTAN CITY TEHSIL	304	2,259,115	1,161,032	1,097,834	249	105.76	7431.30	80.87	6.14	1,381,478	2.62
RURAL		432,114	224,005	208,071	38	107.66			6.12	303,233	1.88
URBAN		1,827,001	937,027	889,763	211	105.31			6.15	1,078,245	2.81
MULTAN SADDAR TEHSIL	1,632	1,323,076	684,064	638,807	205	107.08	810.71	6.38	6.15	950,034	1.76
RURAL		1,238,708	636,150	602,391	167	105.60			6.18	803,159	2.30
URBAN		84,368	47,914	36,416	38	131.57			5.60	146,875	-2.87
SHUJABAD TEHSIL	806	609,004	308,932	300,008	64	102.97	755.59	13.15	6.32	420,623	1.96
RURAL		528,906	268,108	260,741	57	102.83			6.37	363,214	1.99
URBAN		80,098	40,824	39,267	7	103.97			6.01	57,409	1.77

6.12.2 Literacy Rate

Table 6-3: Population (10 Years and Above) By Literacy, Sex and Rural/ Urban

Multan District	Total Population	3,452,652
	Literate	1,373,670
	Illiterate	2,078,982
	Literacy Ratio	60.21
Jalal Pirwala Tehsil	Total Population	379,292
	Literate	237,461
	Illiterate	141,478
	Literacy Ratio	37.38
Multan City Tehsil	Total Population	1,701,977
	Literate	478,953
	Illiterate	1,223,024
	Literacy Ratio	71.86
Multan Saddar Tehsil	Total Population	947,223
	Literate	447,270
	Illiterate	499,953
	Literacy Ratio	52.78
Shujabad Tehsil	Total Population	424,243
	Literate	209,986
	Illiterate	214,257
	Literacy Ratio	50.50

6.12.3 Religion

The vast majority of people in Multan are Muslim. Estimates suggest around 99% of the population adheres to Islam. After Islam, Christianity is the most prominent, with estimates suggesting around 0.5% of the population.

6.12.4 Languages

Saraiki is the primary language for over 64% of the population according to the 2017 census. Punjabi is spoken by around 17.77% of the population. Whereas, Urdu is spoken and understood by 16.20% of the population.

6.13 Basic Facilities in Study Area

In Multan, basic facilities cater to the diverse needs of its population. The city boasts well-established healthcare facilities, educational institutions, and bustling marketplaces that ensure residents have access to essential services and goods. Transportation networks are robust, connecting various parts of the city and facilitating smooth commuting.

In the project area specifically, amenities such as local markets provide a hub for agricultural trade, while healthcare facilities and educational institutions support the well-being and development of the community. These facilities not only contribute to enhancing the quality of life but also bolster the area's infrastructure for sustainable growth and prosperity.

6.14 Educational Facilities in Study Area

Multan is renowned for its abundance of educational facilities, catering to a wide range of academic pursuits. Among the prominent institutions are Bahauddin Zakariya University, known for its comprehensive programs across various disciplines, and Government College University, which offers quality education and research opportunities. These institutions contribute significantly to the city's intellectual capital and educational excellence.

In the project area, there are essential educational institutions including a Government Degree College and a Higher Secondary School. These institutions play crucial roles in providing accessible education to local residents, fostering intellectual growth, and preparing students for higher education or vocational paths. The presence of these schools underscores the commitment to educational development within the project area, ensuring that educational opportunities are readily available to all members of the community.

6.15 Health Facilities in Study Area

Multan is well-equipped with a variety of healthcare facilities that cater to the health needs of its residents. Among these are notable hospitals such as Nishtar Hospital, which is a major tertiary care hospital providing comprehensive medical services, and the Children's Hospital Multan, specializing in pediatric care. These facilities play a crucial role in ensuring accessible healthcare services across the city.

In the project area, healthcare needs are served prominently by the Social Security Medical Centre.

6.16 Archeological Areas near Project Area

There are no archaeological sites present within the project area. The landscape predominantly dedicated to industrial activities and surrounded by industrial settings, lacks historical remnants or artifacts of significant archaeological value.

6.17 Site Suitability

The combination of physical, ecological, and cultural data underscores the project site as an ideal location for construction projects.

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7 SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

7.1 General

The importance of impact assessment in EIA cannot be overstated, as it serves as a fundamental tool for evaluating and understanding the potential effects of a proposed project on the environment. Impact assessment systematically identifies, predicts, and evaluates the anticipated positive and negative consequences of a project, considering various environmental aspects such as air and water quality, biodiversity, soil health, and community well-being. This process is pivotal in informed decision-making, enabling stakeholders to assess the trade-offs and make choices that balance development with environmental conservation. The impact assessment phase provides a comprehensive understanding of the project's potential impacts, allowing for the development of effective mitigation measures and strategies to minimize or eliminate adverse effects. Additionally, it fosters transparency and accountability by providing a basis for public consultation and engagement, ensuring that the concerns and perspectives of affected communities are considered. Overall, impact assessment in EIA is essential for promoting sustainable development practices, preventing environmental degradation, and fostering responsible and informed decision-making in the planning and execution of projects.

7.2 Project Area of Influence

Before commencing the environmental analysis of the project, it is essential to define the specific area of influence. While the primary construction activities will be contained within predetermined boundaries, there are certain aspects where construction-related tasks may extend beyond these confines. These include

- Establishment of construction camps and erection of material grinding plants on temporarily acquired land
- Borrowing soil material from temporarily acquired land
- Quarrying aggregate material; and Construction of haul tracks for transportation of construction material, etc.

Environmental impacts have been identified within the Project Area of Influence; which lies within 0.5 km boundary of the proposed project site. Therefore, the identification of Project impacts and recommendations of mitigation measures will be limited within this area.

7.3 Methodology for impact assessment

In conducting the impact assessment for the project, a comprehensive methodology was adopted, encompassing both qualitative and quantitative assessments to provide a well-rounded understanding of potential effects. The qualitative assessment involved a systematic and in-depth analysis of the project's potential impacts on various environmental and social aspects. This included considering factors such as air and water quality, biodiversity, community health, and cultural heritage. Qualitative data often derived from expert opinions, literature reviews, and consultations, were employed to evaluate the significance of these impacts.

Simultaneously, a quantitative assessment was carried out to provide a numerical representation of specific parameters, allowing for a more precise measurement of the potential consequences. This involved data collection through field measurements, modeling, and statistical analyses to quantify environmental and social variables. The combination of qualitative and quantitative assessments ensured a holistic and rigorous evaluation, enabling a more nuanced understanding of the project's potential impacts and contributing to the formulation of effective mitigation strategies.

7.4 Impacts during Construction Phase

The detailed risk Matrix of Construction phase is shown in the table.

Table 7-1: Screening of Possible impacts during Construction Phase

Potential Impacts	Likelihood (Certain, Likely, Unlikely, Rare)	Consequences (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)
Soil Erosion	Likely	Minor	Low
Land Contamination	Likely	Minor	Low
Soil Contamination	Likely	Minor	Low
Solid Waste	Likely	Minor	Low
Contractor Camp	Likely	Minor	Low
Ground Water	Likely	Minor	Low
Dust	Likely	Moderate	Low
Noise	Likely	Minor	Low

7.4.1 Land Contamination

The construction machinery, including cranes, trucks, loaders/dumpers, and batching plants, used during the construction period can release or spill lubricants, oil, chemicals, and toxic materials, contaminating the land. Paints used in the construction phase can also pose threats to both the environment and human health.

Mitigation Measures

Land contamination will be controlled by the following measures:

- Vehicles and other equipment will be maintained only in designated areas with concrete slabs.
- Prevent the release of contaminated effluent into the environment.
- Direct machinery wash and other potentially contaminated effluents will be drain to a mud pit.

- Proper Handling and storage of fuels, oils, and other hazardous substances according to standard safety practices, such as using secondary containment will be ensured.
- Fuel tanks will be properly labeled and have impervious linings and dykes.
- Leakages during fuel and oil transfer operations will be prevented.
- Checking of fuel, oil, and chemical storage daily for leaks will be ensured.
- Shovels, plastic bags, sandbags, and absorbent materials will be available near fuel and oil storage areas.
- Vehicles will be properly maintained to avoid spills.
- Maintain a leak/spill record for each vehicle.
- Control of soil contaminated by moderate spills or leaks (up to 200 liters) using shovels, sand, and mud.

7.4.2 Soil Erosion

Soil erosion may occur in the construction area due to improper runoff management from equipment washing yards and inadequate construction management practices. This impact is considered negative of minor magnitude.

Mitigation Measures

Soil erosion will be controlled by using good engineering practices especially both at construction site and peripheral area. Following measures should be taken to avoid soil erosion due to runoff water:

- Ensuring that surface run-off controls are implemented and maintained so as to minimize erosion.
- Main drainage courses within the proposed project development site will be lined to avoid erosion.
- Plantation of indigenous grass which will flourish under project site conditions. This should be done for low road embankments.

7.4.3 Soil Contamination

Soil contamination during the construction phase can occur from waste generated from construction camps, such as garbage, putrescible waste, rubbish, and residues; discarded construction materials, such as wires, plastics, cut pieces of pipes, pieces of empty fuel and lubricant tins, and cardboard packing materials; and paint, varnishes, and other hazardous chemicals and toxic materials used in construction activities. This impact is considered negative of minor magnitude.

Mitigation Measures

- Oil, paint, and other chemical leakages will be controlled by storing these substances in special containers. Keep these containers away from unauthorized people and only allow authorized personnel to access them.

- Store other chemicals in adequate and appropriate places, depending on the type of material.
- Place safety equipment, such as fire extinguishers, near these storage areas, along with signs warning of danger and fire.
- Provide workers with Material Safety Data Sheets (MSDS) for each chemical, and take care when handling and storing these chemicals.
- Develop and implement a proper solid waste management plan to avoid waste problems.
- Collect solid waste by placing solid waste collection containers at various locations. Provide separate arrangements for organic and inorganic waste, and make workers aware of the solid waste management system in place at the site.

7.4.4 Impacts of Dust Emissions

Construction activities require machinery and equipment's such as transport vehicles, cranes, excavators, trucks for material excavation, dump/haul truck, etc. This machinery will generate air emissions that contain particulate matter (PM), smoke, dust, Carbon Monoxide (CO), and Oxides of Nitrogen (NO₂).

Mitigation Measures

- Vehicular emissions of NO_x, oxides of sulfur, PM, and CO will be controlled by tuning and maintaining vehicles in good working condition.
- Dust emissions will be controlled by regularly sprinkling water and covering trucks carrying earth, sand, aggregate, and other materials.
- Cover all trucks hauling soil, sand and other loose materials.
- Tuning of all equipment, generators, and vehicles used during the construction phase.
- Ensuring that concrete mixers meet the requirements of zero emissions.
- Daily sweeping (with water sweepers) of all paved access roads, parking areas and staging areas at construction sites.
- Minimizing dust emissions due to vehicular traffic by reducing speed, minimizing traffic through good traffic management, and sprinkling water when required.
- Minimizing dust emissions at construction sites by implementing best management practices.

7.4.5 Impact of Noise

Construction activities may increase noise levels at active construction sites. Noise impact on construction workers/ laborers may be avoided in case of loud noise by provision of adequate. This impact is considered negative of moderate magnitude.

Mitigation Measures

Following measures should be adopted to minimize the noise levels;

- Noise barriers (paneled fencing) will be installed where possible to keep the noise levels within permissible limits.
- While replacing equipment, quieter alternatives will be purchased. New equipment may introduce a noise problem; therefore, a noise assessment will be carried out while installing new piece of equipment.
- Contractor obligation will be to use appropriate and fit machinery.
- Noise analysis will be done every month during construction phase.

7.4.6 Impact of Solid Waste and Sewerage Generation

The contractor camp is expected to generate waste. Improper disposal of this waste can lead to both land and water contamination. To address this, storage and collection system will be provided. This impact is considered minor but negative.

Mitigation Measures

- Solid waste will be collected and segregated.
- Material suitable for recycling will be stored separately and will be handed to vendor.
- It will be ensured that the dumping area having construction waste will be leveled properly after disposal of waste material.

7.4.7 Safety Hazard

The construction phase poses unique safety hazards that require vigilant management to ensure the well-being of workers and the surrounding community. Common hazards include falls from heights, particularly for workers on scaffolding or rooftops, emphasizing the need for proper fall protection measures. Heavy machinery operation poses risks such as collisions and equipment malfunctions, necessitating strict safety protocols and training. Dust and debris generated during construction can lead to respiratory issues, emphasizing the importance of dust control measures and personal protective equipment. Excavation activities may pose risks of cave-ins, demanding proper shoring and trenching practices. Electrical hazards and inadequate signage can contribute to accidents. Construction sites must adhere to rigorous safety standards, enforce proper training for workers, and implement comprehensive safety plans to mitigate these hazards and ensure a secure working environment during the construction phase.

Mitigation Measures

- Enforcement and proper use of PPE by all construction workers.
- Provision of appropriate tools, equipment, and machinery in sound working conditions to employees.
- Proper arrangement of lighting to reduce accidents.

7.5 Impacts during Operational Phase

Table 7-2: Screening of Possible impacts during Operational Phase

Potential Impacts	Likelihood (Certain, Likely, Unlikely, Rare)	Consequences (Catastrophic, Major, Moderate, Minor)	Risk Level (Significant, Medium, Low)
Noise	Likely	Minor	Low
Air Quality	Likely	Minor	Low
Solid Waste	Likely	Minor	Low
Safety Hazard	Likely	Moderate	Medium

7.5.1 Solid Waste

The proposed Paper Impregnation and Laminated MDF Manufacturing Units will generate different types of solid waste during construction and operation. Operational wastes may include MDF off-cuts and trimming residues, wood/MDF dust, rejected MDF panels, impregnated paper and décor paper waste, kraft paper waste, packaging materials, empty chemical/resin containers, and general domestic waste. Improper handling and disposal of these wastes may result in accumulation of waste within the facility, deterioration of site cleanliness, soil contamination and potential blockage of drainage systems.

Mitigation Measures

- MDF off-cuts, trimming residues and recoverable wood-based waste will be collected separately and reused, recovered or disposed of through appropriate channels.
- Wood/MDF dust generated during cutting, sanding and other processing activities will be collected through the installed dust extraction and collection system.
- Paper waste, cardboard, plastic and other recyclable materials will be segregated at source and sent for recycling/recovery where practicable.
- Empty resin, glue and chemical containers will be handled separately and managed in accordance with their contents and applicable requirements.
- General domestic waste generated by workers will be collected in designated waste bins and disposed of through an appropriate waste management arrangement.
- Waste will not be allowed to accumulate in production areas, open land or drainage channels.
- Regular housekeeping, employee training and monitoring will be undertaken to ensure proper waste segregation, storage, handling and disposal..

7.5.2 Noise Pollution

Noise pollution within the proposed facility may primarily arise from the operation of MDF processing machinery and equipment, including chipping, screening, refining, drying, pressing, sanding, cutting and trimming equipment. Additional noise may be generated by compressors, pumps, ventilation systems, material handling equipment and standby power generation equipment. Prolonged exposure to elevated noise levels may affect workers and may contribute to occupational health concerns if appropriate controls are not implemented.

Mitigation Measures

- Proper preventive maintenance of machinery and equipment will be carried out to minimize excessive noise and vibration.
- Noise-generating machinery will, where technically feasible, be provided with suitable acoustic enclosures, barriers or other noise-control arrangements.
- Workers exposed to elevated noise levels will be provided with appropriate hearing protection.
- Unnecessary vehicle horn use and prolonged idling of vehicles within the facility will be avoided.
- Noise levels will be monitored at relevant workplace and project boundary locations where required.
- Green belts and plantation will be developed within available areas of the project premises to provide additional environmental buffering.

7.5.3 Air Pollution

The proposed MDF manufacturing and paper impregnation operations may generate air emissions primarily in the form of wood and MDF dust, particulate matter and process fumes. Dust may be generated during handling, chipping, screening, refining, sanding, cutting and trimming of wood-based materials. Resin application, impregnation and drying operations may also result in the release of process vapors, while the standby generator, when operated, may produce combustion emissions. If not properly controlled, these emissions may affect workplace air quality and the surrounding environment.

Mitigation Measures

- Dust-generating machinery and processing areas will be connected to appropriate dust extraction and collection systems.
- The sand/dust collection system and associated equipment will be regularly operated, inspected and maintained.
- Adequate ventilation will be provided in production, resin handling, impregnation and drying areas.
- Resin and chemical containers will be properly closed when not in use to minimize unnecessary vapor release.

- Appropriate exhaust and ventilation arrangements will be maintained for drying and hot-pressing operations.
- Vehicles, machinery and standby power equipment will be regularly maintained and operated in proper working condition.
- Workers in dust-generating areas will be provided with appropriate respiratory and eye protection.
- Regular housekeeping will be undertaken to prevent accumulation and secondary dispersion of wood/MDF dust

7.5.4 Safety Hazard

The proposed facility will involve the operation of mechanical equipment, hot presses, electrical installations, dust-generating machinery and the handling of melamine resin, glue, wax and other process materials. Workers may therefore be exposed to mechanical, chemical, electrical, thermal, fire and ergonomic hazards. Wood and MDF dust accumulation may also increase fire risk if appropriate housekeeping and dust-control measures are not maintained. Proper safety management, worker training and emergency preparedness will therefore be essential during operation.

Mitigation Measures

- A comprehensive occupational health and safety manual will be prepared and implemented for workers.
- Appropriate Personal Protective Equipment (PPE), including safety helmets, safety shoes, gloves, eye protection, hearing protection and respiratory protection, will be provided according to the nature of the work.
- Fire extinguishers and other appropriate firefighting equipment will be installed at accessible and strategically important locations.
- Workers will receive regular training regarding safe operation of machinery, chemical handling, fire safety and emergency response procedures.
- Appropriate machine guards and safety devices will be installed on moving and rotating machinery.
- Electrical installations and equipment will be properly maintained and periodically inspected.
- Resin, glue and other chemical materials will be properly labeled and stored in designated areas with suitable spill-control arrangements.
- Safety Data Sheets (SDS/MSDS) for chemicals used at the facility will be maintained and made available to relevant workers.
- Adequate ventilation will be maintained in areas where resin, glue or other process chemicals are handled.
- Exposure to dust, chemical vapors, heat and excessive noise will be minimized through engineering controls and appropriate PPE.

- Emergency exits, evacuation routes and assembly points will be clearly identified and kept unobstructed.
- Regular fire and emergency response drills will be conducted.
- Good housekeeping will be maintained to minimize accumulation of MDF/wood dust and prevent slips, trips and fire hazards.

7.5.5 Socio-Economic Impacts

The establishment of the **Paper Impregnation and Laminated MDF Manufacturing Units by M/S Shaheen Wood Private Limited** at Multan Industrial Estate, Phase-I, Multan, is expected to generate several positive socio-economic impacts. The project will contribute to industrial development in the area and create direct and indirect employment opportunities for local and surrounding communities.

The project will create direct employment opportunities for skilled, semi-skilled and unskilled workers during both construction and operational phases.

Preference will be given to the local community for suitable employment opportunities, where feasible.

The project will generate indirect employment through transportation, material supply, maintenance, waste management and other supporting services.

Procurement of goods and services from local suppliers, where feasible, will contribute to local economic activity.

The project will contribute to the development of the industrial sector and value-added wood-based manufacturing in the region.

Government revenue may be generated through applicable taxes, duties and other statutory payments.

The establishment of the facility will contribute to the productive utilization of industrial land within Multan Industrial Estate.

7.6 Potential Environment Mitigations

- Appropriate wastewater management arrangements will be provided for domestic wastewater generated during construction and operation. Where required, a suitable septic tank/treatment system will be installed in accordance with applicable requirements.
- Process wastewater, if generated from MDF production or other activities, will be appropriately collected, treated and managed according to its characteristics before any discharge or reuse.
- A comprehensive tree plantation and green-belt development program will be implemented within the available areas of the project premises.
- Effective dust extraction and collection systems will be installed and maintained for dust-generating MDF processing operations.

- Proper solid waste segregation, collection, storage, recycling/recovery and disposal arrangements will be established.
- Appropriate fire protection, emergency response and occupational health and safety arrangements will be provided throughout the facility.
- Environmental monitoring will be undertaken as required to assess air quality, noise, wastewater and other relevant environmental parameters and to ensure compliance with applicable environmental requirements

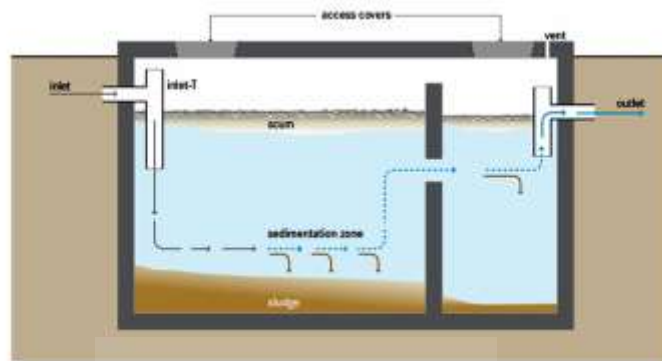


Figure 7-1: Septic Tank Design

8 ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM

An Environmental Management and Monitoring Program (EMMP) is a crucial component of an EIA because it serves as a systematic framework to ensure the effective implementation of mitigation measures and compliance with environmental regulations. The EIA process identifies potential environmental impacts of a proposed project, and the EMMP is designed to address and manage these impacts throughout the project's lifecycle. By establishing a comprehensive monitoring program, authorities can track the environmental performance of the project in real-time, allowing for timely identification and response to any unforeseen adverse effects. Additionally, the EMMP provides a mechanism for ongoing evaluation and adjustment of mitigation measures, contributing to adaptive management strategies. This proactive approach enhances environmental sustainability, helps prevent or minimize negative impacts, and fosters continuous improvement in environmental performance, thereby promoting responsible and sustainable development practices.

8.1 Objectives of EMMP

The objectives of an Environmental Management Plan (EMP) in the context of a project or activity are multi-faceted, aiming to ensure the effective management and mitigation of environmental impacts. These objectives typically include:

- Ensure that the project adheres to local, national, and international environmental laws and regulations, thereby preventing any legal consequences and fostering a culture of environmental responsibility.
- Identify and implement measures to minimize or eliminate adverse environmental impacts associated with the project. This involves the prevention or reduction of pollution, habitat disruption, and other negative consequences.
- Promote the sustainable use of natural resources by incorporating practices that reduce resource consumption, promote recycling, and encourage the efficient use of energy and water.
- Safeguard and preserve biodiversity by implementing measures that prevent harm to ecosystems, habitats, and species. This may involve habitat restoration, conservation initiatives, and the protection of endangered species.
- Foster communication and collaboration with stakeholders, including local communities, NGOs, and governmental bodies, to ensure their concerns are considered and addressed. This contributes to transparency and the incorporation of diverse perspectives.
- Develop and implement strategies to respond effectively to environmental emergencies or accidents, such as spills or releases, to minimize the impact on the environment and human health.
- Establish a framework for ongoing monitoring, evaluation, and periodic review of the EMP to ensure its effectiveness. This includes adapting strategies as necessary to reflect changing conditions, emerging risks, and new information.
- Enhance the socio-economic well-being of local communities by considering their needs and providing opportunities for employment, training, or other community development initiatives.

- Raise awareness among project personnel and stakeholders about environmental issues, emphasizing the importance of responsible environmental stewardship and sustainable practices.
- Identify potential environmental risks associated with the project and develop strategies to manage and mitigate these risks effectively.

By addressing these objectives, an Environmental Management Plan contributes to the overall goal of achieving sustainable development while minimizing the environmental footprint of a project or activity.

8.2 Institutional Capacity

In the proposed monitoring and evaluation framework, the Project Proponent assumes a central role in overseeing the environmental aspects of the project. The Project Proponent will be responsible for the overarching Monitoring and Evaluation (M&E) process. This includes integrating environmental considerations into the main monthly reports of the project, emphasizing a holistic approach to project reporting.

To ensure a detailed and on-the-ground assessment of EMP implementation, the Project Proponent designates the Environment Consultant, who is part of the proponent's team. This consultant will be actively involved in field monitoring, observing the day-to-day activities related to environmental management, and reporting findings to the Project Proponent. This approach ensures a real-time understanding of the project's environmental performance.

For a comprehensive evaluation at the conclusion of the project, an Environment Specialist from the Supervision Consultant will conduct a final assessment. This specialist will review the overall effectiveness of the EMP throughout the project's lifecycle, providing valuable insights into the long-term impact and sustainability of environmental management measures.

Recognizing the importance of external validation, the Project Proponent commits to engaging an independent agency for 3rd party validation of EMP implementation. This external entity, whether an NGO, an academic institute, or an individual consultant, will provide an unbiased and objective evaluation, adding credibility to the environmental performance assessment.

At the district level, the District Office of the Environmental Protection Agency (EPA) Multan will play a crucial role in monitoring the overall activity at the project site. This involvement ensures that the project aligns with regional environmental regulations and standards. The district-level monitoring adds an extra layer of oversight, promoting accountability and adherence to local environmental guidelines.

In summary, the proposed framework establishes a multi-tiered approach to environmental monitoring and evaluation. It leverages internal expertise, engages external validation for impartial assessments, involves EPA offices for regulatory compliance, and integrates findings into regular project reporting. This comprehensive strategy aims to ensure the effective implementation of the EMP, fostering environmental sustainability throughout the project's lifecycle.

8.3 Schedule for Implementation of Environmental Management Plan

The implementation stages of the project activity include:

1st Stage

The stage –1 comprises the onsite contouring studies and soil investigations and the finalization of the project designs.

2nd Stage

The stage –2 comprises the following task:

- 1) Laying of foundations excavation and commencement of erection work.
- 2) Shoring and piling
- 3) Start of civil, electrical and mechanical work.
- 4) Development of basic infrastructure.
- 5) Fitting of instrumentation.

3rd Stage

The stage –3 comprises the following task:

- 1) Civil structure erection completion.
- 2) Completion of the basic infrastructures water supply system, electricity supply etc.

4th Stage

The last stage will be the commencement of regular use.

8.4 Scope of Environmental Management Plan

The Environmental Management Plan (EMP) outlines a comprehensive approach to identifying, evaluating, and addressing the environmental impacts of a specific project or activity. It provides a structured framework comprising strategies, procedures, and assigned responsibilities aimed at ensuring environmental sustainability and regulatory compliance throughout the project's lifecycle. Key components within this framework include the assessment of baseline environmental conditions, implementation of mitigation measures to reduce adverse effects, monitoring of critical environmental indicators, and development of protocols for emergency response and contingency planning. Additionally, the EMP extends its focus beyond the project site to encompass broader environmental considerations such as habitat conservation, waste management, energy efficiency, and pollution prevention. By encompassing these various elements, the EMP acts as a dynamic guide for integrating environmental factors into decision-making processes, facilitating ongoing improvement efforts, and safeguarding natural resources for the benefit of present and future generations.

8.5 Organogram for implementation Environmental Management Plan (EMP)

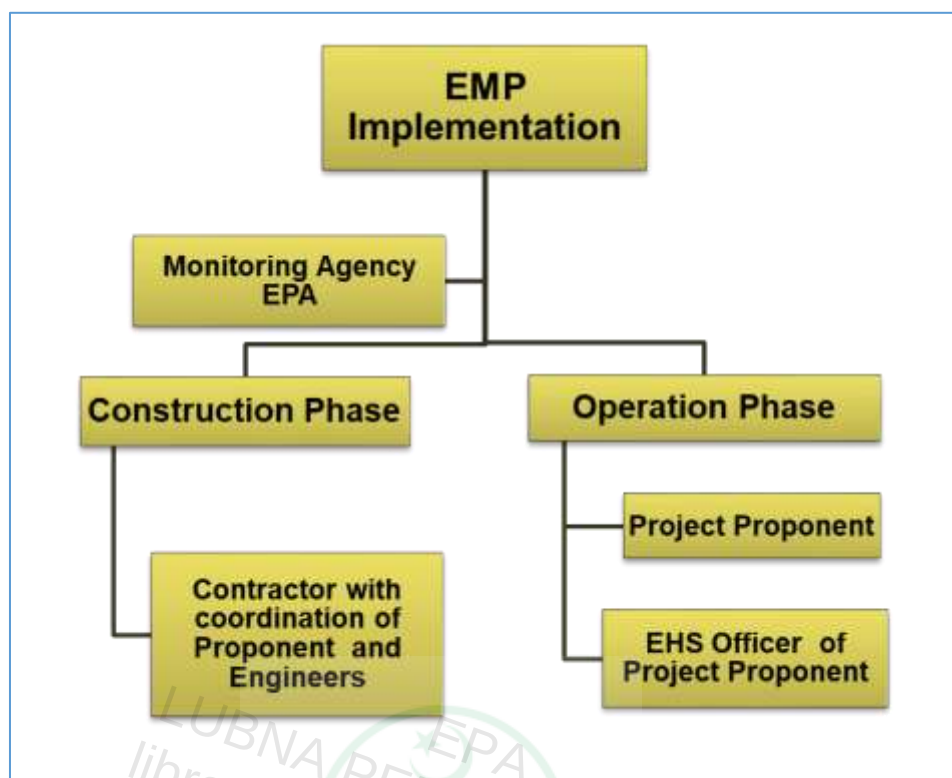


Figure 8-1: Implementation of EMP

8.5.1 Construction Phase

The EMP outlines crucial management principles tailored for the construction phase of the project. This section meticulously details environmental actions, procedures, and associated responsibilities vital during the construction phase. These specifications are not merely recommendations but are integral components of the contract documentation. Consequently, the contractor is bound to adhere to these specifications with precision. The compliance requirement is stipulated to ensure that environmental considerations are seamlessly integrated into the construction process. The satisfaction of both the Project Manager and the Environmental Control Officer is paramount, as their endorsement signifies the contractor's fulfillment of contractual obligations. The EMP serves as a comprehensive guide, fostering a proactive approach to environmental management within the construction framework. By embedding these specifications in the contract documentation, the project emphasizes its commitment to responsible and sustainable construction practices, aligning with regulatory standards and ensuring that environmental concerns are duly addressed throughout the construction phase. The coordination between the Project Manager and the Environmental Control Officer is pivotal, underscoring the importance of effective communication and collaboration in enforcing and overseeing the adherence to environmental specifications by the contractor.

8.5.2 Operational Phase

During the operational phase of the **Paper Impregnation and Laminated MDF Manufacturing Units**, the Environmental Management Plan (EMP) will play a critical

role in ensuring that production activities are carried out in an environmentally responsible, safe and regulatory-compliant manner. The EMP will cover measures for controlling dust and process emissions, managing resin and chemical handling, minimizing noise, ensuring proper solid and liquid waste management, conserving water and energy, maintaining occupational health and safety, preventing fire and accidental spills, and monitoring environmental performance. Particular attention will be given to dust generated during MDF processing, emissions associated with resin impregnation and drying operations, waste generated from MDF trimming and paper processing, and safe handling of melamine resin, glue and other process materials. Regular inspection, environmental monitoring, worker training, preventive maintenance and emergency preparedness will be implemented to minimize environmental risks and ensure sustainable operation of the facility.

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8.6 Mitigation Plan for Construction and Operation Phase

Table 8-1 Environmental Management plan for Construction Phase

Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
		Implementation	Monitoring
Constructional Phase			
Air Quality Dust and particulate matter generated from excavation, earthwork, movement of construction machinery and transportation of construction materials.	Water sprinkling on active construction areas and exposed surfaces will be carried out as required. • Construction machinery and vehicles will be properly maintained. • Trucks transporting soil, sand and other loose materials will be covered. • Vehicle speed within the construction area will be controlled. • Construction materials will be stored properly to minimize windblown dust. • Appropriate PPE, including dust masks, will be provided to workers.	During construction phase	Proponent and Contractor
Water Quality Runoff from construction areas and potential contamination from improper storage of construction materials, fuels and wastes..	Construction materials and wastes will be stored in designated areas. • Suitable measures will be adopted to prevent contaminated runoff from leaving the site. • Fuel, oil and other potentially hazardous substances will be stored in designated areas with appropriate spill-control arrangements. • Construction waste will be properly collected and disposed of at approved/designated locations. • No waste will be discharged into drains, canals or other water bodies.	During construction phase	Proponent and Contractor

Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
		Implementation	Monitoring
Waste Generation Generation of construction debris, excavated material, packaging waste and domestic waste from workers.	Construction and domestic waste will be collected separately. • Reusable and recyclable materials will be recovered where feasible. • Construction waste will be disposed of at appropriate authorized/designated locations. • No construction debris will be dumped in open areas, drains or nearby water bodies. • The site will be cleared of excess construction material and waste on a regular basis.	During construction phase	Proponent and Contractor
Noise Noise generated by construction machinery, vehicles and material handling activities.	The contractor will comply with applicable PEQS requirements. • Construction machinery and vehicles will be properly maintained. • Unnecessary use of noisy machinery and vehicle horns will be avoided. • Loading and unloading of construction materials will preferably be carried out during daytime. • Workers exposed to elevated noise levels will be provided with appropriate hearing protection	During construction phase	Proponent and Contractor
Soil Quality Potential soil contamination due to accidental leakage or spillage of fuel, lubricants, paints or other construction materials.	Fuel, oils, paints and other potentially hazardous substances will be stored in designated areas. • Chemical containers will be properly sealed and labeled. • Spill-control materials will be available at the construction site. • Any accidental spill will be contained and cleaned immediately.	During construction phase	Proponent and Contractor

Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
		Implementation	Monitoring
	Proper waste management practices will be followed to prevent soil contamination.		
Materials Management Improper storage of construction materials may cause dust generation, obstruction and material losses	Construction materials will be stored in designated areas. - Sand, cement and other fine materials will be properly covered where necessary. - Stockpiles will be protected from strong winds and heavy rainfall. - Materials will be arranged systematically to maintain safe access and prevent obstruction of work areas. - Excess materials will be removed from the site regularly.	During construction phase	Proponent and Contractor
Workers Health & Safety Potential accidents and occupational hazards associated with construction, machinery, electrical work, lifting operations and material handling	Appropriate PPE will be provided to all workers and its use will be made mandatory. - First-aid facilities will be available at the construction site. - Workers will receive appropriate safety training and toolbox talks. - Adequate warning and safety signs will be installed. - Electrical equipment, lifting devices and machinery will be inspected and maintained. - Fire extinguishers will be provided at appropriate locations. - Safe working procedures will be enforced by the contractor. - Stagnant water will not be allowed to accumulate at	During Construction Phase	Proponent

Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
		Implementation	Monitoring
	the project site. Regular monitoring will be carried out to ensure compliance with safety procedures.		
Clearance of Site from Excess Material and Construction Equipment Accumulation of excess construction material, equipment and debris may cause congestion and safety hazards.	Excess construction materials and equipment will be removed from work areas when no longer required. - Construction waste will be collected and disposed of separately from other waste streams. - Work areas will be kept clean and organized. - The site will be cleared and properly restored following completion of construction activities.	During Construction phase	Proponent and Contractor

Table 8-2 Environmental Management plan for Operational Phase

Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
		Implementation	Monitoring
Operational Phase			
Air Pollution Generation of wood/MDF dust and particulate matter from wood handling, chipping, screening, refining, sanding, cutting, trimming and other MDF processing activities. Process fumes may also be associated with	Appropriate dust extraction and collection systems will be provided for dust-generating operations. • The sand/dust collection system will be regularly inspected and maintained. • Adequate ventilation will be maintained in production and resin-handling areas. • Resin and chemical containers will be kept properly closed when not in use.	During Operational Phase	EHS officer

**Establishment of Paper Impregnation &
Laminated MDF Manufacturing Units by M/s Shaheen Wood Pvt. Ltd.
Environmental Impact Assessment (EIA)**

Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
		Implementation	Monitoring
resin impregnation and drying operations.	- Drying and hot-pressing equipment will be properly operated and maintained. - Vehicles and standby power equipment will be regularly maintained. - Workers in dust-generating areas will be provided with appropriate respiratory and eye protection.		
Noise Pollution Noise generated from chippers, refiners, dryers, hot presses, sanding/cutting equipment, compressors, pumps, material handling equipment and standby generator	Proper maintenance of machinery and equipment will be ensured. - Noise-generating equipment will be provided with suitable acoustic enclosures/barriers where necessary. - Preventive maintenance will be undertaken to minimize excessive vibration and noise. - Workers exposed to high noise levels will be provided with appropriate hearing protection. - Green belts and plantation will be developed within available areas of the facility	During Phase Operational	EHS officer
Solid Waste Generation of MDF off-cuts, trimming waste, rejected panels, wood/MDF dust, paper waste, packaging materials, empty containers and domestic waste.	MDF off-cuts and recoverable wood-based waste will be collected separately for reuse, recovery or appropriate disposal. - Paper, cardboard, plastic and other recyclable materials will be segregated and sent for recycling where feasible. - Wood/MDF dust will be collected through the dust extraction system. - Empty resin/glue/chemical containers will be managed separately according to their contents.	During Phase Operational	EHS officer

**Establishment of Paper Impregnation &
Laminated MDF Manufacturing Units by M/s Shaheen Wood Pvt. Ltd.
Environmental Impact Assessment (EIA)**

Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
		Implementation	Monitoring
	- Domestic waste will be collected in designated bins and disposed of through appropriate arrangements. - Regular housekeeping and waste segregation will be maintained.		
Liquid Waste Domestic wastewater generated by workers and staff and potential process wastewater from MDF washing/process activities.	Domestic wastewater will be managed through an appropriate septic tank/treatment system or approved drainage arrangement. - Process wastewater, where generated, will be collected and appropriately treated/managed according to its characteristics. - Untreated industrial wastewater will not be discharged into open land, stormwater drains or water bodies. - Water conservation and reuse/recycling practices will be adopted where technically feasible. - Wastewater quality will be monitored where required to ensure compliance with applicable environmental standards.		
Chemical / Resin Handling Potential exposure and accidental spills associated with melamine resin, glue, wax and other process chemicals used during paper impregnation and MDF production	- Chemicals and resins will be stored in designated and secure areas. - Containers will be properly labeled and kept closed when not in use. - Appropriate spill-control arrangements and spill kits will be provided. - SDS/MSDS will be maintained for chemicals used at the facility.	During Phase Operational	EHS officer

**Establishment of Paper Impregnation &
Laminated MDF Manufacturing Units by M/s Shaheen Wood Pvt. Ltd.
Environmental Impact Assessment (EIA)**

Project Component/ Impact	Mitigation/ Preventive Action	Responsibility	
		Implementation	Monitoring
	- Workers will be trained in safe chemical handling and emergency spill response. - Appropriate PPE will be provided to workers involved in chemical handling.		
Work Safety Potential occupational hazards from machinery, hot presses, electrical equipment, wood/MDF dust, chemical handling, heat, noise and fire hazards	An occupational health and safety manual will be implemented. - Appropriate PPE will be provided and its use enforced. - Machine guards and safety devices will be maintained on moving equipment. - Fire extinguishers and appropriate firefighting equipment will be installed at suitable locations. - Fire safety and emergency response training will be provided to workers. - Emergency exits and evacuation routes will be clearly marked and kept unobstructed. - Regular fire and emergency drills will be conducted. - Good housekeeping will be maintained to minimize dust accumulation and other workplace hazards.	During Phase Operational	EHS officer

8.7 Environmental Management Team along with their Roles and Responsibilities

The project proponent bears the responsibility for overseeing all the project activities. To cater to the varying requirements during operational phase, the proponent will hire personnel specifically dedicated to environmental management at the project site. This step is crucial to ensure the effective implementation and operations of the Environmental Management Plan (EMP).

Assigning the responsibilities to designated individuals is paramount to uphold accountability in the event of any oversight or mishap. Each appointed person will have specific duties outlined within the EMP. These responsibilities will be tailored to their roles, ensuring they are accountable for the successful execution of environmental protocols and procedures.

By delineating and assigning these responsibilities to individuals, the project proponent establishes a framework where each person understands their role and obligation within the broader context of environmental management. This structuring allows for a more efficient response to any environmental issue. This approach aims to create a clear chain of accountability, ensuring that the implementation of EMP is conducted diligently and that there are identifiable points of contact for any concerns or queries related to environmental management during the project's operational phase.

8.8 Environmental Monitoring Program

An Environmental Monitoring Program (EMP) is a structured system designed to consistently observe, assess, and record the environmental conditions and impacts associated with the project. It involves systematic data collection related to air quality, water quality, soil conditions, and biodiversity. This collected data is analyzed to detect any deviations from the PEQs.

It also involves impact assessments, communication of findings to stakeholder, and adaptive management making necessary adjustments to mitigate environmental risks and issues. The program's goal is to ensure sustainable environmental practices, minimize adverse impacts, and maintain compliance with set standards, contributing to better environmental management and long-term sustainability.

The objectives of the Environmental Monitoring Plan are given below;

- Detecting environmental changes to prevent and minimize potential negative impacts on the environment.
- Ensuring compliance with environmental laws, permits, and regulations by regular monitoring and reporting environmental parameters. This helps in meeting legal requirements and avoiding penalties or sanction.
- Assessing and managing potential risks to the environment caused by human activities. This involves evaluating the impact of these risks and implementing strategies to mitigate or manage them effectively.

- Monitoring and managing the use of natural resources such as water, air, soil, and biodiversity. The goal is to conserve these resources and maintain ecological balance.
- Assessing the impact of specific actions, projects, or processes on the environment to understand their consequences and make informed decisions regarding future actions.
- Using collected data to improve environmental performance, refine strategies, and adapt measures to achieve better outcomes over time.
- Establishing protocols and responses for emergencies or unexpected environmental incidents, ensuring a rapid and effective reaction to minimize damage.

Table 8-3: Environmental Monitoring

Sr. No.	Monitoring Parameters	Monitoring Mechanism	Frequency	Responsibility
DURING INSTALLATION				
1.	Dust Emissions	Ambient Particulate Matter Monitoring System.	Will be carried out on quarterly basis.	• Proponent • Site Supervisor
2.	Noise Levels	Noise meter	On quarterly basis by a third party	• Proponent • Site Supervisor
3.	Gaseous Emissions	Emissions monitoring system. Monitoring of ambient air quality.	Will be carried out on quarterly basis.	• Proponent • Site Supervisor
4.	HSE Plan	Health, safety and Environmental will be monitored on daily basis	Daily	• Proponent • Site Supervisor
DURING OPERATION				
1.	Noise Levels	Noise meter	On quarterly basis by a third party	• Proponent • Project Manager
2.	Water Quality	Discrete grab sampling and laboratory testing of water samples.	As described by SMART	• Proponent • Project Manager
3.	Emissions	Emissions monitoring system. Monitoring of ambient air quality.	Will be carried out on quarterly basis.	• Proponent • Project Manager
4.	Security	Security arrangements will be made	Daily	• Proponent

Sr. No.	Monitoring Parameters	Monitoring Mechanism	Frequency	Responsibility
5.	HSE Plan	Health, safety and Environmental will be monitored on daily basis	Daily	EHS officer of Project Proponent
6.	Production Management	Production unit will be monitored on daily basis to control bacterial contamination of products.	Daily	• Proponent • Project Manager

8.9 Environmental Budget

An environmental budget is essential in EIA as it provides a structured financial framework for the implementation of environmental management and mitigation measures identified during the assessment process. By allocating resources specifically to address environmental concerns, the budget ensures that adequate funds are available for the proper execution of mitigation strategies, monitoring activities, and other environmental protection measures throughout the project's lifecycle. This financial planning helps to integrate environmental considerations into the overall project budget, emphasizing the commitment to sustainable practices. The environmental budget serves as a tool for accountability, allowing stakeholders to track and assess the financial resources dedicated to environmental protection, thereby promoting transparency and responsible resource management in the pursuit of environmentally sustainable development.

Table 8-4: Environmental Budget

Environmental Component	Quantity	Approximate Cost (PKR)
(i) Tree Plantation	1000	250,000.0
(ii) Health and Safety Measures and Provision of PPEs	L.S.	500,000.0
(iii) Air and Water Quality & Noise Monitoring	L.S.	200,000.0
(iv) Environmental Trainings	L.S.	350,000.0
Total Environmental Management and Monitoring Cost		1,300,000.0

9 TREE PLANTATION PLAN

The incorporation of a tree plantation plan within an EIA is of paramount importance for several compelling reasons. Trees play a pivotal role in environmental sustainability, acting as natural carbon sinks, enhancing biodiversity, and mitigating the impacts of climate change. A well-designed tree plantation plan contributes significantly to offsetting carbon emissions associated with a project, thereby fostering a more balanced and ecologically friendly footprint. Beyond their role in carbon sequestration, trees contribute to soil stabilization, preventing erosion and promoting water retention. They also provide habitat for diverse wildlife, supporting biodiversity conservation. Moreover, trees contribute to the improvement of air quality by filtering pollutants and releasing oxygen, thereby enhancing the overall health and well-being of surrounding communities. Integrating a tree plantation plan into the EIA showcases a commitment to ecological stewardship and reflects a proactive approach toward environmental sustainability, aligning the project with broader conservation goals and community well-being.

9.1 Objectives of Tree Plantation

The following objectives of tree plantation helps to clarify its basic purpose.

- Trees in urban areas provide shade and heat reduce heat, mitigation the urban heat island heat.
- Trees store carbon in their biomass, helping and reduce the atmospheric carbon dioxide levels.
- Trees contribute to visual appeal of urban and rural landscapes, making areas more attractive.
- Trees yield valuable resource such as timber, fruits, nuts, and medicinal plants.
- Trees plantations create employment opportunities for the people living in the vicinity of the project area.
- Trees act as a natural air filters by trapping airborne pollutants and particulate matter.
- Trees release oxygen during photosynthesis, improving air quality.
- Trees help maintain healthy watersheds, reducing the risk of floods and ensuring a consistent water supply.
- Trees help prevent soil erosion by anchoring soil with roots.
- Trees planted strategically can safeguard against landslides and protect roads and buildings.
- Trees absorb carbon dioxide and release oxygen, helping reduce greenhouse gas level and circumvent climate change.
- Trees can efficiently serve as windbreaks.

9.2 Benefits of Tree Plantation

A well-executed tree plantation plan offers numerous advantages, covering all the environmental, economic and soil aspects. Some of the key benefits of tree plantation are enlisted below;

- Plants absorb carbon dioxide (CO₂) from the atmosphere and store this carbon in the biomass helping to circumvent climate change by reducing greenhouse gas emissions.
- Roots of the trees help to stabilize soil and prevent soil erosion.
- Trees act as a natural air filter, by trapping particulate matter which leads to healthier living environments.
- Trees can provide habitat and food residues to birds contributing to local biodiversity.
- Trees act as a natural buffer that helps to control and purify water entering into the streams and rivers reducing the risks for the contamination of water.
- Well-maintained tree plantation enhances the visual appeal of the landscapes, making area more attractive.
- Tree roots can improve soil quality by increasing its organic matter content and nutrient availability.
- Tree plantation contribute to climate resilience by moderating temperature extremes, reducing the risk of heatwaves, and providing shelter from extreme weather events.
- Trees can help to enhance the mental and physical well-being of the people living around the project area.

A well-designed tree plantation plan serves as a long-term investment in the environment and the future, as they continue to provide benefits for generations to come.

9.3 Tree cutting

The proposed land is identified as barren, non-agricultural terrain, eliminating the need for any tree cutting or uprooting during the construction phase.

9.4 Area Enhancement Plan

The tree plantation plan for the project area has been meticulously prepared, taking into consideration the specific characteristics and requirements of the project site. This strategic plan involves a thorough assessment of the area's ecosystem and aims to enhance environmental sustainability. The selection of tree species, their placement, and the overall design of the plantation plan are based on the best possible estimations derived from ecological studies and expert consultations.

It is important to note that the tree plantation plan is designed to be adaptable, allowing for modifications at the execution stage. This flexibility is essential to accommodate any unforeseen factors that may arise during implementation. It

reflects a commitment to responsiveness and ensures that the tree plantation aligns seamlessly with the evolving needs and conditions of the project area.

The plan's adaptability is a proactive measure that acknowledges the dynamic nature of environmental conditions and the potential for unforeseen challenges. By remaining open to adjustments, the tree plantation plan demonstrates a commitment to optimizing its ecological impact and ensuring the long-term success of the afforestation efforts. This thoughtful and flexible approach not only reflects a commitment to environmental conservation but also underscores a dedication to continuous improvement and sustainable practices throughout the project's lifecycle.

9.5 Trees Recommended

Tree species are recommended for the plantation are the indigenous species of Multan

Table 9-1: Recommended Trees

Sr. No.	Common Name	Scientific Name
1	<i>Dalbergia sissoo</i>	Shisham
2	<i>Acacia Arabica</i>	Kikar
3	<i>Albizzia lebbeck</i>	Siris



Figure 9-1: Recommended Trees

9.6 Tree Plantation Cost

A 250,000 PKR budget for tree plantation and maintenance will be implemented. These funds will be utilized to cover the costs associated with procuring and planting trees, as well as sustaining their well-being through regular maintenance practices. This investment signifies a proactive approach to fostering a healthier and more aesthetically pleasing living environment, aligning with the community's long-term commitment to environmental stewardship.

10 OCCUPATIONAL HEALTH AND SAFETY PLAN

The Occupational Health and Safety (OHS) plan holds paramount importance within the framework of an EIA. This plan is a comprehensive document that outlines strategies and protocols to safeguard the well-being of workers involved in the project. Beyond the ethical imperative of ensuring a safe working environment, the OHS plan is integral to regulatory compliance and risk management. It identifies potential occupational hazards associated with the project, establishes preventive measures, and details emergency response procedures. By incorporating an OHS plan into the EIA, not only is the health and safety of the workforce prioritized, but it also contributes to the overall success and sustainability of the project. A well-executed OHS plan minimizes the likelihood of accidents, injuries, and occupational health issues, fostering a workplace culture that values the welfare of its personnel. In essence, the OHS plan, as part of the EIA process, aligns with responsible and ethical project management, ensuring that occupational health and safety considerations are seamlessly integrated into the project's design, implementation, and ongoing operations.

10.1 Objectives of OHS Plan

The Occupational Health and Safety (OHS) plan for any industry is designed to prioritize the well-being and safety of workers, contractors, and all individuals involved in the construction process. The primary objectives of an OHS plan during the construction phase include:

- Identify potential hazards and assess risks associated with the construction activities.
- Implement measures to eliminate or control hazards to prevent accidents and injuries.
- Ensure strict adherence to local and international safety regulations and standards.
- Stay updated on relevant legal requirements and ensure the project complies with all safety guidelines.
- Develop and communicate emergency response plans for various potential scenarios.
- Conduct regular drills to ensure all workers are familiar with emergency procedures.
- Implement measures to protect workers from exposure to hazardous substances, dust, noise, and other health risks.
- Provide necessary personal protective equipment (PPE) and ensure its proper use.
- Provide comprehensive safety training to all personnel involved in the construction phase.
- Ensure workers are aware of potential risks, safe work practices, and emergency procedures.

- Establish and enforce security measures to control access to the construction site.
- Prevent unauthorized entry and mitigate the risk of theft or vandalism.
- Conduct regular inspections to identify and rectify potential safety issues.
- Perform periodic safety audits to assess the overall effectiveness of the safety management system.
- Establish clear communication channels for reporting safety concerns and incidents. Ensure timely reporting and investigation of accidents or near misses.
- Collaborate with contractors and subcontractors to align safety procedures and expectations.
- Ensure that all entities working on the construction site adhere to the established safety standards.
- Establish a feedback loop for continuous improvement of safety measures.
- Review incidents, identify lessons learned, and implement changes to enhance safety.

By focusing on these objectives, an OHS plan for the construction phase aims to create a safe and healthy work environment, prevent accidents, and ensure regulatory compliance throughout the construction process.

10.2 Personal Protective Equipment

Personal Protective Equipment (PPE) plays a crucial role in a project, serving as a fundamental component of occupational health and safety measures. The importance of PPE in construction cannot be overstated, and here are several key reasons why it is essential:

- PPE is designed to protect workers from potential hazards and risks present in the construction environment, such as falling objects, electrical shocks, noise, and exposure to harmful substances.
- PPE serves as a barrier against injuries and accidents, reducing the likelihood of physical harm. Items like hard hats, safety glasses, and steel-toed boots are examples of PPE that prevent injuries from falling objects and impacts.
- Many occupational health and safety regulations mandate the use of specific PPE in construction settings. Adhering to these regulations ensures legal compliance and helps avoid penalties.
- Construction sites often involve various hazards, such as dust, chemicals, and noise. PPE, including respirators, gloves, and ear protection, helps mitigate these hazards, safeguarding the health of workers.
- The use of PPE reinforces a safety culture within the construction industry. It encourages workers to adopt safe work practices, as they are more likely to be mindful of potential risks and take precautions when equipped with the necessary protective gear.

- PPE minimizes the risk of injuries and illnesses, which can result in reduced downtime, worker compensation claims, and associated costs. This, in turn, contributes to the overall efficiency and productivity of the construction project.
- In emergency situations, such as fires or chemical spills, PPE can be crucial in providing immediate protection to workers while they evacuate or address the emergency. For example, flame-resistant clothing can be vital in fire-related incidents.
- PPE safeguards workers from long-term health issues caused by prolonged exposure to construction-related hazards. This includes protection from respiratory issues, skin disorders, and hearing loss.
- PPE is particularly essential when working in environments with high-risk factors, such as confined spaces, heights, or areas with heavy machinery. Helmets, fall protection equipment, and safety harnesses are critical in these situations.

Providing appropriate PPE demonstrates an employer's commitment to the well-being of their workforce. This, in turn, fosters a positive work environment, enhances employee morale, and contributes to higher job satisfaction.

10.3 PPE Required for Construction Phase

During the construction of a project, a comprehensive set of Personal Protective Equipment (PPE) is necessary to safeguard the health and safety of workers involved in various tasks. The specific PPE requirements may vary based on the nature of construction activities, potential hazards, and regulatory standards. Here is a general list of PPE commonly required during construction:

Head Protection: Hard hats to protect against falling objects, impact, or head injuries.

Eye and Face Protection: Safety glasses or goggles to shield the eyes from dust, debris, or other airborne particles. Face shields for additional protection during tasks with a higher risk of facial exposure.

Hearing Protection: Earplugs or earmuffs to reduce exposure to loud noises, especially in areas with heavy machinery or construction equipment.

Respiratory Protection: Dust masks or respirators to protect against inhalation of dust, particulates, or hazardous substances.

Hand Protection: Safety gloves appropriate for the specific tasks, such as cut-resistant gloves, leather gloves, or chemical-resistant gloves.

Body Protection: High-visibility vests or clothing to enhance visibility, especially in areas with moving equipment. Reflective clothing for nighttime or low-visibility construction activities. Protective clothing, such as coveralls, for tasks involving exposure to hazardous substances.

Foot Protection: Steel-toed safety boots or shoes to protect against crushing injuries, falling objects, or punctures.

Fall Protection: Safety harnesses, lanyards, and other fall protection systems for workers operating at heights or in elevated areas.

Hand and Arm Protection: Elbow and knee pads for tasks that involve kneeling or crawling. Wrist support or braces for tasks with repetitive motions.

Weather Protection: Weather-appropriate clothing, such as rain gear, insulated clothing, or sunscreen, depending on the climate and weather conditions.

First Aid Kit: Access to a well-equipped first aid kit to provide immediate care for minor injuries.



Figure 10-1: PPEs for Construction Phase

It is essential for the construction project management to conduct a thorough hazard assessment to identify the specific risks associated with each construction activity and determine the appropriate PPE for the workers involved. Regular training, monitoring, and enforcement of PPE usage contribute to a safer construction environment.

10.4 Safety Signs during Construction Phase

Safety signs serve as critical elements in maintaining a secure and hazard-free environment at construction sites. Their importance lies in their ability to effectively communicate potential risks and hazards to workers, visitors, and contractors. By providing clear information about safety procedures, required personal protective equipment, and safe work practices, these signs play a pivotal role in preventing accidents and injuries. Moreover, safety signs contribute to regulatory compliance, ensuring adherence to local regulations and occupational health and safety standards. They also serve as essential tools for emergency response by indicating

the location of emergency exits, first aid stations, fire extinguishers, and other emergency equipment. In addition to their role in risk reduction, safety signs assist in site navigation, guiding individuals to specific areas and enhancing overall organization. Beyond practical benefits, safety signs contribute to fostering a culture of safety awareness among the workforce. They communicate important safety policies, promote compliance with site-specific regulations, and reduce the project's liability by showcasing a commitment to responsible construction practices. Ultimately, safety signs are integral components in creating a safe, compliant, and organized construction site conducive to the well-being of all involved parties.



Figure 10-2: Safety signs for Constructional Phase

10.5 Safety Signs

Fire safety signs play a crucial role in enhancing fire prevention and emergency response measures at the proposed **Paper Impregnation and Laminated MDF Manufacturing Units by M/S Shaheen Wood Private Limited**. Since the facility will involve wood and MDF processing, wood/MDF dust generation, electrical equipment, hot pressing operations, heating systems, and the handling of materials such as melamine resin, glue and wax, clearly visible fire safety signs will be essential for informing workers, visitors and emergency response personnel about potential fire hazards and appropriate emergency procedures.

Fire safety signs will clearly identify the locations of fire exits, emergency evacuation routes and designated assembly points throughout the facility. These signs will enable workers and visitors to identify safe evacuation routes quickly during a fire or other emergency. Particular attention will be given to production halls, storage areas, chemical/resin handling areas and other locations where workers may require immediate guidance during an emergency.

Appropriate signage will also identify the locations of fire extinguishers, fire alarms, firefighting equipment, emergency exits and other fire protection facilities. Such signs will allow trained personnel to locate firefighting equipment rapidly and respond effectively to small fire incidents before they develop into major emergencies. may accumulate. Appropriate signs will communicate warnings such as fire hazards, restricted access, no smoking and requirements for the use of PPE.

In addition, warning signs will be installed in areas associated with specific hazards, including chemical and resin storage areas, electrical rooms, hot-pressing and heating equipment, combustible material storage areas and locations where MDF/wood dust

All fire safety signs will be installed at prominent and easily visible locations, maintained in good condition and kept unobstructed. Signs will use clear symbols, colors and wording that can be readily understood by workers and visitors. The signage system will be reviewed periodically and updated whenever there are changes in the plant layout, emergency routes, firefighting arrangements or operational procedures.

Overall, the provision of properly designed and strategically located fire safety signs will strengthen the fire prevention and emergency response system of the facility, improve worker awareness, facilitate safe evacuation and contribute to the protection of personnel, equipment, buildings and the surrounding environment.



Figure 10-3: Safety Signs

10.6 Fire Safety

Fire extinguishers play a critical role in maintaining safety within Paper Impregnation and Laminated MDF Manufacturing Units. Given the presence of various flammable materials, such as solvents, chemicals, and packaging materials, as well as electrical equipment and machinery, the risk of fire in MDF facilities is considerable. In the event of a fire outbreak, rapid response is paramount to prevent the escalation of flames and minimize damage to property, equipment, and most importantly, to safeguard the lives of employees. Fire extinguishers provide a first line of defense, allowing trained personnel to quickly suppress small fires before they spread

uncontrollably. Moreover, having strategically placed fire extinguishers throughout the facility ensures accessibility and readiness in emergency situations. Regular maintenance and inspection of fire extinguishers further enhance their effectiveness, ensuring they are in proper working condition when needed. Ultimately, the presence of functional fire extinguishers serves as a crucial component of the Paper impregnation and MDF industry's overall fire safety strategy, contributing to a safer work environment and mitigating the potential impact of fire-related incidents.



Figure 10-4: Fire Extinguishers

10.7 PPEs during Operational Phase

In the **Paper Impregnation and Laminated MDF Manufacturing Units**, appropriate Personal Protective Equipment (PPE) will be essential for protecting workers from occupational hazards associated with wood and MDF processing, dust generation, chemical and resin handling, hot pressing, noise, mechanical operations and material handling. PPE will be selected according to the nature of each task and the level of exposure.

Safety Helmets: Safety helmets will be provided to protect workers from falling objects, accidental impacts and other head injuries, particularly during construction, maintenance, material handling and plant operations.

Safety Glasses/Goggles: Safety glasses or goggles will protect workers' eyes from wood/MDF dust, flying particles generated during cutting and sanding, chemical splashes and other workplace hazards. Appropriate chemical-resistant goggles will be provided for workers involved in resin and chemical handling.

Protective Gloves: Suitable gloves will be provided according to the task. Cut-resistant gloves may be used during handling of MDF panels and sharp materials, while chemical-resistant gloves will be provided for workers handling melamine resin, glue, wax and other chemicals.

Respiratory Protection: Appropriate dust masks or respirators will be provided to workers exposed to wood dust, MDF dust and other airborne particulate matter.

Suitable respiratory protection will also be considered for workers involved in resin handling or other activities where process vapors may be present.

Face Shields: Face shields will be provided for activities where workers may be exposed to chemical splashes, flying particles or other hazards requiring additional facial protection, particularly during chemical handling, maintenance and certain processing activities.

Protective Clothing/Coveralls: Suitable industrial coveralls or protective clothing will be provided to protect workers from dust, chemical splashes, dirt and other workplace contaminants. Chemical-resistant protective clothing will be provided where required for resin and chemical handling operations.

Safety Footwear: Workers will be provided with safety shoes or boots having protective toes and non-slip soles to protect against falling materials, sharp edges, slips, trips and other foot injuries during MDF production, material handling and maintenance activities.

Hearing Protection: Earplugs or earmuffs will be provided to workers working in areas where noise levels generated by chippers, refiners, sanding machines, cutting equipment, presses, compressors and other machinery may exceed permissible occupational exposure levels.

High-Visibility Clothing: High-visibility vests or clothing will be provided where necessary to workers involved in vehicle movement, loading/unloading, material handling and other activities in areas with significant internal traffic.

Chemical Handling PPE: Workers involved in handling melamine resin, glue, wax and other process chemicals will be provided with appropriate chemical-resistant gloves, goggles/face protection, protective clothing and other task-specific PPE based on the chemical's hazards and applicable Safety Data Sheets (SDS/MSDS).

Safety Harnesses: Where work at height is required during maintenance, installation or construction activities, appropriate full-body safety harnesses and fall-protection equipment will be provided and used in accordance with safe working procedures.

Emergency Safety Shower and Eye-Wash Facilities: Suitable emergency eye-wash stations and safety showers will be provided at or near designated chemical/resin handling areas where there is a potential risk of chemical splash or exposure. These facilities will be readily accessible, clearly marked and maintained in operational condition.

All workers will receive appropriate training regarding the correct selection, use, inspection, cleaning and maintenance of PPE. PPE requirements will be displayed at relevant workstations, and supervisors will ensure that required PPE is properly worn. PPE will be regularly inspected and replaced whenever damaged, defective or no longer providing adequate protection.



Figure 10-5: PPEs during Operational Phase

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11 STAKEHOLDER CONSULTATION

Stakeholder consultation is of paramount importance in the EIA process as it facilitates inclusive decision-making, fosters transparency, and enhances the overall quality of the assessment. Involving stakeholders, including local communities, governmental bodies, non-governmental organizations, and affected parties, ensures that diverse perspectives, concerns, and local knowledge are taken into account. This inclusive approach contributes to the identification of potential environmental and social impacts that might not be evident from a solely technical or regulatory standpoint. Stakeholder consultation is a way to involve both the primary and secondary stakeholders in making decisions about the project. Stakeholder engagement builds trust, allows for the exchange of valuable information, and empowers communities by giving them a voice in the decision-making process. Moreover, it helps to align the project with the needs and expectations of the local population, minimizing conflicts and fostering a sense of shared responsibility for environmental stewardship. In essence, stakeholder consultation transforms the EIA into a more robust and credible tool, enhancing the sustainability and social acceptance of proposed projects.

11.1 Objectives of Stakeholder Consultation

In 1992, the United Nations Conference on the Environment and Development (UNCED) supported the idea of involving the public in decision-making, and this was outlined in one of the key documents of the conference called Agenda 21.

Agenda 21 is a comprehensive plan for global actions focused on sustainable development and deals with how people interact with the environment. It highlights the importance of including the public in making decisions about the environment to achieve sustainable development.

The objectives of stakeholder consultation in the context of EIA are multi-faceted, aiming to foster meaningful engagement, inclusivity, and informed decision-making. Some key objectives include:

- Ensure the inclusion of diverse stakeholder perspectives in the decision-making process, promoting a more comprehensive understanding of potential environmental and social impacts.
- Provide a platform for stakeholders to express their concerns, values, and local knowledge related to the project, contributing to a more nuanced understanding of potential impacts and benefits.
- Gather valuable insights and feedback that can be integrated into the project design, helping to address and mitigate potential adverse impacts and enhance positive contributions.
- Establish trust among stakeholders by being transparent, responsive, and open to dialogue. Building trust is essential for the successful implementation of the project and its long-term acceptance by the community.

- Fulfill regulatory requirements by actively engaging with stakeholders, demonstrating a commitment to compliance with environmental and social standards, and addressing concerns raised during the consultation process.
- Facilitate an open and inclusive dialogue to build understanding and acceptance of the project within the affected communities, minimizing potential conflicts and fostering a sense of shared responsibility.
- Integrate local knowledge and community input to enhance the overall sustainability of the project, aligning it with the needs and aspirations of the affected stakeholders.
- Disseminate accurate and accessible information about the project, its potential impacts, and proposed mitigation measures to ensure that stakeholders are well-informed and can actively participate in the decision-making process.
- Consider the needs and interests of all affected parties, including vulnerable or marginalized groups, to ensure that the benefits and burdens of the project are distributed equitably.
- Create a platform for addressing conflicts and disputes, allowing for the resolution of issues through open communication and negotiation.



Figure 11-1: Stakeholder Management

By achieving these objectives, stakeholder consultation contributes to the overall success and sustainability of the project, enhancing its social, environmental, and economic outcomes while fostering positive relationships with the communities it impacts.

11.2 Proponent Environment Management Team

A comprehensive discussion on all conceivable impacts and corresponding mitigation measures related to the project was conducted with both the proponent and project management. In this collaborative dialogue, a thorough examination of potential environmental, social, and economic implications of the project took place. The proponent and management, demonstrating a proactive commitment to responsible practices, assured the incorporation of all suggested mitigation measures to

effectively control and address any discrepancies that may arise during the project's implementation. Their pledge to embrace these measures underscores a dedication to environmental stewardship and sustainable practices. By actively engaging in this discourse, the proponent and management not only exhibit a commitment to regulatory compliance but also demonstrate a broader responsibility to the well-being of the community and the preservation of the surrounding environment. This collaborative approach ensures that the project aligns with best practices, fostering a positive impact on the environment and minimizing any potential adverse effects.

11.3 The Responsible Authority

The Proponent assumes the crucial role of the responsible authority, pledging to undertake all necessary measures both prior to the commencement of the project and throughout its operational phases. This commitment encompasses a comprehensive approach to project management, ensuring that all regulatory requirements, environmental standards, and best practices are diligently adhered to. Before project initiation, the Proponent commits to conducting thorough assessments and implementing necessary preparatory measures to mitigate potential impacts. This includes adopting robust environmental management strategies, obtaining required permits, and addressing any concerns raised during stakeholder consultations. Throughout the operational phase, the Proponent maintains an ongoing commitment to environmental sustainability and regulatory compliance. This involves continuous monitoring, prompt response to emerging issues, and the implementation of adaptive management practices. By assuming the mantle of responsibility, the Proponent not only safeguards the project's integrity but also prioritizes the well-being of the environment, local communities, and all stakeholders involved. This proactive stance ensures that the project operates within the parameters of environmental and ethical standards, reflecting a dedication to responsible and sustainable project execution.

11.3.1 Other departments and agencies

A comprehensive impact analysis was conducted in collaboration with key stakeholders, including project management, the local community, educational institutes, health institutions, hospitals, and non-governmental organizations (NGOs). This inclusive approach sought to gather diverse perspectives and insights related to the implementation of the project. The engagement process involved scoping sessions, focused group discussions, and wayside consultations, providing a multifaceted platform for dialogue and information exchange. Through these forums, all pertinent issues associated with the project were thoroughly examined, including potential environmental, social, and economic impacts. The proactive involvement of stakeholders, representing various sectors of the community, ensured that a holistic understanding of the project's implications was achieved. This collaborative effort not only fostered transparency but also allowed for the incorporation of valuable local knowledge and concerns into the impact analysis. By actively engaging with stakeholders through diverse communication channels, the project management demonstrated a commitment to responsible and inclusive decision-making, setting the stage for a well-informed and socially accepted project implementation process.

11.4 Environmental Practitioners and Experts

Our dedicated team undertook a comprehensive site visit, engaging in extensive discussions with a broad spectrum of project stakeholders. This inclusive approach involved reaching out to residents from nearby villages and beyond, ensuring a diverse representation of perspectives to assess the socio-economic impacts of the project. The community demographic was richly diverse, encompassing individuals from various professions, such as those employed in different fields, business owners, doctors, expatriates, military personnel, and educators. In a conscious effort to ensure gender inclusivity, consultations with women were prioritized to gather their unique perspectives on how the project could contribute to the improvement of the area. While some women openly shared their thoughts, it was evident that social norms in the area made many feel hesitant, creating discomfort with speaking or being photographed. This nuanced understanding allowed our team to respect and navigate the cultural sensitivities of the community. The local community, nonetheless, proved to be a wellspring of information, offering valuable insights into the project and expressing predominantly positive views regarding its potential for development. This holistic approach to stakeholder engagement not only highlights the diverse fabric of the community but also underscores the importance of cultural sensitivity in ensuring meaningful and respectful interactions during the assessment of socio-economic impacts.

Table 11-1 Stakeholders and Their Roles and Responsibilities

Stakeholders	Roles
Proponent/Responsible Authority	The discussion with the proponent proposed the mitigation measures and alternatives to control any disparity in the project.
Environmental Expert	The consultants from the Integrated Environment Consultants survey the project site to gather relevant information and to record the local community stance and behaviors regarding the project. And also the evaluation of socio-economic impacts of the project has been done.
Government Departments	The consulted government department includes Environmental protection agency, wildlife, planning, and development. The departments overviewed the proposed projects and its socio-economic impacts.
Local affected communities	The surveys determined the extent of community that could be affected and their verdict about the proposed project.

11.5 Discussed Points

The points that have been kept in view while consulting stakeholders are as follows:

- Activities of the project and their consequences.

- Requirements of the people likely to be affected.
- Mitigation measures or compensation strategies.
- Role of the affected people in the implementation and development of the project.

11.6 Affected and Wider Community

In the vicinity of the proposed project, there is no identified affected community; however, the proactive engagement of the proponent with inhabitants from various villages has been instrumental in understanding and addressing local perspectives. The absence of a distinct affected community does not diminish the importance of comprehensive consultations. The proponent has undertaken conscientious efforts to reach out to residents across different villages, fostering a dialogue to assess the community's sentiments towards the project. Remarkably, the feedback from these consultations has been overwhelmingly positive, with residents expressing favorable views regarding the proposed endeavor. This positive reception is indicative of the proactive communication and collaborative approach adopted by the proponent, establishing a foundation of mutual understanding and support within the broader community. While the absence of an affected community streamlines certain aspects of the engagement process, the commitment to inclusive consultations with diverse stakeholders remains integral to building a harmonious relationship with the local population.

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12 GRIEVENCE REDRESS MECHANISM

A Grievance Redress Mechanism (GRM) is a structured system established to address and resolve complaints, concerns, or issues raised by individuals or entities regarding their experiences or interactions. This mechanism typically involves clear channels for lodging complaints, whether through written communication, online platforms, or dedicated grievance officers. Once a grievance is registered, the mechanism ensures a systematic and fair investigation of the matter, taking into account all relevant information and perspectives. Timely resolution and effective communication with the aggrieved party are essential components, helping to restore trust and rectify any perceived injustices. An efficient Grievance Redress Mechanism not only safeguards the rights and interests of individuals but also contributes to organizational transparency, accountability, and continuous improvement in service delivery.

12.1 Objectives of Grievance Redress Mechanism

The objectives of a GRM are designed to provide an effective and transparent process for addressing and resolving complaints or grievances raised by individuals or entities affected by a project or organization. The key objectives of a Grievance Redress Mechanism include:

- Ensure that the grievance redress process is easily accessible to all stakeholders, providing a straightforward means for individuals or communities to voice their concerns.
- Promote a fair and impartial mechanism that treats all grievances with equal consideration, regardless of the stakeholder's background, status, or affiliation.
- Establish a system that addresses grievances in a timely manner, minimizing delays and providing prompt resolution to concerns to prevent prolonged dissatisfaction.
- Foster transparency in the grievance redress process, ensuring that stakeholders are informed about the status of their complaints and the steps taken to address them.
- Hold the organization or project accountable for addressing and resolving grievances in accordance with established policies and procedures.
- Utilize the grievance redress process as an opportunity for organizational learning, collecting feedback to identify areas for improvement in project implementation or organizational practices.
- Empower affected individuals or communities by giving them a voice in the decision-making process and acknowledging the importance of their concerns.
- Serve as a mechanism for resolving conflicts and disputes in a constructive manner, minimizing the potential for escalation and promoting harmonious relationships.
- Use insights gained from the grievance redress process to enhance project design, implementation strategies, and overall organizational practices for continuous improvement.

- Ensure that the grievance redress mechanism aligns with legal requirements, industry standards, and the principles of social responsibility.
- Strengthen community engagement by demonstrating a commitment to addressing concerns and maintaining open communication channels.

By achieving these objectives, a Grievance Redress Mechanism contributes to building trust, fostering positive relationships with stakeholders, and enhancing the overall social and environmental sustainability of a project or organization.

12.2 Components of GRM

GRM typically involves several basic steps to address and resolve complaints or grievances effectively. While specific procedures may vary depending on the organization or context, the following are common steps in a basic GRM:

- Individuals submit their grievances through designated channels, which may include online platforms, written communication, or direct contact with a grievance officer.
- The received grievance is formally registered in the system, assigning a unique identifier. This step ensures proper tracking and documentation of each complaint.
- A preliminary assessment is conducted to determine the nature and severity of the grievance. This step helps in categorizing grievances and prioritizing them based on urgency.
- A thorough investigation is carried out to gather relevant information and facts related to the grievance. This may involve interviews, document reviews, or other means of inquiry.
- Clear and timely communication is maintained with the aggrieved party throughout the process. Regular updates and feedback are provided to keep them informed about the progress of the investigation.
- Once the investigation is complete, appropriate measures are taken to address the grievance. This may involve corrective actions, policy changes, compensation, or other forms of redress, depending on the nature of the complaint.
- The resolution is communicated to the aggrieved party, and feedback is sought to ensure their satisfaction. Follow-up may be conducted to confirm that the resolution has been implemented and to monitor any lingering concerns.
- The entire process, from grievance registration to resolution, is documented for record-keeping and reporting purposes. This documentation aids in analyzing trends, identifying systemic issues, and improving the overall grievance-handling process.

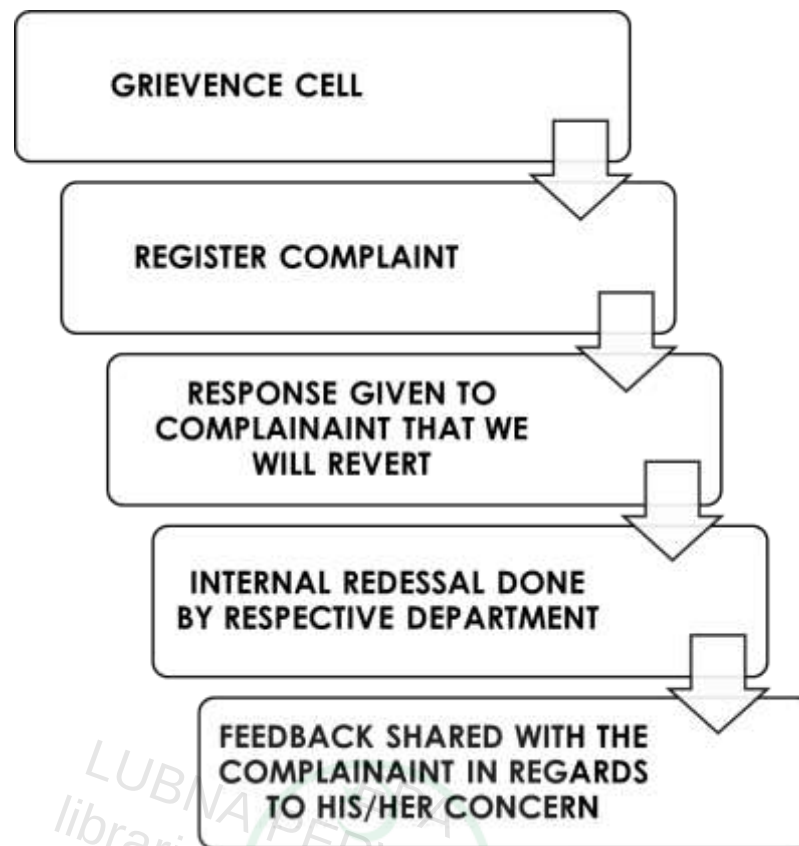


Figure 12-1: Grievance Redress Mechanism

13 CONCLUSION AND RECOMMENDATION

Based on the study conducted for EIA of the project, the following recommendations are made:

- Plantation as far as permissible and within the scope of the project to be carried out.
- Sustainable development approach through conservation of natural environment is followed.
- Environmental aspects of the project should be well taken care through implementation of the Environmental Management Plan as recommended in this report.
- The project management may adopt “cleaner and greener environment” as its motto and this will make the project more environment friendly.

On the basis of the findings of the EIA, it is concluded that the project will not pose any adverse impact on the local population and the environment. Therefore, it is recommended that the competent authority may please be issues Environmental Approval for the construction and operation of this project.

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ANNEXURES

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ANNEXURE – A: LIST OF ABBREVIATION

CO	Carbon Monoxide
CO₂	Carbon Dioxide
DHQ	District Headquarters
EA	Environmental Approval
EC	Electrical Conductivity
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
GRM	Grievance Redress Mechanism
Gop	Government of Punjab
IEE	Initial Environmental Examination
M & E	Monitoring and Evaluation
NGO	Non-Governmental Organizations
OHS	Occupation Health and Safety
PEPA	Punjab Environmental Protection Act
PEQs	Punjab Environmental Quality Standards
PM	Particulate Matter
PPE	Personal Protective Equipment
TDS	Total Dissolved Solid
UNCED	United Nations Conference on the Environment and Development

ANNEXURE – B: REFERENCES

Listed below are some of the documents, reports and other references consulted during the preparation of this report:

1. Information and data provided by project proponents;
2. Project Pre-Feasibility Study Report;
3. Technical Design Data related to the project.
4. Information gathered through discussions with the project related persons of the project proponent;
5. Information collected from the Technical documents of various suppliers of machinery/equipment.
6. Punjab Environment Quality Standards for Ambient Air August 2016;
7. Punjab Environment Quality Standards Noise Levels August 2016;
8. Punjab Environment Quality Standards for Drinking Water August 2016;
9. Pakistan Environmental Protection Act, 1997;
10. The Punjab Environmental Protection (Amendment) Act 2012 covers aspects related to:
 - The protection, conservation, rehabilitation and improvement of the environment and the prevention, control of pollution and promotion of sustainable development;
 - Establishing complete regulatory and monitoring bodies, policies, rules, regulations and national environmental quality standards; and
 - To ensure enforcement, the act establishes regulating bodies i.e. Punjab Environmental Protection Council (PEPC) and responsible bodies i.e. Punjab Environmental Protection Agency (Punjab EPA) at Provincial level.
- i. Environment related Laws in Pakistan and the Province of Punjab;
- ii. Government of Pakistan, Pakistan Environmental Protection Agency, Policy and Procedures for Filing, Review and Approval of Environmental Assessment, 2022;
- iii. Google earth, maps.
- iv. Guidelines for Public Consultations - These guidelines cover:
 - Consultation, involvement and participation of Stakeholders
 - Techniques for public consultation (principles, levels of involvements, tools, building trust)
 - Effective public consultation (planning, stages of EIA
 - where consultation is appropriate)
 - Consensus building and dispute resolution.
1. workplace safety and health act 2011
2. Land Acquisition Act (LAA) of 1894

3. The forest Act 1927
4. Pakistan Penal Code, 1860
5. Provincial Wildlife Act, 1974

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ANNEXURE – C: TERM OF REFERENCES

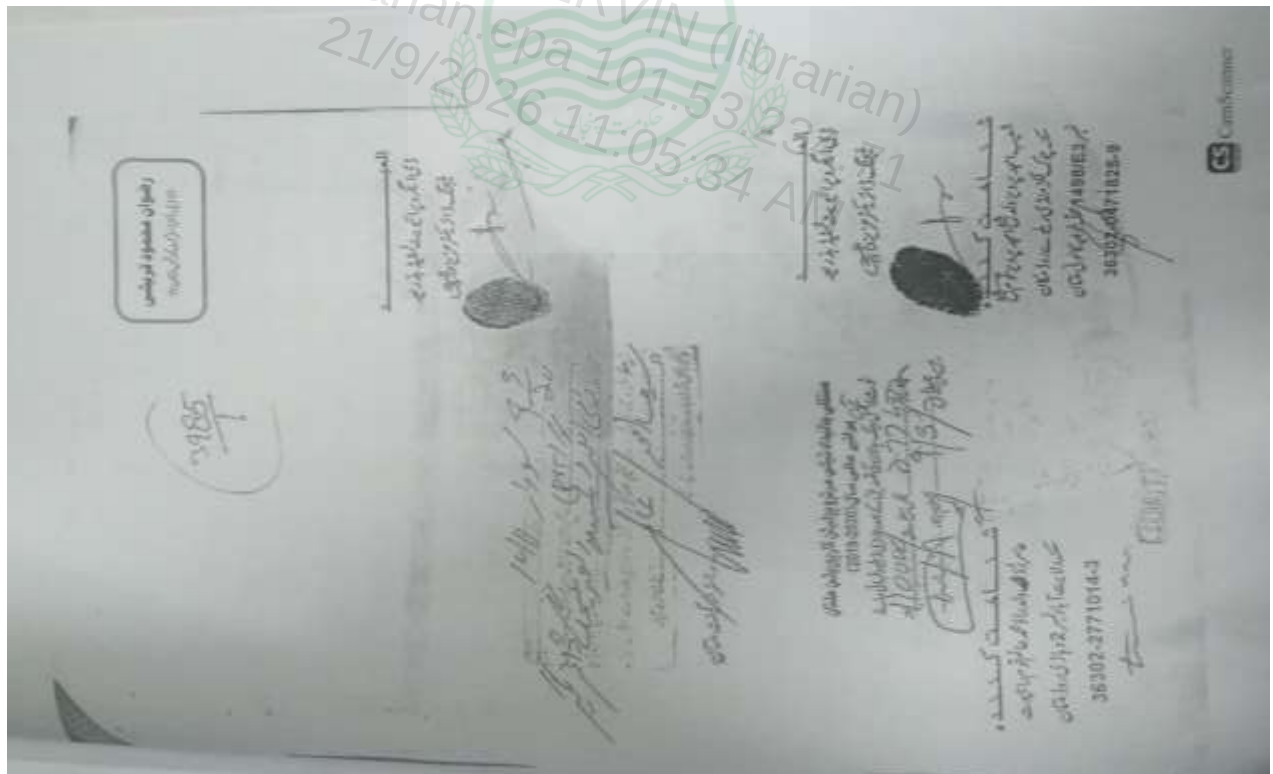
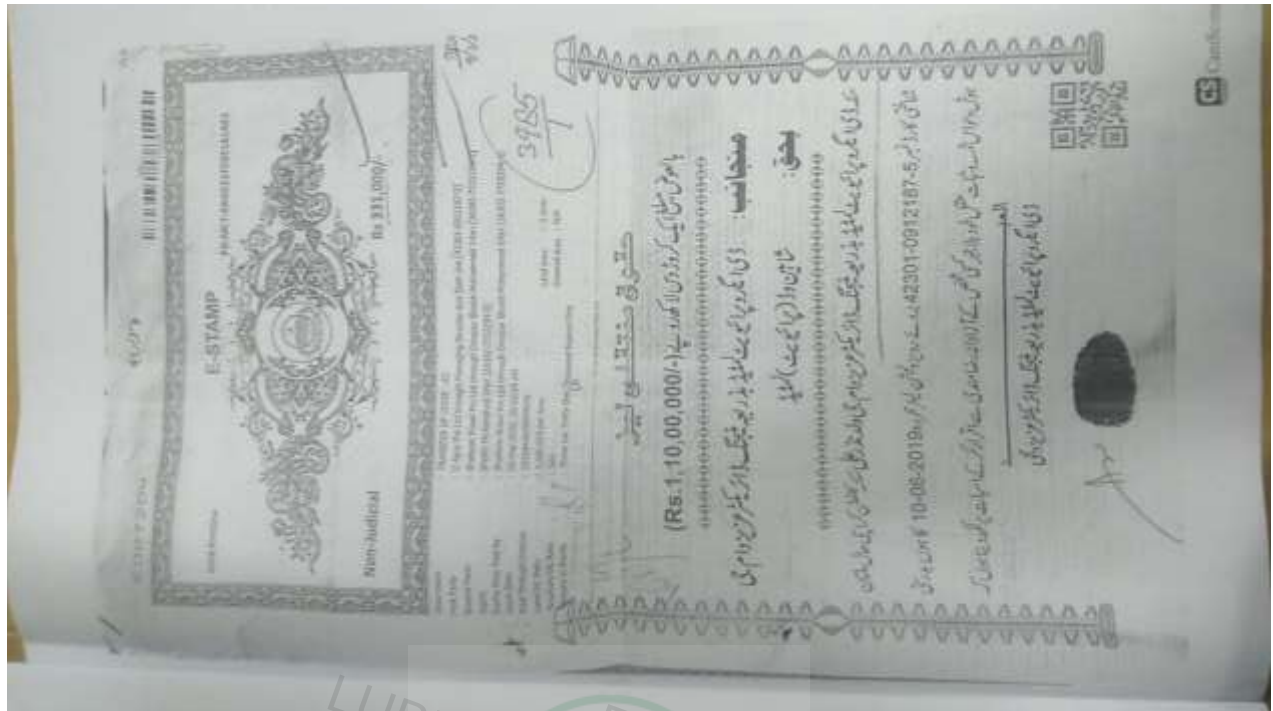
1. The Consultant is required to carry out an Environment Assessment Study of the Project as required under section 12 of Pakistan Environmental Protection Act 1997/ Punjab Environmental Protection Act 2012.
2. The Study should be comprehensive and should cover all aspects which are envisaged under the relevant national and provincial's laws & regulations including but not limited to:
 - Identification and recommendation for suitable solution/treatment/mitigation measures of emissions and effluents such as waste water and sludge etc. in accordance with Punjab Environmental Quality Standards (PEQS).
 - Identification and recommendation for suitable solution/treatment/mitigation measures of solvents, oils (tar), hazardous waste, organic compounds, steam, flue gases, particulate matter and chemical compounds harmful for the environment and other substances leading to air, noise, water and soil pollution in accordance with PEQS.

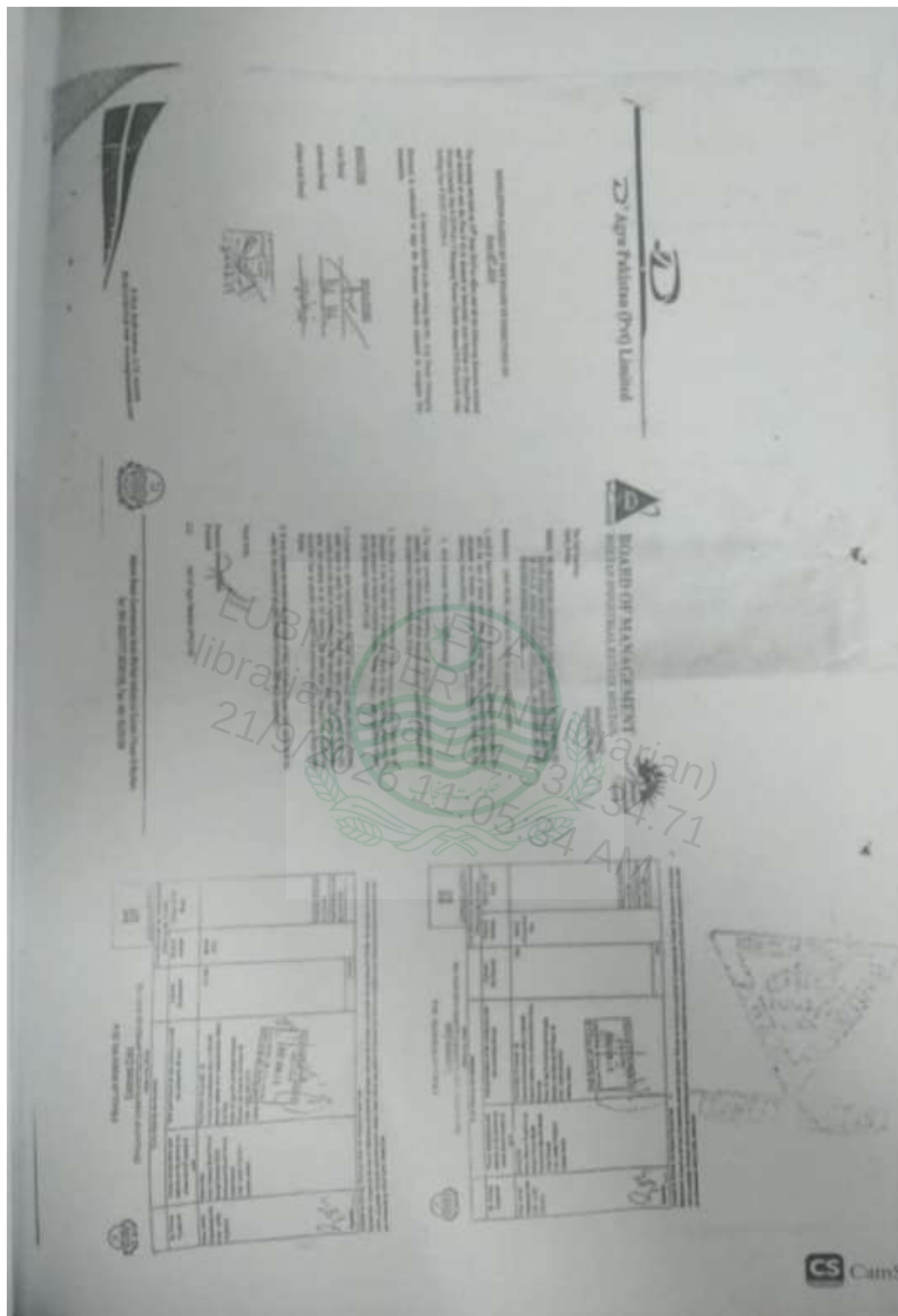
The Study should be acceptable to the relevant national and/or provincial authorities (relevant authorities) in Punjab

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ANNEXURE – E: LAND DOCUMENTS





**EPA PUNJAB EIA CHECKLIST FOR PREPARATION AND REVIEW OF
ENVIRONMENTAL REPORTS**

Required Content	EIA Report		
	PAGE NO.	REMARKS (If Any)	LACKING
Executive summary:	A; GPS p14		
1. Title and location of project with GPS Co-ordinates			
2. Name of the proponent along with contact number and email	A-B		
3. Name and details of the organization preparing the report	A-B		
4. A brief outline of the proposal (type, production capacity, process, technology and land requirement)	B; 13-21		
5. The major impacts	B-L		
6. Recommendations for mitigation measures	B-L; 41; 47-66		
7. Proposed monitoring	A , 68-70		
Screening: Whether the Project requires IEE or EIA as per Regulations	4		
Scoping	5-9		
1. Spatial and Temporal Boundaries of Environmental Assessment	5-7		
2. Important issues and concerns raised during consultation	8		
3. Significant impacts and factors to be determined	8-9		
Consideration of Alternatives	11-13		
1. Site alternatives, their selection and rejection criteria	11-13		
2. Design/Technology alternatives, their selection and rejection criteria	11		
3. Environmental Alternatives, their selection and rejection criteria	11		
4. Economic Alternatives, their selection and rejection criteria	11		
Description of the project:	13-23		
1. Type and Category of project	4; 13		
2. Objectives of Project	13		
3. Location and Site Layout of the project	14-15		
4. Site alternatives, their selection and rejection criteria	11-13		

**Establishment of Paper Impregnation &
Laminated MDF Manufacturing Units by M/s Shaheen Wood Pvt. Ltd.
Environmental Impact Assessment (EIA)**

Required Content	EIA Report		
	PAGE NO.	REMARKS (If Any)	LACKING
5. Design/Technology alternatives, their selection and rejection criteria	11		
6. Process, Raw material and product alternatives	15–20		
7. Pictures of project site and surroundings (East, west, north, south.)	14		
8. Google earth map with coordinates	14–15		
9. Land use on the site	21–22		
10. Road access	22		
11. Vegetation / tree plantation features of the site	30–31; 71–75		
12. Cost and Magnitude of operation	22		
13. Schedule of implementation	22–23		
14. Description of the project (Process flow chart/steps, Technology, Raw material and products, by-products):	15–21		
a) Detail of process/operations involved	17–20		
b) Source and quantity of raw materials	15–20		
c) Source and quantity of raw materials	15–20		
d) Collection, storage and transport of raw material	15–21		
e) Operational equipment and machinery to be used	15–16		
f) Production capacity of the unit for each product	15; 21		
15. Water usage (also mention quantity) and source	14		
16. Wastewater generation (Quantity and quality) and disposal method	63–64; 47		
17. Air emissions and control measures	44–45; 38–39		
18. Solid waste generation and disposal method	43–44; 62–63		
19. Operational hours of the facility	21		
20. Energy requirements and sources (e.g., electricity, LPG)	14		
21. Fuel storage and handling (if applicable)	39–40; 43		
22. Emergency response and safety features	45–46; 80–85		
23. Restoration and rehabilitation plans	59–60		

**Establishment of Paper Impregnation &
Laminated MDF Manufacturing Units by M/s Shaheen Wood Pvt. Ltd.
Environmental Impact Assessment (EIA)**

Required Content	EIA Report		
	PAGE NO.	REMARKS (If Any)	LACKING
24. Any green or sustainable features planned a. Rainwater Harvesting system b. Renewable Energy Production (Solar System) c. Tree plantation Plan	71-75		
Description of Environment: Clear-cut picture of existing environmental resources:	23-35		
	PAGE NO.	REMARKS (If Any)	LACKING
1. Baseline Physical Environment (Land use, physical structures, human settlements etc.)	24-35		
2. Baseline Ecological Environment (Flora and Fauna etc.)	30-31		
3. Baseline Socioeconomic Environment (Gender, populations, income levels etc.)	31-35		
4. Lab reports of environmental analyses (Ambient air, water quality and quality of surface water body receiving the discharge of project) along with soil tests, geo-investigation in case of building projects and industries)	—		
5. Suitability of the site (not prohibited, environmentally sensitive, incompatible to surroundings and unsuitable)	35-36		
Impact Assessment 1. Methodologies for impact identifications (One/more)	37		
✓ Checklists	18,129,130		
✓ Matrices	38; 42		
✓ Networks			
✓ Overlays			
✓ GIS and Computer expert systems			
2. Characteristics of impacts (nature, magnitude, extent and location, timing, duration, reversibility, risk)	38; 42-46		
Screening of potential Environmental Impacts and mitigation measures on/during:	36-46		

**Establishment of Paper Impregnation &
Laminated MDF Manufacturing Units by M/s Shaheen Wood Pvt. Ltd.
Environmental Impact Assessment (EIA)**

Required Content	EIA Report		
	PAGE NO.	REMARKS (If Any)	LACKING
1. Project location	36–37		
2. Design	37		
3. Construction phase	37–42; 54–60		
4. Operational phase	42–46; 61–67		
5. Potential Environmental Enhancement Measures	46–47; 71–75		
Environmental management and monitoring program	48–70		
1. Description of proposed mitigation actions along with:	54–67		
2. Schedule for implementation and Environmental budget	51; 70		
3. Environmental Management Team along with their Roles and responsibilities (by name or position)	67		
4. Proposed monitoring program to assess performance or output of EMP	68–70		
5. Proposed EMP reporting and reviewing procedures	70; 88–96		
6. Any training needs required to ensure implementation of EMP and Monitoring plans	67–70; 79; 84–85		
Stakeholders Consultation: Communicate the possible impacts and concerns to the following to assist further analysis and decision making:	86–92		
1. Proponent's Environment Management Team	88		
2. The responsible authority	88–89		
3. Other departments and agencies	89–90		
4. Environmental practitioners and experts	90–91		
5. Affected and wider community	91–92		
Appendices			
i. List of abbreviations	101		
ii. Lists of individuals and organizations consulted along with their written feedback	—		
iii. Sources of data and a full list of all reference material used	102–104		

**Establishment of Paper Impregnation &
Laminated MDF Manufacturing Units by M/s Shaheen Wood Pvt. Ltd.
Environmental Impact Assessment (EIA)**

Required Content	EIA Report		
	PAGE NO.	REMARKS (If Any)	LACKING
iv. Terms of references of environmental reports and those given to individual specialists	104		
v. List of names, qualifications and roles of team members carrying out the EIA study	3		
vi. Approvals from other concerned departments	105-106		
vii. Approved Building layout map/ planning Permission	104		
viii. KML file of project site	—		

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