

# EIA

## *Environmental Impact Assessment*

M/s T & D Pvt. Limited.  
Situating at Mouza Mari  
Tehsil Shalimar, District  
Lahore.



## A unit for Manufacturing of conductors / electric equipment

**Reporting**  
**Oct, 2025**

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## EXECUTIVE SUMMARY

The executive summary is an outline of the key outcomes in EIA (Environmental Impacts Assessment). The proponent intends to take environmental approval of the project from Environment Protection Agency (EPA) in order to comply with all the rules and regulations. The name of the project is M/s T&D Pvt. Ltd. located at Mouza Mari, Tehsil Shalimar, District Lahore. The project involves the electric conductors and allied material unit over an area of 55.50-Kanal. The basic detail of the project is provided in this chapter.

### Screening

According to projects categorization for environmental assessment studies, the project falls under **Schedule II** (list of projects requiring an EIA), **Category A** (Energy), as per the IEE/EIA Regulations 2022, established under Section 12 of the Punjab Environment Protection Act 1997 (Amended 2012).

T&D (Pvt) Limited was established in 2003 with the objective to manufacture distribution transformers (Pole-Mounted & Pad-Mounted) and power transformers to fulfill requirements of the local market, however will have a vision to expand business and will export in future.

Presently, we are manufacturing 5KVA to 8000 KVA transformers for Area Electricity Boards, private sector. Furnace Transformers for Steel Mills Industry as well as purpose designed transformers for specific application. Our in house design capabilities are extensive. Our transformers are designed by a team of highly qualified engineers. The manufacturing process is supervised by experienced engineers and strict quality control is maintained at all stages. Tests according to relevant standards are carried out before dispatch ISO certification is ongoing at this time.

### Title and location of the project

The proponent intends to establishment of electric conductors and allied material unit by the title "M/s T&D" at Mouza Mari, Tehsil Shalimar, District Lahore over an area of 55.50-Kanal.

### Name of the Proponent

The detail of the proponent is given below:

**Table 1 Details of Proponent**

Details of the Proponent
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<b>Proponent name</b>	Mr. Syed Zulfajadin Shah
<b>CNIC #</b>	35202-2825158-7
<b>Address</b>	Syed Zulfiqar Shah House, Mohollah Masoom Ganj, Hafeez Road, Lahore.

### **A brief outline of the proposal**

M/s T&D, led by **proponent** Mr. Syed Zulfajadin Shah, is electric conductors and allied material unit **located** at Mouza Mari, Tehsil Shalimar, District Lahore. The facility spans a total area of 55.50-Kanal The **coordinates** of project site are 31°38'26.7"N 74°26'02.9"E. This project **aims** to establish electric conductors and allied material unit for manufacturing miscellaneous sizes. The facility will **ensure** high-quality production, cost efficiency, and compliance with industrial safety and environmental standards. The **objective** is to meet the growing demand for specialized chemicals, reduce import reliance, and support the local manufacturing sector. The project ensures efficient and sustainable production while maintaining the highest standards of quality and safety. With a total **cost** of 70 million PKR, the **raw materials** include collagen. The final **products** include Transformers of miscellaneous sizes upto 8000KVA. The **detailed list** of raw materials and products with the capacity is provided in Chapter 3.

The project site is **industrial land** and operates on electricity supplied by LESCO. The construction phase engaged 20-25 workers, while the operational phase requires 30-35 workers. The construction period was approximately 06 months.

From an environmental perspective, the primary concerns include solid and liquid waste management. Solid waste generation is negligible and limited to domestic waste, while wastewater is treated before disposal into the drainage channel adjacent to the site. The facility adheres to Punjab Environmental Quality Standards (PEQS 2016) and follows the guidelines issued by the Environmental Protection Agency (EPA) and other relevant authorities. Additionally, all solid and liquid waste disposal is managed through EPA-approved vendors to ensure compliance with environmental regulations.

### **Legal and Administrative Framework**

The national guidelines and legislations relating to the environment considered for the project include, National Conservation Strategy (1992), National Environment Policy (2005), Pakistan

Labor Policy (2010), Punjab Environmental Protection Act (PEPA 1997), amended PEPA, (2012), Punjab Environmental Quality Standards (PEQS), Land Acquisition Act (1894), Cutting of Trees (Prohibition) Act (1975), Punjab Wildlife Act (1974), Punjab Plantation and Maintenance of Trees Act (1974), Antiquities Act (1975) etc.

Environment related documents have been reviewed including submission of environmental assessment study report to obtain environmental approval was made mandatory by the Pakistan Environmental Protection Ordinance (PEPO), 1983 and the Pakistan Environmental Protection Act (1997). Section 12(1) of the PEPA (1997) amended 2012 stipulates that no project involving construction or any change in the physical environment can be undertaken unless an IEE or an EIA is conducted, and approval (NOC) is received from the relevant provincial environmental agency.

This EIA report has been prepared with due consideration of PEPA, 1997, Punjab Environmental Protection (Amendments) Act, 2012 and all other legal requirements of Pakistan and Punjab Government Including LAA, 1894.

## **Major Impacts**

The establishment of a electric conductors and allied material unit will have various environmental and social impacts during both the construction and operational phases. While the project is essential for industrial growth and economic development, it requires proper mitigation measures to minimize potential environmental risks and ensure regulatory compliance.

During the construction phase, several environmental impacts are anticipated. Air quality may be affected due to dust (particulate matter) generated from land clearing, excavation, and transportation of materials. Additionally, gaseous emissions from construction machinery, generators, and transport vehicles may contribute to local air pollution. Noise pollution is another concern, as heavy construction equipment and machinery will be in continuous operation, along with vehicle movement at the site. The project will also generate solid waste, including construction debris, discarded packaging materials, and excess building materials. However, on the socioeconomic front, the construction phase will have a positive impact by creating temporary job opportunities for construction workers, engineers, and laborers. A minor challenge may arise from transport congestion due to the movement of heavy machinery and raw materials required for construction activities.

In the operational phase, the environmental impacts will be more ongoing. Air pollution may result from raw material handling, chemical mixing processes, and vehicular emissions. Additionally, dust emissions from product handling and transport activities may contribute to local air quality concerns. Noise pollution will persist due to the continuous operation of industrial machinery, mixers, pumps, and the movement of transport vehicles. Another major concern is solid and hazardous waste generation, which will primarily include chemical residues, by-products, and packaging waste. Without proper waste management, these materials could pose environmental and health risks. There is also a potential for soil and water contamination if chemicals are not stored, handled, or disposed of correctly, leading to accidental spills or leaks that could seep into the ground and water sources. Wastewater generation will arise from industrial processes and domestic activities within the facility, necessitating a robust wastewater treatment system to ensure environmental compliance.

Despite these environmental concerns, the socioeconomic benefits of the project are significant. The electric conductors and allied material unit will create long-term employment opportunities for skilled and unskilled labor, contributing to economic growth in the region. The project will support industries by providing essential transformers for various applications, reducing reliance on imported chemicals. Transport congestion during operations is expected to be minimal due to a well-planned logistics system and supply chain management.

### **Mitigation Measures**

The mitigation measures of potential environmental impacts resulting during construction and operational phase of the project are given below:

#### **During construction phase:**

- Usage of water sprays to control dust during excavation and construction activities.
- Implement dust barriers or screens around construction sites to minimize dispersion.
- Maintain and regularly service all construction equipment to minimize emissions.
- Use noise barriers or enclosures around high-noise equipment.
- Equip machinery with noise-reducing features.
- Segregate and properly dispose of construction waste, recycling materials where possible.
- Implement temporary wastewater systems for construction activities.
- Treat and manage wastewater from domestic sources appropriately.

- Limit vehicle movement during peak traffic hours to reduce congestion.
- Generators will be installed with proper enclosure, tuning and maintenance to control emissions.

**During operational Phase:**

- Adoption of effective solid waste management practices for domestic refuse.
- Installation of a septic tank with sufficient capacity before discharging into nearby wastewater channels.
- Erection of safety signage to prevent traffic-related incidents on adjacent roads.
- Disposal of process-related solid waste by an EPA-certified contractor.
- Establishment of a dedicated health and safety department to foster a secure and healthy workplace, aiming to reduce accidents and improve staff morale.
- Regular Health, Safety, and Environment (HSE) training for employees.
- Mandatory use of Personal Protective Equipment (PPE), such as gloves and masks, especially while handling hazardous materials.
- Direct reporting protocols for any incidents to the relevant authorities.
- Enhancement of the green zone and ongoing tree planting during the operational phase to further diminish dust emissions.
- A well-designed ventilation system and preventive maintenance schedule for generators and machinery to check air pollution levels.

**Proposed Monitoring**

During the construction phase, regular monitoring will be conducted to ensure compliance with environmental and safety standards. Key focus areas will include ambient air quality (particularly dust levels), vehicle and equipment emissions, noise pollution, solid waste management, soil contamination, and worker safety. Dust levels and exhaust emissions from construction activities will be closely tracked to ensure adherence to air quality regulations. Noise levels generated by heavy machinery and vehicle movement will be monitored to minimize disturbances to nearby areas. Solid waste management practices will be enforced to ensure proper disposal of construction debris and packaging materials, reducing environmental hazards. Soil contamination risks will be assessed, especially during excavation and material handling. Worker safety will be a top priority, with ongoing safety inspections, the mandatory

use of Personal Protective Equipment (PPE), and adherence to occupational health and safety protocols.

In the operational phase, monitoring activities will be conducted on a quarterly basis to ensure environmental sustainability and workplace safety. Ambient air quality assessments will focus on dust levels from raw material handling, chemical processing, and vehicle movement within the facility. Noise levels from industrial machinery, mixers, pumps, and transport vehicles will be measured to maintain compliance with acceptable limits. Solid waste disposal will be systematically monitored, with a focus on proper handling and disposal of chemical residues, packaging waste, and industrial by-products. Soil contamination risks will be continuously evaluated to prevent potential leaks or spills from chemical storage and handling processes. Additionally, worker and community safety will remain a key aspect of monitoring, with periodic safety reviews to ensure a secure and hazard-free work environment.

## **Conclusions and Recommendations**

The proposed electric conductors and allied material unit is expected to bring numerous economic and social benefits, including job creation, business growth, and increased local income levels, which will contribute to improving the social infrastructure in the area. The project will provide employment opportunities for both skilled and unskilled workers, fostering economic development and supporting industries reliant on transformers. Additionally, the project will enhance industrial productivity by supplying essential chemicals to key sectors, thereby strengthening the local economy.

While the project may lead to some environmental challenges, such as air quality degradation, noise pollution, and dust emissions, these impacts can be effectively managed through well-planned mitigation measures. Proper air pollution control, noise reduction techniques, and waste management practices will help minimize the environmental footprint of the project. Cost-effective environmental management strategies have been incorporated into the project design to ensure sustainable operations while complying with environmental regulations.

To ensure long-term environmental sustainability, it is recommended to:

- Provide ongoing environmental training for workers and staff to ensure awareness of best practices and regulatory requirements.
- Implement effective water management strategies, including rainwater harvesting and wastewater treatment, to minimize water consumption and pollution risks.

- Adopt a comprehensive waste management plan to ensure proper handling, storage, and disposal of chemical residues and industrial waste.
- Conduct regular environmental monitoring and reporting to track air quality, noise levels, and waste disposal compliance.

Furthermore, it is essential that the project proponent obtains environmental approval (No Objection Certificate – NOC) from the Punjab Environmental Protection Agency (Punjab-EPA) before commencing construction, in compliance with local environmental regulations. By implementing these recommendations, the project can operate efficiently while minimizing its environmental impact and ensuring long-term sustainability.

## **1 INTRODUCTION**

### **1.1 General**

Kahna Nua, a key industrial hub in Pakistan, offers an ideal environment for establishing a electric conductors and allied material unit due to its well-developed infrastructure, strategic location, and access to skilled labor. As a major center for textile and manufacturing industries, Lahore provides a strong demand for binders, pigment emulsions, and auxiliaries, ensuring business sustainability. The proximity to raw materials and an efficient transportation network facilitates cost-effective supply chain management and enhances export opportunities. Moreover, the industrial estate is equipped with modern facilities, including uninterrupted power supply and well-planned roads, ensuring smooth production operations. The establishment of a electric conductors and allied material unit will contribute to economic growth by generating employment for skilled and unskilled workers while also strengthening related industries such as packaging, transportation, and raw material supply. Additionally, adopting eco-friendly production techniques and sustainable waste management practices will help meet environmental regulations and enhance the unit's reputation in both local and international markets. With a supportive industrial ecosystem and increasing global demand for high-quality chemicals, setting up a formulation unit in Kahna Industrial Estate presents a strategic opportunity for long-term business success.

### **1.2 Purpose of the Report**

This report has been prepared to conform to the requirements of the Punjab Environmental Protection (Amendment) Act 2012 (PEPA), which states that:

**“No proponent of a project shall commence construction or operation unless he has filed with the Provincial Agency an Environmental Impacts Assessment or where the project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained from the Provincial Agency approval in respect thereof.”**

The proponent feels its social, moral, and legal obligation to protect the environment. It is in this context that the company initiated the process of gaining Environmental Approval from the EPA, Government of Punjab. According to the direction of the EPA, as detailed in the preceding para under "Introduction" this EIA (Environmental Impacts Assessment) is being submitted for issuance of the said Environmental Approval in compliance with the Punjab Environmental Protection Act -1997 (Amended 2012) Section 12.

The proponent affirms that environmental management order will prevail both during construction and regular operation in accordance with the Punjab Environment Quality Standards (PEQS).

The EIA (Environmental Impacts Assessment) report considers socio economic, physical, and environmental, land use, forestry, crops, water bodies, biodiversity (flora and fauna), heritage, and other relevant aspects associated with the project itself and the area around the project. The report also describes mitigation measures that will be adopted to undo environmental impacts on any segment of the environment, i.e., human health and environmental health around the project site both during construction and normal operation of the project. The report provides relevant information, as required under the officially approved format, to help the decision makers (EPA Punjab in the Present case) before issuing the desired environmental approval.

### **1.3 Identification of the project and proponent**

The details of the project and proponent are given below:

**Table 2 Proponent & Project Details**

<b>Details of the Project and Proponent</b>	
<b>Proponent name</b>	Mr. Syed Zulbajadin Shah
<b>Proponent designation</b>	Proponent
<b>Address of proponent</b>	House # 84 A2, Mohollah Engineer Town, Kahna Nua, Lahore
<b>Project title</b>	M/s T&D Pvt. Limited
<b>Location of project</b>	Mouza Mari, Tehsil Shalimar, District Lahore
<b>Description of project</b>	This project aims to establish a electric conductors and allied material unit for manufacturing miscellaneous sizes. The facility will ensure high-quality production, cost efficiency, and compliance with industrial safety and environmental standards.

### **1.4 Nature and size of the project**

The project is spread over an area 55.50-Kanal The land is industrial in nature. While establishing of the project and resultantly around 20-25 people got jobs during the construction

phase and around 30-35 people will be engaging during the operational phase of the project.

Table 2 Schedule of area

Schedule of Area		
I.	Total Area of Plot	55.50-Kanal
II.	Covered Area	229487 Sq. Ft.

## 1.5 Location

The project site is located at Mouza Mari, Tehsil Shalimar, District Lahore. The coordinates of the project area are 31°38'26.7"N 74°26'02.9"E.

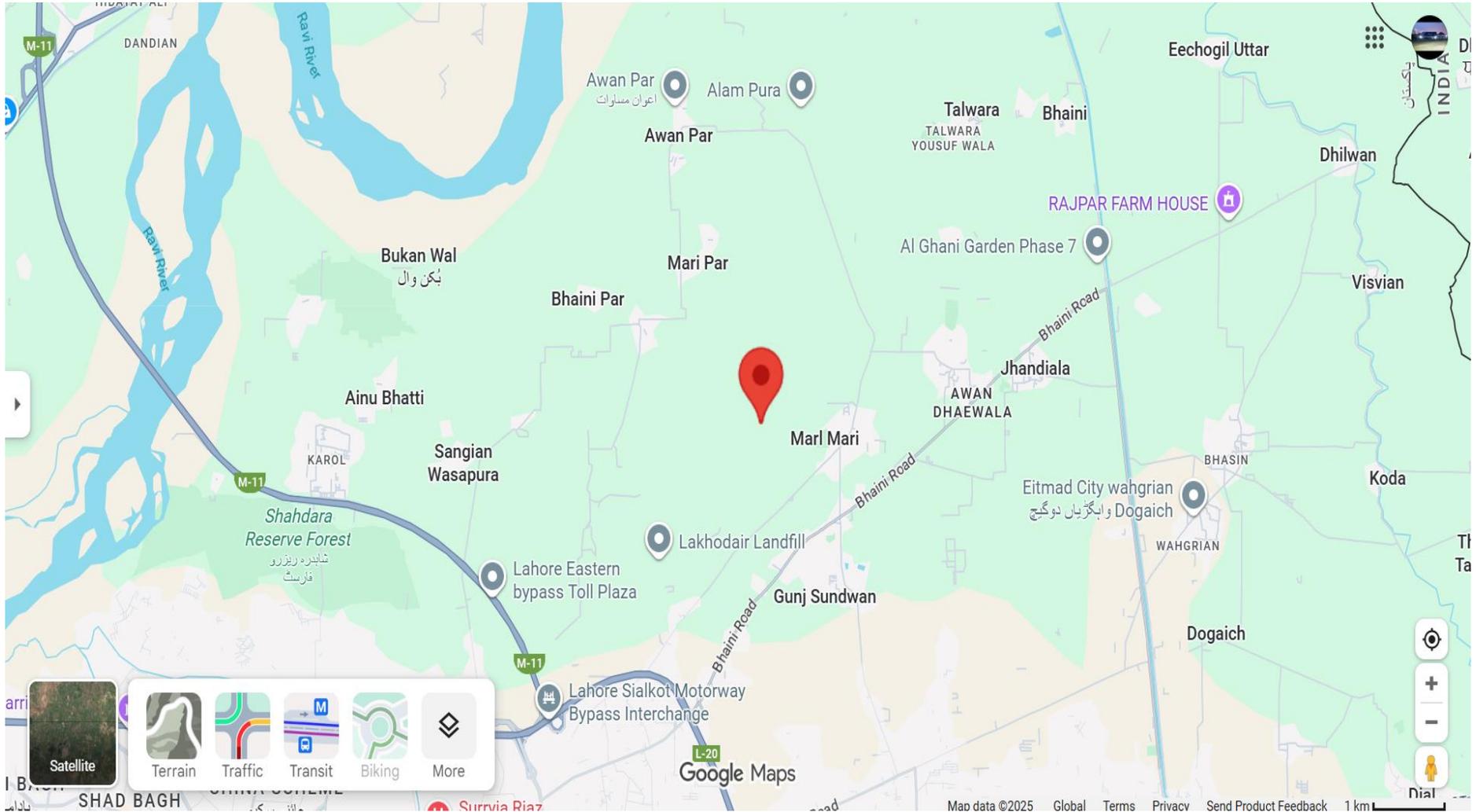


Figure 1 Project Location

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## **1.6 Extent of the EIA study, scope of the study, magnitude of the efforts**

This Environmental Impacts Assessment (EIA) study has been conducted in accordance with Serial 2.3 of the *Guidelines for the Preparation and Review of Environmental Reports, October 1997*. In compliance with the Pakistan Environmental Protection Act (PEPA), 1997 (amended 2012), the EIA report has been prepared by a team of environmental experts. This document evaluates the environmental impacts associated with the establishment and operation of the said project, covering the physical, ecological, and socio-economic aspects, while identifying potential positive and negative impacts. However, any external developmental activities beyond the project site, such as road rehabilitation or the establishment of unrelated industries, are not included in this EIA study.

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## 2 POLICY, LEGISLATION, LEGAL & ADMINISTRATIVE FRAMEWORK

### 2.1 General

This section deals with the current policy as well as legal and administrative framework related to carrying out EIA (Environmental Impacts Assessment) of various projects. Several laws exist in Pakistan, containing a few clauses concerning protection of the environment. Like other Projects, this project is also required to go through an Environmental Assessment for getting a NOC under Section 12 of the Punjab Environmental Protection Act – 1997 (Amended 2012).

According to environmental laws of the country development projects must undergo the process of Environmental Impact Assessment (EIA) or Initial Environmental Examination (IEE) to predict and mitigate the impacts of the development at an early stage.

### 2.2 Screening

The project falls under **Schedule II** (list of projects requiring an EIA), **Category B** (Manufacturing and Processing), Sub Section 02 (**Electric conductors and allied material units, including pharmaceuticals and cosmetics**) as per the IEE/EIA Regulations 2022, established under Section 12 of the Punjab Environment Protection Act 1997 (Amended 2012). Details of the process description are given in **Chapter 03** under the heading of project description.

### 2.3 Existing Regulation and Framework

This EIA study has been carried out in the light of the policy guidelines for the preparation of IEE/EIA Reports under the procedure and practices formulated by the Provincial Environmental Protection Agency (EPA).

### 2.4 Relevant Legal / Institutional Framework

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

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#### **2.4.1 National Conservation Strategy, 1992**

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

#### **2.4.2 PEPO, 1983 and PEPA 1997 (Amended 2012)**

In 1983, the Government of Pakistan issued an Environmental Protection Ordinance (EPO), which was replaced by the Pakistan Environmental Protection Act (PEPA) 1997, through an Act of Parliament. Now the PEPA 1997 has been replaced by Punjab Environmental Protection Act 1997 (Amended 2012) on 18<sup>th</sup> April 2012.

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

Under section 12 of the Punjab Environmental Protection Act, 1997 (Amended 2012) it is mandatory to take an Environmental Approval Environmental Protection Agency for commencement of any construction of project.

#### **2.4.3 National Environmental Policy 2005**

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

#### **2.4.4 Review of EIA and IEE Regulations, 2022**

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

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#### **2.4.5 Guidelines for the Preparation and Review of Environmental Reports, 1997**

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

#### **2.4.6 Punjab Environmental Quality Standards (PEQS)**

According to Punjab Environmental Protection Act, 1997 (Amended 2012), Punjab Environmental Quality Standards (PEQS) were established for municipal and industrial effluents and air emissions.

#### **2.4.7 Guidelines for Sensitive and Critical Areas**

GOP issued Guidelines for Sensitive and Critical Areas in October 1997. The objective of the guideline is to provide guidance to project proponents and other stakeholders in the environmental assessment process, so that the projects are planned and sited in a way that protects the values of sensitive and critical areas.

#### **2.4.8 Policy and procedures for the Filing, Review and Approval of Environmental Assessments, November-1997**

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

#### **2.4.9 Guidelines for Public Consultation, Pakistan Environmental Protection Agency October 1997**

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

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

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#### **2.4.10 Punjab Wildlife Protection Act, 1974**

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

#### **2.4.11 Forest Act, 1927**

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

#### **2.4.12 Explosive Act, 1884**

This act deals with explosives in prohibiting either absolutely or subject to conditions, the manufacture, possession, or importation of any explosive which is so dangerous in character that, in the opinion of the appropriate Government, it is expedient for public safety to issue the notification.

#### **2.4.13 Punjab Local Government Ordinance, 2001**

Schedules 4 and 8 of this Ordinance pertain to environmental pollution. Under the Ordinance, the local councils are authorized to restrict projects causing pollution of air, water or land. They may also initiate schemes for improving the environment.

#### **2.4.14 Pakistan Penal Code, 1860**

This defines the penalties for violations concerning pollution of air, water bodies and land. Sections 268 to 291 are about offences affecting public health. The offences relating to public health, safety and environment are as under:

**Sec 268:** Public Nuisance

**Sec 269:** Negligent acts likely to spread infection of disease dangerous to life:

**Sec 270:** Malignant act likely to spread infection of disease dangerous to life:

**Sec 278:** Making atmosphere noxious to health:

**Sec 284:** Negligent conduct with respect to poisonous substances:

**Sec. 290:** Punishment for public nuisance in cases not otherwise provided for:

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**Sec. 291:** Continuance of nuisance after injunction to discontinue.

#### **2.4.15 Punjab Land Use Rules 2009**

In January 2009 the Punjab Government notified “Punjab Land Use Rules 2009” for the clarification of Lahore Master Plan. In these rules permissible land use according to area type is defined.

#### **2.4.16 Antiquities Act 1975**

The law relates to the protection of Antiquities, monuments, and National & International heritage. Compliance of this Act is mandatory for the Installation of Generators. Under section 22 of the Act no development plan or scheme or new construction can be done within distance of 200ft from the boundary of the monuments/ National Heritage. There is no historical Site or monuments in the proximity of the project.

#### **2.4.17 Solid Waste Management Rules 2005**

The Solid Waste Management Department, CDGF, has notified these rules for proper waste management.

#### **2.4.18 Labor Laws**

The labor laws apply to child labor and measuring instruments.

#### **2.4.19 Safety & Civil Defense Laws**

The civil defense laws provide details about safety, fire protection and civil defense.

#### **2.4.20 Guidelines for Critical and Sensitive Area**

These guidelines have been prepared under section 12 of Punjab Environmental Protection Act 1997 (Amended 2012) for protection and safety of critical and sensitive localities.

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## 3 PROJECT DESCRIPTION

The proponent intends to take environmental approval of the project from Environment Protection Agency (EPA) in order to comply with all the rules and regulations. The name of the project is M/s T&D Pvt. Ltd. located at Mouza Mari, Tehsil Shalimar, District Lahore. The project involves the transformers over an area of 55.50-Kanal. The estimated cost for the subject project will be about 70 million PKR.

The project will pose positive impacts in terms of employment opportunities, will create jobs during operation and will contribute to the country's economy by meeting the market demands.

### 3.1 Type and category of the project

The project spreads over an area of 55.50-Kanal as a result of the project, around 20-25 people got jobs during the construction phase and another around 30-35 people will be engaging during the operational phase of the project.

According to projects categorization for environmental assessment studies, the project falls under Schedule II (list of projects requiring an EIA), Category A (Energy), as per the IEE/EIA Regulations 2022, established under Section 12 of the Punjab Environment Protection Act 1997 (Amended 2012).

### 3.2 Objective of the project

The objective of the aforesaid project i.e. M/s T&D for economic growth and to meet the demand of the market. The project will have the following advantages:

- To manufacture high-quality binders, pigment emulsions, auxiliaries, and specialty chemicals to meet the growing demand of Pakistan's textile and industrial sectors.
- Enhance local industrial capacity, reduce dependence on imported chemicals, and support the growth of allied industries such as textiles, packaging, and construction.
- To provide cost-effective and innovative chemical solutions while ensuring environmental sustainability.
- To contribute to the socio-economic uplift of the proponent and the local community by adding value through this project.

### 3.3 Alternatives consideration

Alternatives are recommended and examined to determine the best method of achieving project objectives, while minimizing environmental impacts. The discussion and analysis of

alternatives in an EIA (Environmental Impacts Assessment) study should consider other practicable strategies that will promote the elimination of negative environmental impacts identified.

This section covers the project alternatives which were examined for the project. An analysis of the available alternatives is necessary to establish that the most suitable management and technology options will be adopted for the project, while minimizing environmental impacts. This evaluation explains the selection of the most feasible alternative in terms of economics, environment, and health & safety. It outlines the following options that were considered for this project:

- Site Alternative their selection and rejection criteria
- Design/technology alternatives, their selection and rejection criteria
- Environmental Alternatives, their selection and rejection criteria
- Economic Alternatives, their selection and rejection criteria

### **3.3.1 Site alternative their selection and rejection criteria**

The chosen location for the project of M/s T&D is situated in Mouza Mari, Tehsil Shalimar, District Lahore, making it an ideal site for the project as the project site is industrial in nature. The location is spacious enough to accommodate the required facilities and infrastructure. With its existing infrastructure and strategic position, we believe this site is perfectly suited for the development. Additionally, there are no historical sites or recreational areas in the vicinity.

No alternative sites were considered for the establishment of the unit, as this location best meets all the necessary criteria, including accessibility, space requirements, and proximity to essential infrastructure. The chosen site is optimal for the successful implementation of the project, providing a secure, efficient, and sustainable environment for the project.

Key characteristics of the site include:

- ✓ Availability of transportation infrastructure, including a well-developed road network.
- ✓ No significant land damage is anticipated from the project's implementation.
- ✓ No alternative sites are considered due to the strategic advantages of this location.

### **3.4 Land Use of the Site**

The selected land is industrial in nature ensuring that the project does not require any land use changes. Its status and location make it fully compatible with the development, in line with

existing land use policies. This not only simplifies the approval process but also minimizes any potential impact on nearby communities.

#### **3.4.1 Environmental Alternatives, their selection and rejection criteria**

Upon completion of construction, comprehensive plantation efforts will be carried out to improve the surrounding environment. A maximum number of trees will be planted in and around the project site to enhance the aesthetics of the infrastructure, reduce air pollution, and mitigate noise pollution. Additionally, a well-designed sewage and solid waste management system will be implemented to prevent contamination and ensure that waste is managed in an environmentally responsible manner.

To further minimize environmental impact, the project will focus on reducing workplace accidents and injuries through strict safety protocols and effective training programs. These measures aim to not only protect the workforce but also contribute to a safer and healthier working environment.

Moreover, a commitment to improving workforce morale will be emphasized by providing proper facilities and creating a conducive environment that promotes productivity and well-being. These initiatives are all part of the project's efforts to minimize its environmental footprint while maximizing its positive contributions to the community and the workforce. In terms of site selection, environmental factors such as air quality, noise levels, waste management capabilities, and the potential for enhancing the local ecosystem were critical considerations.

#### **3.4.2 Economic Alternatives, Their Selection and Rejection Criteria**

The project is expected to significantly boost local employment by creating opportunities for qualified and skilled workers. In line with this, the selection of technologies and machinery for the project has been carefully chosen to ensure economic efficiency, both in terms of initial investment and long-term operational costs. The selected technologies are cost-effective and provide high operational efficiency, ensuring the project remains financially viable and sustainable.

Additionally, tree plantation will be a key feature of the project, providing not only environmental benefits such as cooling the area and acting as a noise barrier but also contributing to the local economy through improved aesthetics and air quality

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To further reduce operational costs, the project has been designed to maximize the use of natural daylight, reducing the need for artificial lighting during the day. For nighttime operations, energy-efficient LED lighting will be used, significantly lowering electricity consumption and minimizing energy expenses over time.

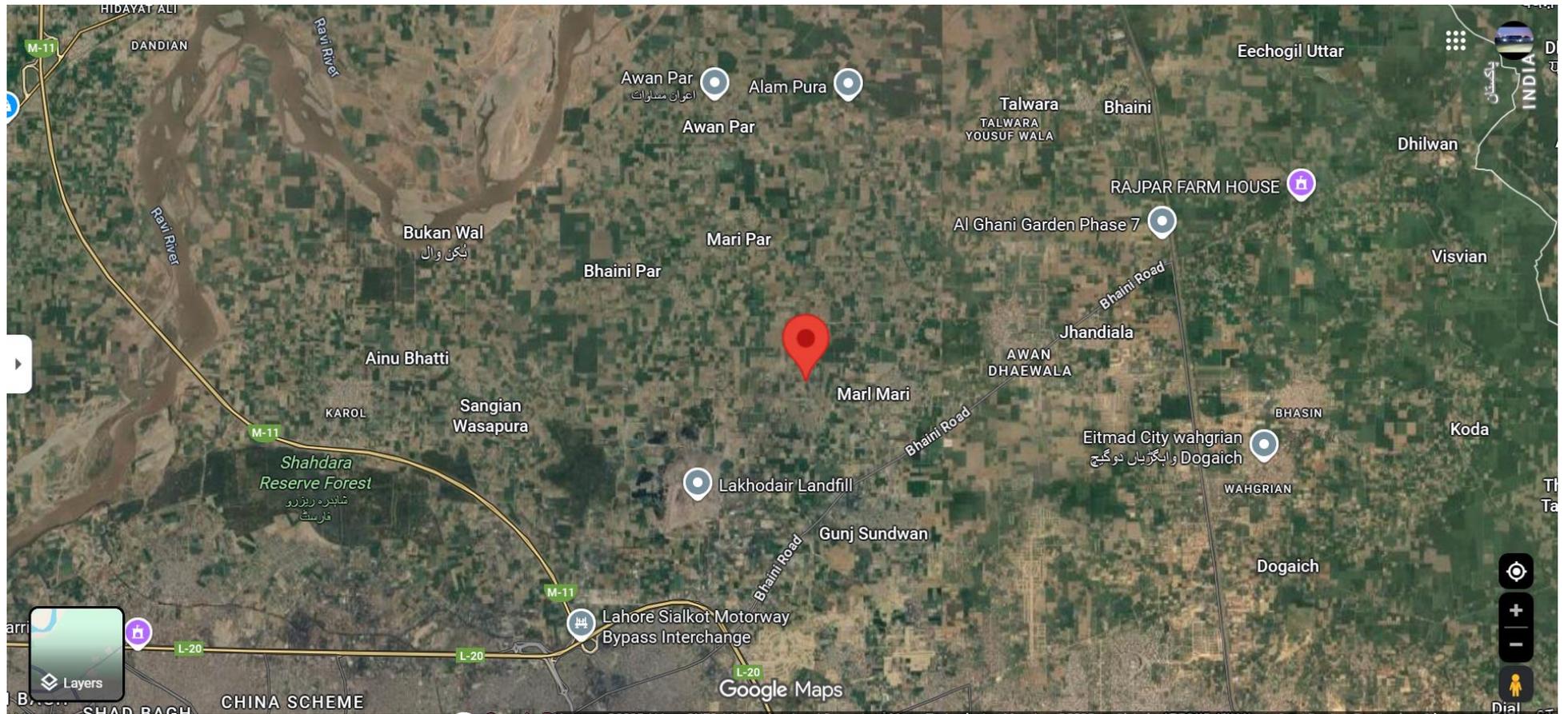
Economic alternatives were considered based on their ability to reduce operational costs, enhance energy efficiency, and create long-term employment opportunities.

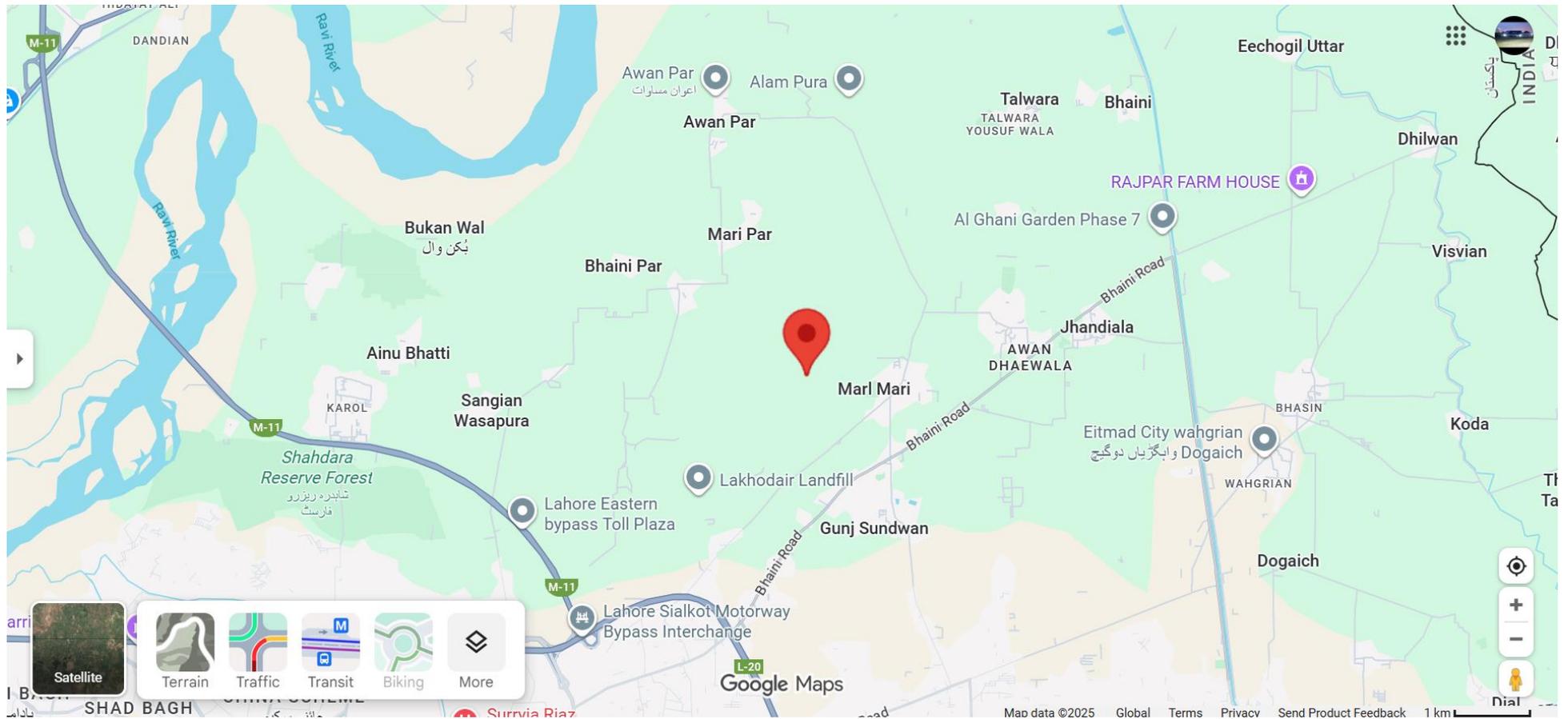
### **3.5 Project Location and Layout**

The site for the project of “M/s T&D” is located at Mouza Mari, Tehsil Shalimar, District Lahore. The location of the project is given below, and layout of project is attached within the file. The coordinates of the project site are 31°38'26.7"N 74°26'02.9"E.

### **3.6 Road Access**

The project site is easily accessible via the Defense Road and Lahore – Kasur Road, providing convenient access for operational activities. This accessibility is essential for the smooth transportation of raw materials, products, and for employee commutes to and from the site. The well-maintained road network ensures minimal transportation delays, supporting the project's efficiency and overall productivity. Furthermore, road access is vital for quick distribution to local markets, enhancing supply chain operations. A road access map has been provided, offering a detailed overview of the site's connectivity and highlighting its strategic location for efficient logistics and seamless transportation operations.





**Figure 2 Project Location  
Road Map**

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### 3.7 Vegetative Features of the Site

The area surrounding the project site is primarily industrial, with some green patches scattered throughout. In line with the project's commitment to sustainable development, plans are in place to establish green belts around the site during its operational phase. These green belts will not only enhance the aesthetic appeal of the site but will also serve vital environmental functions. They will act as natural buffers to reduce pollution, particularly from vehicular emissions, and help mitigate noise pollution originating from the unit. The development of these green spaces is a strategic measure to improve air quality and create a peaceful environment surrounding the project's site.

### 3.8 Plantation Plan

To further enhance visual appeal and improve ambient air quality, the project will implement a plantation plan that includes the planting of approximately 500 to 1000 plants within and around the project area's vicinity. The selection will focus on a variety of plants, including ornamental species like Coreopsis and daylilies, alongside a strong emphasis on planting shade-providing trees. This initiative aligns with the project's environmental sustainability goals, aiming to create a greener, more pleasant environment that will benefit both the local ecosystem and the surrounding community.

#### Maintenance Plan

- **Watering:** Use drip irrigation to minimize water wastage. Ensure plants are watered according to their specific needs.
- **Trimming:** Regular pruning of trees and shrubs to maintain their shape and encourage healthy growth.
- **Pest Management:** Use organic pest control methods to avoid harmful chemicals and maintain a healthy ecosystem.

#### Landscaping and Design Considerations:

- **Sustainability:** The selection of drought-resistant and low-maintenance plants that are suited to the local climate of Multan will reduce the need for excessive irrigation and chemical fertilizers, aligning with sustainable landscape practices.
- **Seasonal Color:** Seasonal flowering plants are integrated to maintain aesthetic vibrancy throughout the year, ensuring visual appeal during all seasons.

- 
- **Soil and Fertility:** To maintain soil fertility and reduce the dependence on chemical fertilizers, natural fertilizers are used to promote healthy soil conditions and support plant growth.

### **3.9 Magnitude & Cost of the Project**

The project is poised to be a significant industrial venture with an estimated initial capital investment of approximately 70 million PKR. This investment will cover the costs related to the procurement of equipment, construction, raw materials, and the operational expenses necessary for the functioning. A key focus will be on ensuring the safety and efficiency of all equipment and operations, supported by diligent management practices. Notably, no separate funds are required for additional safety or operational assurances, as the budget plan comprehensively includes all necessary provisions for safety, environmental measures, and sustainability. This strategic financial planning highlights the project's dedication to both economic feasibility and environmental stewardship.

### **3.10 Schedule for implementation (Tentative)**

- ❖ **Stage I:** The clearing of land, and preparation of land for construction activity.
- ❖ **Stage II:** During this phase, machinery will be brought to the site and installed.
- ❖ **Stage III:** In this phase all the outstanding activities will be completed, and construction activities will be initiated.
- ❖ **Stage IV:** After completing construction, employees will be hired, and staff will be assigned their respective work. The operation activities will be initiated.

### 3.11 Project Description

The proponent intends to take environmental approval of the project from Environment Protection Agency (EPA) in order to comply with all the rules and regulations. The name of the project is M/s T&D Pvt. Ltd. located at Mouza Mari, Tehsil Shalimar, District Lahore. The project involves the transformers over an area of 55.50-Kanal There is a proper waste management system.

#### 3.11.1 Process Description

The basic detail regarding the process is:

**Raw Material:** The main raw materials used in transformer manufacturing are electrical steel (for the core), copper or aluminum (for windings), and insulating materials (like paper, pressboard, and oil).

##### 1. Core Materials:

- **Silicon Steel:** This is the most common material for transformer cores, often used in the form of cold-rolled grain-oriented (CRGO) silicon steel sheets. Silicon steel is chosen for its high permeability and low hysteresis loss, which helps minimize energy loss during magnetization and demagnetization.
- **Amorphous Alloy:** This material is also used for cores, particularly in distribution transformers, due to its lower iron losses and higher saturation magnetic induction.
- **Iron:** Iron can also be used in cores, especially for smaller transformers.

##### 2. Winding Materials:

- **Copper:**

Copper is preferred for its superior electrical conductivity, making it a good choice for windings in most transformers.

- **Aluminum:**

Aluminum is a cost-effective alternative to copper, particularly in larger transformers, despite having lower conductivity.

##### 3. Insulating Materials:

- **Kraft Paper, Pressboard:**

These are used to insulate the windings and the core, preventing electrical shorts and ensuring safe operation.

- **Transformer Oil:**

Mineral oil is used as a coolant and insulating medium in liquid-filled transformers, maintaining proper temperature and dielectric strength.

**Final Product:** Transformers of miscellaneous sizes upto 8000 KVA.

## Transformer / conductors Manufacturing Process

Key Features

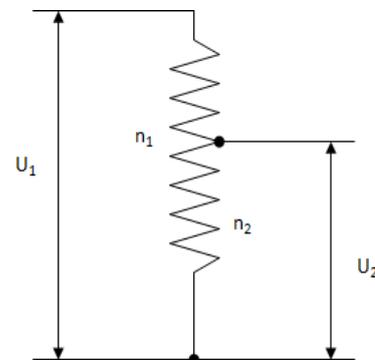
- Most common types of power transformers / conductors

**i. GSU's (Generator Step-Up):**

- 2 windings HV/LV
- 3 windings HV/LV1/LV2
- with D.T.C. in HV, typically  $\pm 2 \times 2.5\%$  +5%
- normally no L.T.C. -5%
- Connection Wye/Delta
- typical LV: 10, 20, 25 kV
- typical HV: 33, 69, 115, 138, 161, 230, 345, 500 kV
- Single-phase
- Three-phase

**ii. Auto-Transformers:**

- 1 winding (series + common winding)
- 2 windings (series + common) + tertiary winding
- D.T.C. in HV
- L.T.C. in HV or LV
- Single-phase or three-phase
- Connection: always Wye/Wye
- purpose of tertiary winding
  - suppression of harmonics
  - can be buried (no bushings brought out)
  - sometimes brought out for station service
  - voltage 3% of rating



Auto-transformer has smaller frame size

Rating = 300 MVA  
 HV = 230 kV  
 LV = 115 kV

Frame size:  
 $\frac{230-115}{230} \times 300 = 150$  MVA

**iii. Step-down transformers:**

- 2 winding HV/LV + D.T.C.
- 2 winding HV/LV + L.T.C. winding
- 3 winding HV1xHV2/LV + D.T.C.

Connection: Delta - Wye (majority)  
 Wye - Delta  
 Wye - Wye

Three Phase

**Core Construction**

∨

**Insulation**

∨

**Windings**

∨

**Core and Coil**

∨

**Processing**

∨

**Tanks**

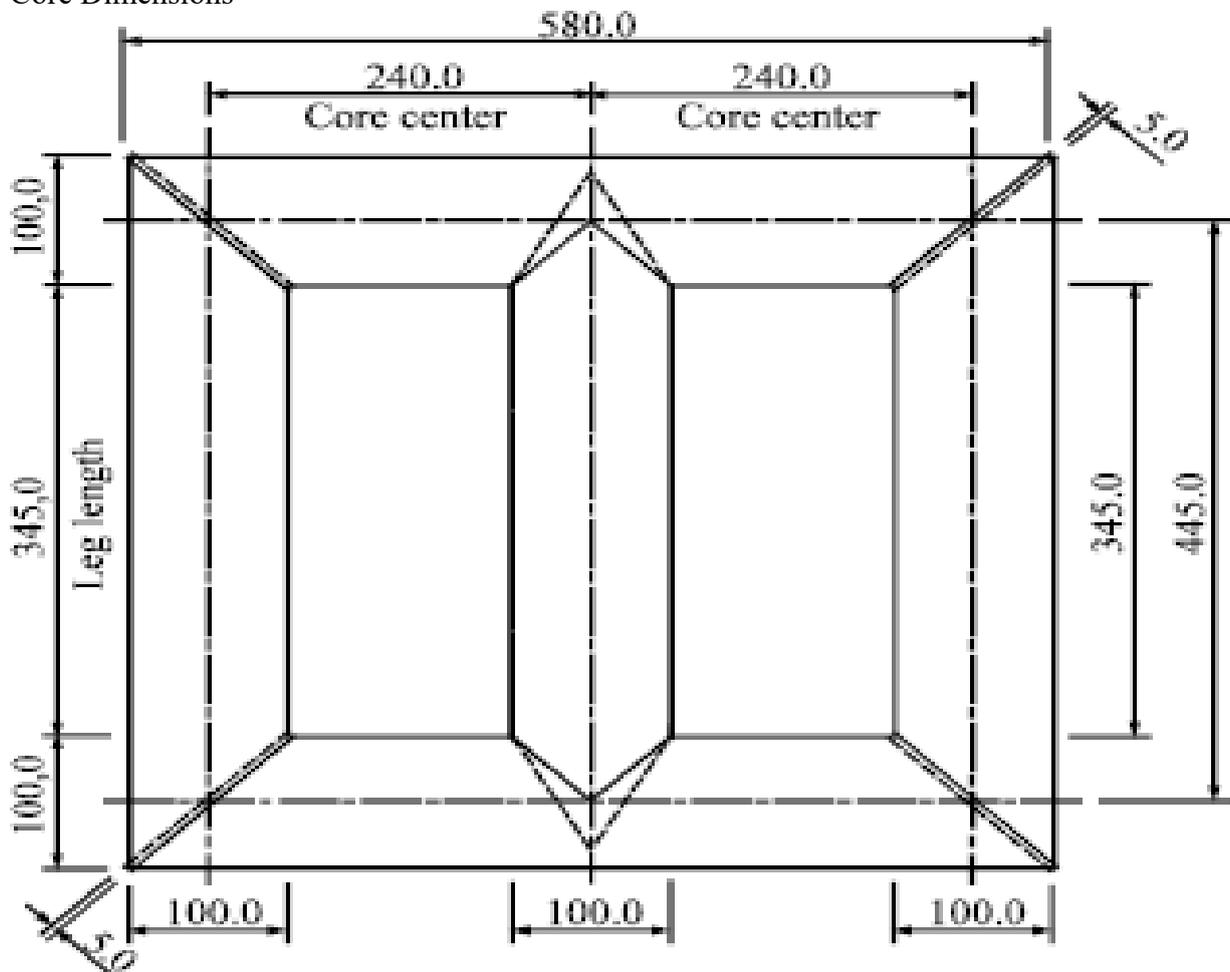
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**Testing**

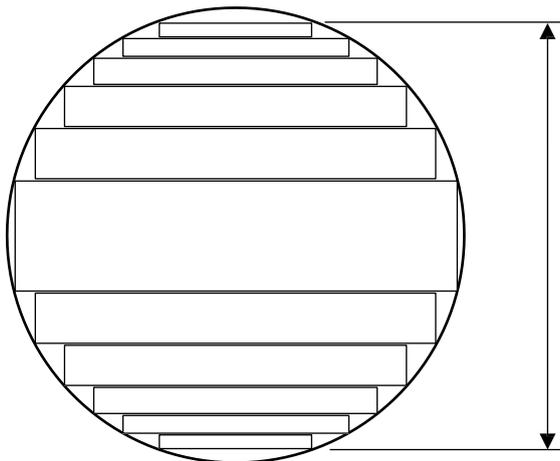
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**Shipping**

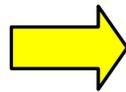
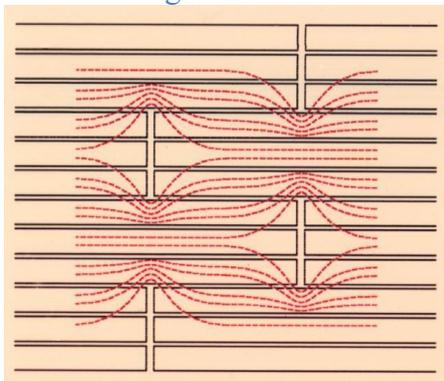
Core Dimensions



Circular core cross section:



Core stacking methods



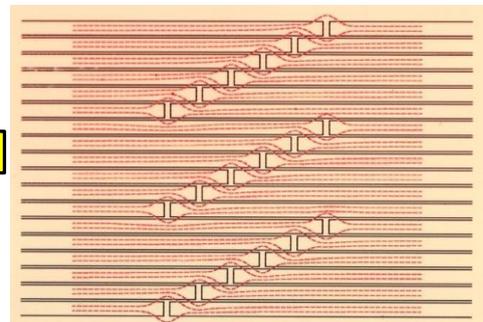
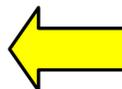
**BUTT-LAP STACKING:**

- Local concentration of flux
- higher excitation current & core loss.

**STEP-LAP STACKING:**

- Reduced Local flux concentration
- lower excitation current & core loss.

**Core Material- Grain Oriented Silicon M - NON-LS; H - LS H**  
**ZDKH (laser scribed)**  
**ZDMH (mechanically scribed)**



**Core Cutting**

- Automatically stacks legs & yokes
- Purchase uncut slit rolls of steel or pre-cut
- “Core Form Design”
- Fully mitered & step lapped in corner joints
- improves flux distribution, minimizes losses & sound level
- Circular core shape
- provides windings with optimum radial support



Core 'Logs' Stacked

### Core Stacking

- Use of temporary bolt guides for stacking
- 2, 3, 4 & 5 leg cores manufactured for single & three phase units
- Oil ducts utilized to control temperature rise
- Temporary, Permanent or combination of banding



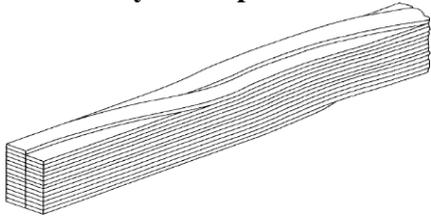
Type 2 and type 3 cores with DCC = 500 mm															
cooling ducts			1 cooling duct			2 cooling ducts			3 cooling ducts						
SW [mm]	PS [mm]	CS [mm]	No	SW [mm]	PS [mm]	CS [mm]	No	SW [mm]	PS [mm]	CS [mm]	No	SW [mm]	PS [mm]	CS [mm]	
1	120	5.8	5.8	1	120	5.8	5.8	1	120	5.8	5.8	1	120	5.8	5.8
2	160	8.9	14.7	2	160	8.9	14.7	2	160	8.9	14.7	2	160	8.9	14.7
3	205	11.5	26.2	3	205	11.5	26.2	3	205	11.5	26.2	3	205	11.5	26.2
4	250	9.4	35.6	4	250	9.4	35.6	4	250	9.4	35.6	4	250	9.4	35.6
5	280	10.9	46.5	5	280	10.9	46.5	5	280	10.9	46.5	5	280	10.9	46.5
6	310	12.9	59.4	6	310	12.9	59.4	6	310	12.9	59.4	6	310	12.9	59.4
7	340	15.1	74.5	7	340	15.1	74.5	7	340	15.1	74.5	7	340	15.1	74.5
8	370	11.8	86.3	8	370	11.8	86.3	8	370	11.8	86.3	8	370	11.8	86.3
9	390	13.3	99.6	9	390	13.3	99.6	9	390	13.3	99.6	9	390	13.3	99.6
10	410	15.5	115.1	10	410	15.5	115.1	10	410	15.5	115.1	10	410	15.5	115.1
11	430	18.6	133.7	11	430	18.6	133.7	11	430	18.6	133.7	11	430	15.0	130.1
12	450	23.7	157.4	12	450	23.7	157.4	12	450	23.7	157.4	12	DUCT	6.0	136.1
13	470	35.6	193.0	13	470	35.6	193.0	13	470	11.5	168.9	12	450	21.3	157.4
14	490	99.4	292.4	14	490	46.7	239.7	13	DUCT	6.0	174.9	13	470	35.6	193.0
15	470	35.6	328.0	14	DUCT	6.0	245.7	13	470	18.1	193.0	14	490	46.7	239.7
16	450	23.7	351.7	14	490	46.7	292.4	14	490	99.4	292.4	14	DUCT	6.0	245.7
17	430	18.6	370.3	15	470	35.6	328.0	15	470	18.1	310.5	14	490	46.7	292.4
18	410	15.5	385.8	16	450	23.7	351.7	15	DUCT	6.0	316.5	15	470	35.6	328.0
19	390	13.3	399.1	17	430	18.6	370.3	15	470	11.5	328.0	16	450	21.3	349.3
20	370	11.8	410.9	18	410	15.5	385.8	16	450	23.7	351.7	16	DUCT	6.0	355.3
21	340	15.1	426.0	19	390	13.3	399.1	17	430	18.6	370.3	17	430	15.0	370.3
22	310	12.9	438.9	20	370	11.8	410.9	18	410	15.5	385.8	18	410	15.5	385.8
23	280	10.9	449.8	21	340	15.1	426.0	19	390	13.3	399.1	19	390	13.3	399.1
24	250	9.4	459.2	22	310	12.9	438.9	20	370	11.8	410.9	20	370	11.8	410.9
25	205	11.5	470.7	23	280	10.9	449.8	21	340	15.1	426.0	21	340	15.1	426.0
26	160	8.9	479.6	24	250	9.4	459.2	22	310	12.9	438.9	22	310	12.9	438.9
27	120	5.8	485.4	25	205	11.5	470.7	23	280	10.9	449.8	23	280	10.9	449.8
				26	160	8.9	479.6	24	250	9.4	459.2	24	250	9.4	459.2
				27	120	5.8	485.4	25	205	11.5	470.7	25	205	11.5	470.7
								26	160	8.9	479.6	26	160	8.9	479.6
								27	120	5.8	485.4	27	120	5.8	485.4

### Coil Winding Shop

- Winding room separate from other manufacturing areas
- Positive Pressure
- Horizontal/Vertical winding mandrels
- Windings are circular concentric type
- Conductor are either copper magnetic wire or continuously transposed conductor
- Conductor purchased pre-wrapped with thermally upgraded paper or Nomex
- High strength wire or epoxy bonded CTC used when high short circuit forces
- Winding type chosen according to voltage & application, Cont. Disc, Interleaved Disc, Helical, etc.



**Continuously Transposed Conductor**



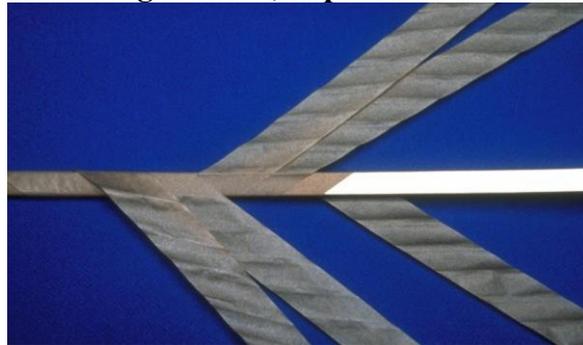
**CTC – Thermally upgraded paper**



**CTC - epoxy bonded, netting tape**



**Magnet Wire, Paper Insulated**

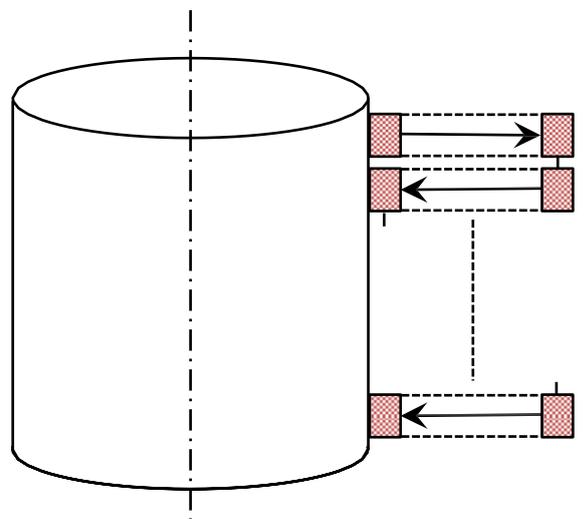
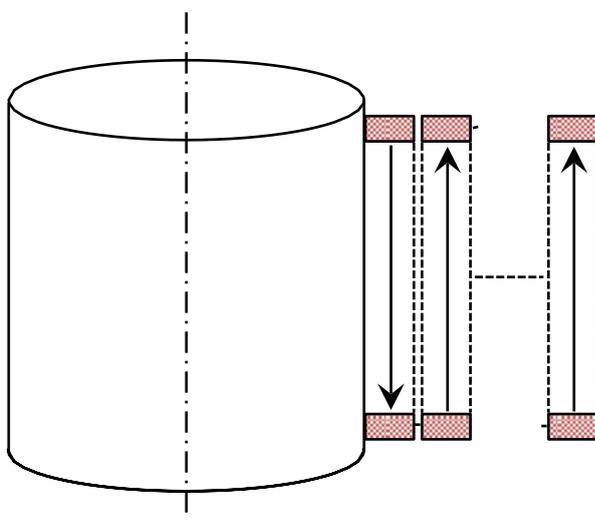


**Winding Types**

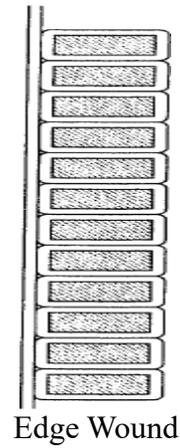
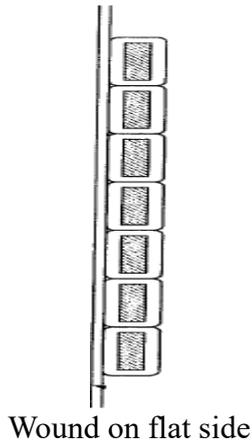
2 main groups

helical windings

disc windings



## Flat/Edge Wound



## Winding Types

### 2 main groups

#### helical windings

- Boomerang
- Giron
- Equally transposed
- Layer and multilayer
- Multistart

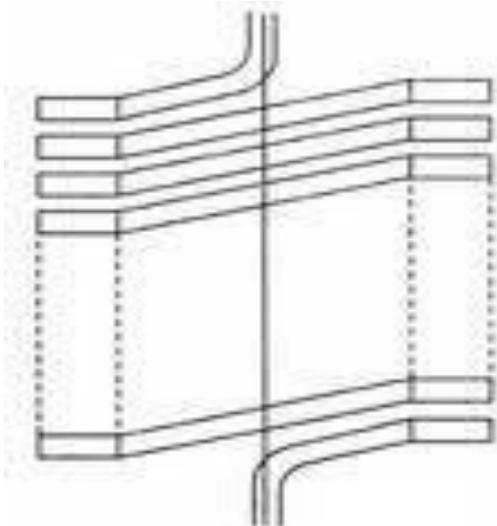
Mainly LV, TV, CR and FR

#### disc windings

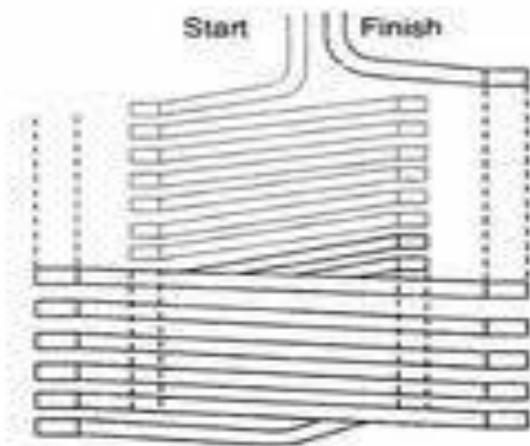
- Continuous disc
- Interleaved
- Partial Interleaved
- Axial Interleaved

Mainly HV, LV, FR

## Helical Winding



*Helical coil  
(single layer).*



*Helical coil  
(double layer).*

Helix- Boomerang, Giron, Double Helix equally Transposed

**Use(Varies from Manufacturer to Manufacturer):**

- 1 or 2 layers
- Up to 325 kV BIL for single-layer windings
- Up to 200 kV BIL for two-layer windings
- Axial cooling ducts in the winding or with zigzag cooling depending on what kind of helix
- Preferably with at least one turn between successive transpositions

**Advantages:**

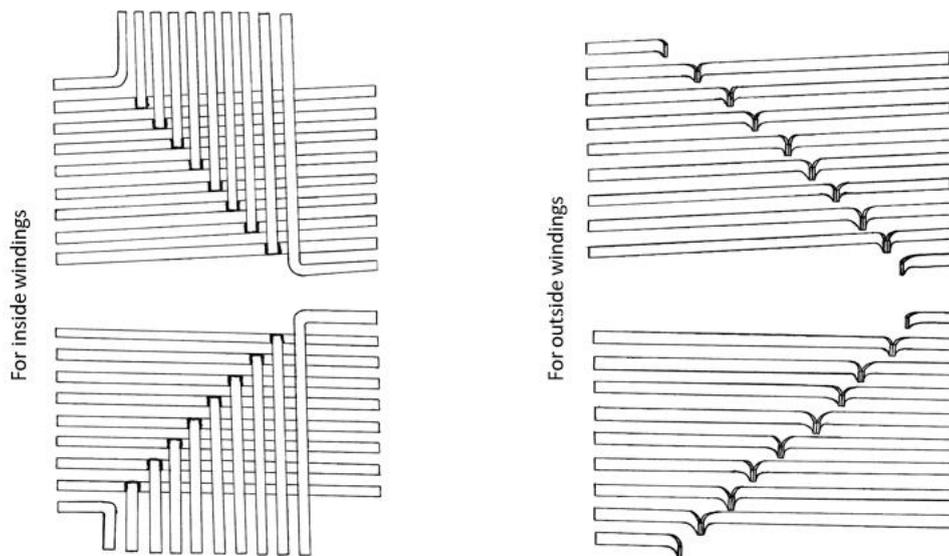
- Cheap winding
- No radial overbuild at the transpositions depends on Boomerang type

**Disadvantages:**

- One brazing per transposition on Boomerang type
- Cannot be used for zigzag cooling without radial overbuilds on Giron and Double helix type

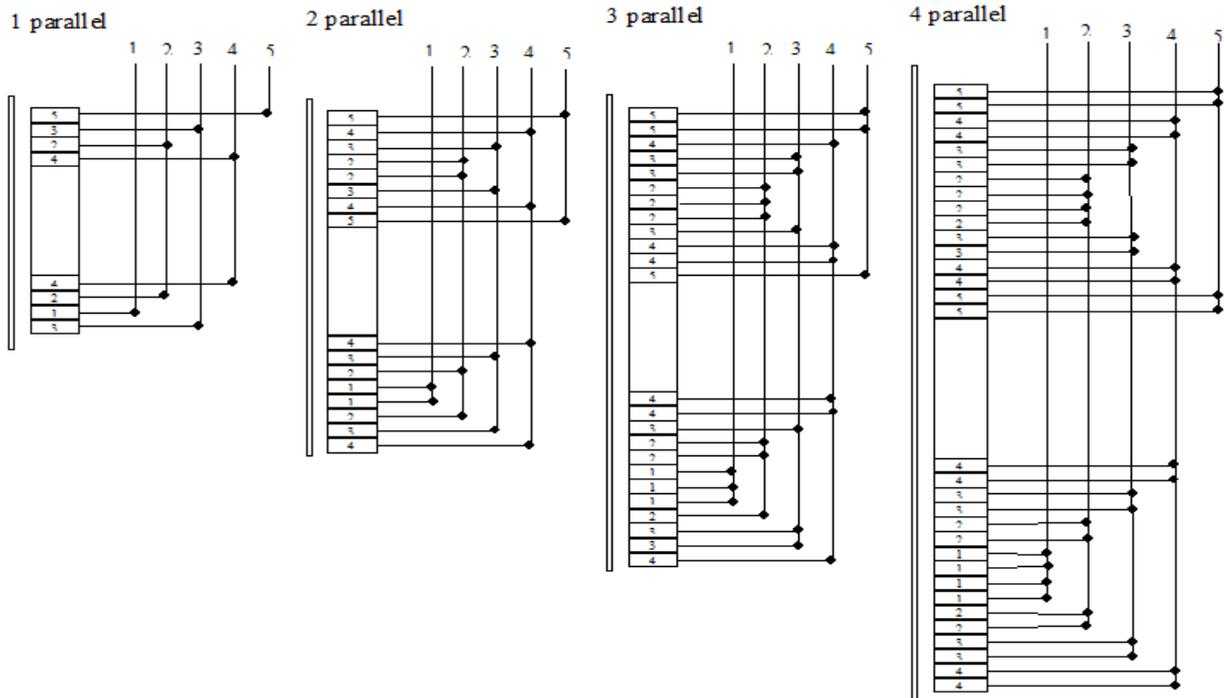
**Tapped helix MW / CTC**

- Regulating winding(for LV)
- Easy to wind, high Cu cross-section possible
- Eccentric duct necessary if used as inside winding



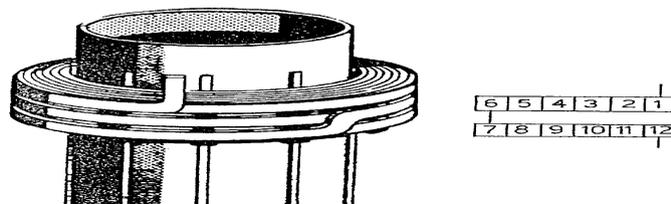
## Multistart MW / CTC

- With ZnO-discs : up to 1050 kV BIL, Without ZnO-discs : up to 450 kV BIL if impulsed and up to 950 kV BIL if not impulsed
- Easy to wind, Uniform Amp-turns distribution, Robust winding, especially when MW is used on the edge
- Medium to high paper insulation thickness needed, due to the voltage difference of 1 or 2 taps between adjacent wires. This can cause high thermal winding gradients.

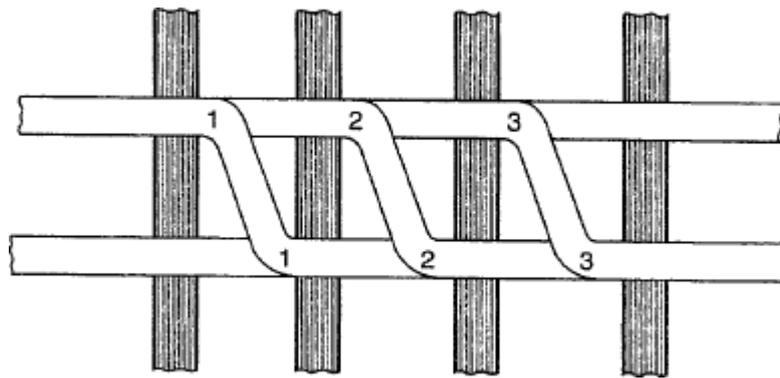


## Continuous disc

- Many electrical turns, up to 550 kV BIL with key spacers, above 550 kV BIL with key spacers in combination with interleaved part at impulse side
- Easy to wind, No brazing, High axial space factor and reduced manufacturing time for version without key spacers
- Partial turns can cause extra sections, Decreased radial space factor for the version without key spacers



## Continuous disc Transposition



(Transposition at each cross over)

### **INTERLEAVED**

- Many electrical turns, typically above 550 kV BIL, if necessary for impulse reasons  
Adjacent is standard method for interleaving, Braided interleaving method if necessary for lightning impulse
- High impulse withstand capability, due to improved voltage distribution
- Brazing necessary, and thus very time consuming with CTC, Total number of sections must be even.



### **Shielded Winding**



### **Winding Selection**

Based on:

- winding voltages: (nominal, test, impulse, ...)
  - number of turns
  - electrical clearances
  - ZnO discs allowed?

- winding current:
  - needed Copper cross-sectional area
  - maximum allowed temperature (average and hottest spot)
- cooling type: axial cooling or zigzag cooling
- winding position in the core window

### **Lead Connection**

Stress ring and pick tail connected with lead



### **Insulation Section**

- Insulation Shop separate from other areas
- Winding cylinders and spacers are made from high density pressboard

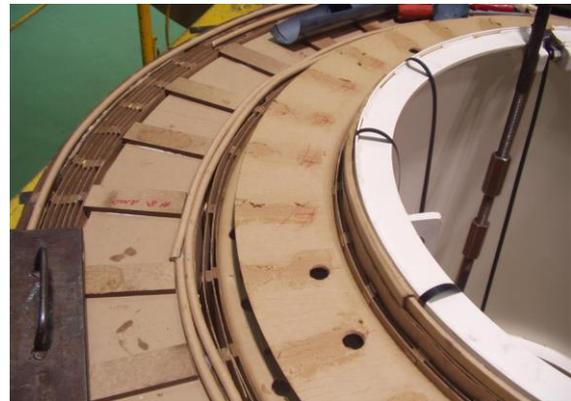


### **Coil Sizing**

Coil sizing force applied to check and adjust (of stabilize) the winding height

### **Coil Assembly**

- **Winding type**
- **Conductor Type**
- **Insulation components**



### Coil & Core Assembly

- Exposed edges of core are bonded with low viscosity, high strength epoxy resin which penetrates and bonds laminations.
- Prefabricated coil to clamp insulation is placed on bottom clamps



- Coils lowered over core
- Top coil to clamp insulation
- Top clamps
- Top core inserted

- Windings are clamped using external or internal tie rods to provide additional support for axial forces
- Leads and busbars are rigidly supported to withstand forces from shipping & short circuits
- Assembly moved on air cushions



#### DTC Lead Connection



#### Vapor Phase Unit

- Complete core and coil assembly is dried using a vapor phase cycle method
- Power factor & water extraction are continually monitored
- Kerosene is vaporized & drawn by vacuum into autoclave

#### Tank Shop

- Designed to withstand full vacuum filling
- Facilities for lifting, jacking, and pulling provided
- All tanks are grit-blasted cleaned before priming and painting.
- Inside painted white for good visibility during internal inspections.

- Shunt Packs

#### **Tank Covers**

- **Raised flanges are provided to prevent water entry**
- **Cover is designed to prevent water collection**
- **High quality steel plate is cut by an automated waterbed plasma cutter**



#### **Re-Pack & Tanking**

- **After vapor phase unit is re-packed and undergoes final hydraulic clamping**
- **Maximum exposure time to atmosphere is limited to under 16 hours**

#### **Exciter and Series Transformer**

## **Final Assembly**

**Installation of conservator, radiators, pumps, fans, etc.**



**Fans bottom mounted**



**The surge of one pump should die down before the next pump comes-on**

## **TESTING**

- **All Industry standard tests :**
  - ✓ **Routine Tests**
  - ✓ **Loss Measurement and Temperature Rise tests**
  - ✓ **Dielectric tests**
  - ✓ **Zero-phase-sequence**
  - ✓ **Audible Sound Level**
  - ✓ **Short-circuit tests, if required (performed at the IREQ lab)**



### Factory Pretest

Ratio		Std	ANSI C57.12.90	7.3.3	
Polarity		Std		6.2.2	
Resistance		Std		5.3.1	
Core Loss & Exciting Current		Std		8.1	
Load Loss & Impedance		Std		9.1	
Zero Sequence Impedance				9.5	
Temperature Rise Tests	OA			11	
	FA			11	
	Overload			11	
Lightning Impulse	HV			10.3	kV LIL
	HVN				kV LIL
	LV				kV LIL
	LVN				kV LIL
	TV				kV LIL
Switching Impulse	HV			10.2	kV SIL
	LV				kV SIL
Applied Potential	HV			10.5	kV rms
	LV				kV rms
	TV				kV rms
Induced Potential				10.7	
Partial Discharge				10.8	
Sound Level				13	
110 % Voltage Run			CAN/CSA-C88-M90	16.3.k	

Core Loss after Dielectrics		ANSI C57.12.90 CAN/CSA-C88-M90	8 16.3.k	
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Test		Standard	Section	Engineering Instructions
Parallel Turns	No	EMT 200.011		
Ratio, Polarity, Core meg.	Std	EMT 200.011		
R.S.G.	Yes	EMT 200.011		
Non Linear Resisters	Std	EMT 200.011		
CT's & PT's	Std	EMT 200.011		
LTC Reactor	Std	EMT 200.011		
LTC Pretest prior to tank.	Std	EMT 200.011.1		
Dissipation	Std	EMT200.012.6 & ANSI	10.9	
Core Megger	Std	CSA & EMT 200.012.1		
CT Resistance	Std			
CT Ratio & Polarity	Std	CSA & EMT 200.012.4		
PT Ratio & Polarity	Std	CSA & EMT 200.012.4		
Hi-Pot: Panels, Fans, Pumps	Std	CSA & MI 355.021		
Hi-Pot: PT's & CT's	Std	CSA & EMT 200.012.4		
Hot Spot Calibration	Std	CSA & EMT 200.012.8		
Top Oil Calibration	Std	CSA & EMT 200.012.8		
GDR Alarm & Trip	Std	CSA & EMT 200.012.8		
Panel Operation	Std	CSA & EMT 200.012.7		
Line Drop Compensator	Std	CSA & MI 355.105		
Fan, Pump Losses;Klixon	Std	CSA & EMT 200.012.7		
Tapgear Operation	Std	CSA & EMT 200.012.7		
Pressure Tests	Std	CSA & MI 358.012		
Gas-in-Oil Samples				
PCB Oil Sample				
ADDITIONAL TESTS				

**Test Unit**



**Paint Booth**



Epoxy base paint system, meets ANSI C57.12.28

### **3.12 Available Facilities**

#### **i. Firefighting System**

The firefighting equipment/system has been designed and will be implemented in project. Fire extinguisher has been provided in site.

#### **ii. Water Facility**

The source of water for the site is ground water at the depth of 70-100 ft.

#### **iii. Electricity**

FESCO will be the main source and generator will also be there.

#### **iv. Personal Protective Equipment**

Following Personnel Protective equipment will be provided to the workers for their safety during construction and operational phase as per the requirement of specific activity:

- Protective Goggles
- Protective leather/rubber shoes
- Gloves
- Face masks
- Protective shields
- Helmets
- Overcoats

### **3.13 Restoration and Rehabilitation at the end of Project Life**

The estimated lifespan of the project is approximately 25 years. However, well before reaching the end of its first lifecycle, the project will undergo complete renovation and refurbishment. Modern and advanced equipment will replace outdated machinery, ensuring efficiency and sustainability. Additionally, all civil structures and related infrastructure will be extensively renovated to maintain operational standards. All restoration activities will be conducted in compliance with prevailing environmental management laws to prevent any harm to the environment or human health. Given the planned refurbishment and modernization, rehabilitation of the site will not be required.

### **3.14 Government Approvals and Leases**

In accordance with Section 12 of the Punjab Environmental Protection (Amendment) Act, 2012, approval from the Environmental Protection Agency (EPA), Government of Punjab, Lahore, is mandatory before project construction begins. Therefore, this Environmental Impacts Assessment (EIA) report has been prepared for submission to EPA Punjab.

### **3.15 Health, Safety & Hygiene**

#### **3.15.1 First Aid Facility**

Workers and employers will be trained in first aid treatment to handle emergencies effectively.

#### **3.15.2 Safety Training**

All workers and staff will receive proper training on workplace safety measures and best practices.

#### **3.15.3 Use of Drugs and Narcotics**

The use of drugs and narcotics is strictly prohibited in the workplace. Smoking will only be permitted during designated break times in isolated smoking areas.

#### **3.15.4 Fire Protection System**

Firefighting arrangements will be in place at the project site. Fire extinguishers and firefighting equipment will be positioned at easily accessible, clearly marked locations. A first aid box will be provided at the site to handle injuries promptly.

#### **3.15.5 Security Measures**

The project site will be fully secured with a boundary wall and round-the-clock security guards. These measures will help ensure the safety of the site and its surrounding areas.

#### **3.15.6 Safety Signs and Boards**

Safety signs and symbols play a crucial role in preventing workplace accidents. Signs must be in a clear and understandable language for all workers. Workers will be trained to recognize and understand safety signs. Each department will provide safety signs and boards to protect employees from workplace hazards. Safety signs will be color-coded to enhance recognition

and understanding. At this project site, safety signs and boards will be installed in key locations to minimize risks and promote a safe working environment.



Figure 2 Safety Sing & Symbol

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## 4 DESCRIPTION OF ENVIRONMENT

An Environmental baseline data study is essential while preparing EIA reports. The basic purpose is to establish a clear understanding of existing environmental conditions in the project area and to identify potential impacts of the project. It refers to the collection of baseline information on biophysical, social, and economic aspects of project location.

Interviews were conducted with the public and stakeholders of the project area to seek public opinion on the implementation of the project. Various Governmental and Non-Governmental Organizations (NGOs) were also visited for the collection of relevant data and their views on the project were recorded for incorporation into the EIA report. The environmental impacts of any activity or process will be assessed based on deviation from the baseline or normal situation.

It presents information on existing environmental and socioeconomic conditions of the proposed project area. It discusses aspects pertaining to geology and soils, climatic conditions, hydrology, ambient air quality and noise levels as well as land use. Further, the chapter presents details related to flora and fauna as well as socio-economic environment.

For any project the prevailing environmental conditions need to be assessed prior to the preliminary stages of planning, designing, execution and operation. Identification of physical, ecological and social aspects of environment and collection of relevant data is essentially important for the evaluation of impacts as well as for the suggestion of adequate mitigation measures. The existing environmental conditions of the project have been considered with respect to physical, ecological and socio-economic aspects. Information has been collected from various sources, including published literature, field observations and surveys conducted for evaluation of associated or related impacts.

### 4.1 Data Collection

The data collection phase involved several key activities aimed at understanding the existing environmental conditions and gathering community and stakeholder insights:

#### Site Visits:

A thorough survey of the field area was undertaken to collect pertinent data directly from the project site, ensuring a grounded understanding of the physical, ecological, and socioeconomic settings.

### **Interviews with the Public and Stakeholders:**

Engaging with the public and project stakeholders provided valuable perspectives on the proposed project. These interactions offered insights into public opinion and expectations regarding the project's implementation.

### **Consultations with Organizations:**

Meetings with various Governmental and Non-Governmental Organizations (NGOs) were conducted to gather additional relevant data. The views and feedback obtained from these organizations were documented to enrich the EIA report with diverse perspectives on the project's potential environmental impact.

The environmental baseline study focuses on three primary components:

- **Physical Environment**
- **Ecological/Biological Environment**
- **Socioeconomic Environment**

The comprehensive approach to data collection and analysis within the environmental baseline study ensures that all potential impacts of the proposed project are anticipated and addressed. This process not only aids in the responsible planning and implementation of the project but also aligns with regulatory requirements and community expectations, paving the way for sustainable development.

## **4.2 Physical Environment**

The proposed project lies in Mouza Mari, Tehsil Shalimar, District Lahore, over an area of 55.50-Kanal Ft. where proponent intends to develop the proposed project. There are different industrial units within the project area in operational, constructional, and planning phase. The project lies in lahore, and it has a detailed background history.

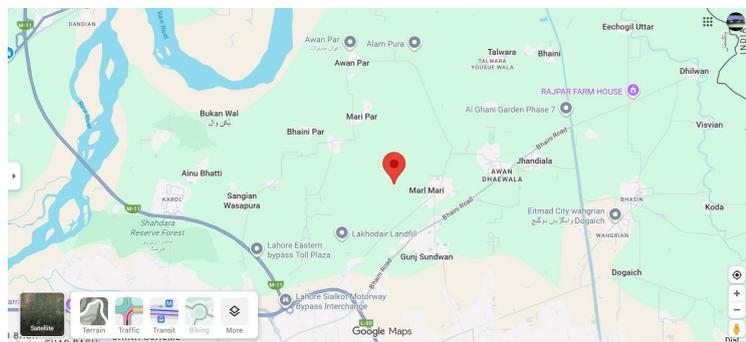
### **4.2.1 Geology**

This part examines the physical resources such as topography, soil, climate, surface & ground water resources & quality, ambient air quality and geology of not only the project site but also the city as a whole to assess whether the project under assessment can or does have any impacts on any of these parameters. The description of physical environment of the city and the project site is presented in the following sub sections.

#### 4.2.2 Topography

Topographically Lahore is an older and much larger city and is a center of the province. Lying between 31°15'—31°45' N and 74°01'—74°39' E, Lahore is bounded on the North and West by the Sheikhupura District, on the East by Wagah and on the South by Kasur District. The Ravi River flows on the northern side of Lahore. Lahore city covers a total land area of 404 square kilometers (156 sq mi). Lahore is the capital city of the province of Punjab. It is the second largest and most populous city in Pakistan, after Karachi and the 32nd most populous urban city in the world<sup>1</sup>. The city is located in the North East part of Punjab province, near the border with India. Lahore is ranked as a Gamma+ world city<sup>2</sup> and is one of Pakistan's wealthiest cities with an estimated total nominal GDP of \$58.14 billion<sup>3</sup>.

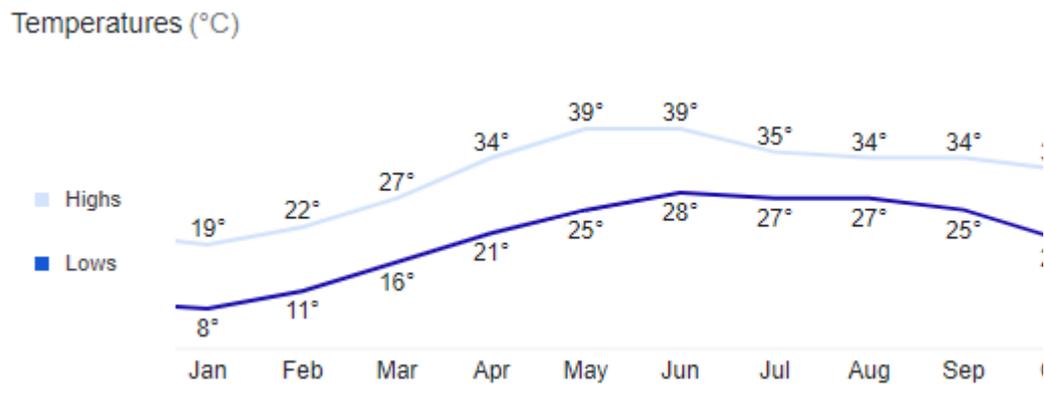
The project site is located at Plot No.323, Sundar Industrial Estate, Lahore. Geographical location of the project is 31°18'53.74"N 74°8'57.58"E. The project site is industrial in nature and is located between the various industrial units.



#### 4.2.3 Climate

The climate of Lahore has a semi-arid. The hottest month is June when average highs routinely exceed 40 °C (104.0 °F). The monsoon season starts in late June and the wettest month is July with heavy rain falls and evening thunderstorms with the possibility of cloudbursts. The coolest month is January with dense fog.

The city's record high temperature was 48.3 °C (118.9 °F), recorded on 30 May 1944. 48 °C (118 °F) was recorded on 10 June 2007. At the time the meteorological office recorded this official temperature in the shade, it reported a heat index in direct sunlight of 55 °C (131 °F). The record low is −1 °C (30 °F), recorded on 13 January 1967.



#### 4.2.4 Precipitation

Precipitation is the lowest in April and the greatest amount of precipitation occurs in July. The highest rainfall in a 24-hour period is 221 millimeters (8.7 in), recorded on 13 August 2008. On 26 February 2011, Lahore received heavy rain and hail measuring 4.5 mm (0.18 in), which carpeted roads and sidewalks with measurable hail for the first time in the city's recorded history.

#### 4.2.5 Air Quality

Atmospheric pollution particularly in urban area has a strong impact upon daily life. Its economic growth, industrial progression & transport

have increased which ground for rising energy consumption and ultimately consequences are increase in air pollution. The main sources of air pollution exhaust from motor vehicles and industries are SO<sub>2</sub>, NO<sub>2</sub>, CO, etc. Particulate Matter (PM) and noise which is inspected as the pollution indicators.

Dust particles along with oxides of nitrogen, sulphur and carbon are the major causes of air pollution in the ambient air quality. It was observed during the visit that petrol and diesel operated vehicles are emitting smoke and exhaust gasses in excessive quantity which are the leading sources of environmental pollution and responsible for the air quality worsening. Infact exhaust emissions (including dangerous gases such as carbon monoxide, oxides of nitrogen, hydrocarbons and particulates) and evaporative emissions (including vapors of fuel which is released into the atmosphere, without being burnt) are the prime sources for deterioration of air quality. Monitoring was conducted at the project site by using Fine Dust Sampler IPM-FDS 2.5/10 $\mu$  and Ambient Air Analyzer.

#### **4.2.6 Noise Level Monitoring**

Noise is described as an unwanted sound emitted from un-avoidable sources of anthropogenic activities. Daily based natural induced sources of noise are rare to none but human induced noise sources are plenty and un-avoidable. Physically, there is no distinction between sound and noise. Sound is a sensory perception and the complex pattern of sound waves is labeled noise, music, speech, low altitude airplane flying etc.

The affluent areas of City are quieter than rest of the city. The noise level in these areas is still far higher than the standards set by the World Health Organization and the Pak-EPA as the safe noise level; i.e. 60-85 dB(A). Environmental noise is a common cause of hearing loss of people indulged in industrial activities. Noise pollution in the city is on the rise

with most residents complaining that the noise is becoming a public nuisance.

Details as described below

#### **4.2.7 Basic Environmental Conditions**

During the measurement following conditions were prevailed in workplace.

#### **4.2.8 Metrological Conditions**

During the noise level monitoring weather was dry and sky was clear. Air was blowing at normal speed.

#### **4.2.9 Monitoring Instruments**

The description of the instrument used for the noise level monitoring is given below:

Name: Digital sound level meter

Model: AR824

Company: Intel Instruments plus

Frequency Range: 31.5Hz to 8kHz

#### **4.2.10 Methodology Adopted**

Noise level was monitored at four points; lab results will be provided to the EPA.

#### **4.2.11 Ground Water**

The city is underlain by the deep permeable aquifer formed within the alluvial plane of the River Ravi, which is the part of Greater Indus Plain. Ground water is the principal source of municipal water supply. This is also the case in the immediate vicinity of the site. The City's drinking water is obtained from groundwater aquifer by means of tube wells located throughout the area. Groundwater is pumped from 400-800 feet

and is generally good for direct consumption. About 83% of the city's population is consuming groundwater for drinking purposes.

### **4.3 Ecological Resources**

Biodiversity has an important role in the functioning of the ecosystem. Mainly a country's wilderness areas and scenic landscapes with their associated flora and fauna form natural capital of a country. Both collectively and within each level, the range or variety of the resources is referred to as the —Biological Diversity. The contribution of the —Natural capital is recognized at three distinct levels including genera, species and community - habitat and ecosystem.

Pakistan comprises of a total of nine major ecological zones and the term has relevance for each of Pakistan's administrative units—district, province and particularly country. The greater the number of genera, species and habitats and ecosystems present within these units, the greater is the biodiversity. It is in this background that the biodiversity of the area is discussed below:

City is enriched with the presence of natural flora and fauna; although with the growing population and development activities the presence of some has been somewhat affected.

There are however no significant or well-shaped trees and shrubs on the project site. There are some trees only along the main roads.

#### **4.3.1 Flora**

Trees, also called the lungs' of the earth are important for the restoration of the ecosystem. People can benefit incalculably from their survival and existence. Trees have also been a source of medicine for thousands of years and a refuge for various species of birds. No threatened or endangered species and medicinal plants are present anyhow in the project area.

#### **4.3.2 Fauna**

With an increase in the rate of urbanization, the ecology of city has been considerably affected but there is no threatened or endangered species found in the project site. Similarly no wildlife is present within the project corridor.

#### **4.3.3 Forestry**

There is no forest in the area where the project will be located. The entire area is industrial.

### **4.4 Socioeconomics Environment**

“The Socio economic environment is represented by the human and economic development and quality of life values. For the study of socio-economic environment of the project area, field surveys were conducted and interviews were held with the general public and neighbors. The baseline conditions of the city are as follow:

#### **4.4.1 Population**

According to the senses 2017 population of the district in which the project falls is approximately 11.13-million persons.

#### **4.4.2 Profession**

Main profession of the area is jobs, business as well as self-employment activities however a large number of the peoples are doing jobs in govt. institutions and different private institutes of the District.

#### **4.4.3 Education Level**

Literacy rate in the area is approximately ranging from 65% (source: District Govt.).

#### **4.4.4 Language**

The popular language of the area is “Punjabi / Urdu”

#### **4.4.5 Cultural Diversity**

In Lahore, the shrine of Hazrat Ali Hajveri (RA) is situated in the centre of the district. Due to which at the “URS” of Hazrat Data Saab cultural as well as spiritual activities have been seems. People of the district celebrate such URS and reveal their culture.

#### **4.4.6 Socio Economic Survey**

The socio-economic aspects were studied and analyzed by conducting socio-economic survey in the community residing in the project vicinity. Public participation was a key component in order to get information for incorporation. The local people were interviewed. The positive and negative views of the perceived affected locals were sought. The exercise was conducted by a team of experts via administration of structured questionnaires as well as interviews surrounding the project site. During the detailed field survey, consultations were made with local community/ general public. The basic purpose of these meetings/ focus group discussions was to:

- ✓ Share information with stakeholders about the expected impacts of development works on the physical, biological and socioeconomic environment;
- ✓ Understand stakeholders’ concerns regarding various aspects of the project including the existing conditions and the potential impacts either positive or negative of the project.

The following methodologies were used for carrying out public consultation:

- ✓ Local communities, individuals affected, owners and employees who will be directly or indirectly affected were given priority while conducting public consultation.
- ✓ Walk-through informal group consultations in the project area.

The local communities had been informed through public consultation with a briefing on project interventions including its benefits.

#### **4.5 Quality of Life Values**

Quality of life the in the project area is good as there are proper sanitation system and basic health facilities are available. Some of the important factors are discussed are below;

##### **4.5.1 Heath and Education**

Basic health & education facilities are available in the area of the project site and these health and educational facilities are sufficient.

##### **4.5.2 Compensation in Money Terms**

As the project has been developed on the land of Punjab Small Industries Estate, so, there is not any affected community and no need of compensation.

#### **4.6 Archaeological and Historical Treasures**

Archaeological or historical treasures within the project area are not available.

#### **4.7 Lab reports of environmental analysis**

For the analyses of different environmental parameters of the project site, the analysis was carried out from EPA certified lab.

The selected site is going to brought into industrial use which has availability of infrastructure facilities such as water supply, power, roads, social infrastructure and man power. By the establishment of said project no land use change of the area is being envisaged. The selected site is located outside the negative zone and unsuitable surroundings. Moreover, the selected site is neither location within prohibited zone nor located in environmentally sensitive site.

This socio-economic analysis underscores the project's potential to integrate seamlessly into the existing community framework, with careful management to ensure minimal disruption and maximal benefit to the local socio-economic landscape.

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## **5 Potential Environmental Impacts and Mitigation measures**

This chapter provides a review of the potential impacts by the M/s T&D, located at Mouza Mari, Tehsil Shalimar, District Lahore, which could occur because of the project activities. These impacts could be both positive and negative in nature and have been classified accordingly by a thorough review of the construction and operational phases of the project. This assessment numerates the magnitude of these impacts with the aid of environmental matrices and presents effective mitigation measures to counter their adverse nature.

### **5.1 Purpose of Environmental mitigation measures**

For the project to be running successfully and compliance with environmental regulations mitigation of impacts caused by the project is required. The purpose of the need for mitigation can be answered by various questions as follows:

#### **1. What is the problem?**

When the resources of the environment are being used ruthlessly, it results in degradation of the environment to the extent that the environment loses its resilience and the carrying capacity reduces the resources found and the recovery process is too slow or nearly no recovery is possible.

#### **2. When will the problem occur and when should it be addressed?**

The problems that would occur fall within the project premises, and near the boundaries of the project location. The impacts would range up to the distance where project related activities are performed or up to the geographical zone where the effects spread. Impacts would show their presence soon after the project development starts.

#### **3. Where should the problem be addressed?**

The problems should be addressed where they originated. That is at the project location.

#### **4. How should the problem be addressed?**

Problems can be addressed by using environmentally friendly practices. Such practices can be followed by the following mitigation plans.

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## **5.2 Potential Environmental Impacts and Mitigation Measures due to project location**

The location is well linked to the other parts of the city. There will be no enduring, high and adverse impact predicted due to the establishment of the project at this location. The selected site is in the industrial area. Moreover, the area is not inhabited by any ecologically important or protected flora and fauna specie as well as within 500-600 m vicinity of the project area. There is no archaeology and historically important site located.

## **5.3 Potential Environmental Impacts and Mitigation Measures due to project design**

The design of a Health Capsule Pakistan located at Mouza Mari, Tehsil Shalimar, District Lahore, may lead to environmental concerns such as land degradation, water contamination, air pollution, noise disturbances, and waste accumulation. Improper waste disposal can impact water quality, while ammonia emissions and dust may affect air quality. Additionally, high energy consumption and biodiversity disruption are potential risks. However, these impacts can be mitigated by implementing efficient waste management systems, biosecurity measures, water conservation techniques, and renewable energy sources such as solar power and biogas. Establishing proper drainage, ventilation, composting, and tree buffers can help minimize environmental harm. With a well-planned design and sustainable practices, the unit can operate efficiently.

## **5.4 Potential Environmental Impacts and Mitigation Measures due to construction phase**

The construction phase of the M/s T&D located at Mouza Mari, Tehsil Shalimar, District Lahore, could result in various environmental impacts, including soil degradation, dust emissions, noise pollution, water contamination, and waste generation. These impacts effectively managed to ensure minimal disruption to the environment and surrounding communities. Below are the key potential impacts and their corresponding mitigation measures:

### **5.4.1 Soil Degradation and Erosion**

#### **Potential Impact:**

Land clearing, excavation, and leveling will lead to soil erosion and loss of topsoil fertility. Heavy machinery movement will cause soil compaction, reducing groundwater infiltration.

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**Mitigation Measures:**

Excavation will be limited to the required area, avoiding excessive land disturbance. Topsoil will be stored separately and reused for landscaping or farm boundaries. Erosion control measures like tree plantation, vegetation barriers will be implemented.

**5.4.2 Air Pollution and Dust Emissions****Potential Impact:**

Dust from excavation, material handling, and vehicular movement will deteriorate air quality. Emissions from construction machinery and generators will contribute to air pollution.

**Mitigation Measures:**

Water will be sprinkled regularly on dusty surfaces to minimize dust emissions. Covered trucks will be used to transport construction materials and reduce airborne dust.

**5.4.3 Noise Pollution****Potential Impact:**

Construction activities, machinery operation, and material transportation will generate high noise levels, disturbing nearby communities and livestock.

**Mitigation Measures:**

Construction work will be restricted to daytime hours to minimize disturbances. Noise barriers, such as temporary walls or tree plantations, will be established around the construction site. Machinery will be regularly maintained to reduce noise levels.

**5.4.4 Water Contamination and Wastewater Generation****Potential Impact:**

Runoff from construction activities will carry sediments, oils, and chemicals, contaminating nearby water sources. Improper disposal of construction waste and wastewater will degrade water quality.

**Mitigation Measures:**

Drainage channels will be constructed to direct runoff away from water bodies and agricultural fields. Sediment traps will be installed to prevent soil erosion into nearby streams or

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groundwater. Construction waste will be disposed of properly, and biodegradable or eco-friendly materials will be used where possible.

#### **5.4.5 Construction Waste and Debris Management**

##### **Potential Impact:**

Uncontrolled disposal of construction materials like cement, bricks, wood, and plastic will lead to land pollution.

##### **Mitigation Measures:**

Construction waste will be segregated into recyclable and non-recyclable categories. Materials like bricks and wood will be reused where possible to reduce waste generation.

#### **5.4.6 Occupational Health and Safety Risks**

##### **Potential Impact:**

Construction workers will face risks like injuries, exposure to dust, and heat stress. Lack of proper safety measures will lead to accidents and health hazards.

##### **Mitigation Measures:**

Personal protective equipment (PPE) such as helmets, gloves, and dust masks will be provided. Workers will be trained on health and safety protocols. First-aid kits and emergency response plans will be made available on-site.

### **5.5 Potential Environmental Impacts and Mitigation Measures Due to Operational Phase**

The operational phase of the Health Capsule Pakistan will have several environmental impacts. Below are the key potential impacts and their corresponding mitigation measures:

The operational phase of the products manufacturing facility will bring about several environmental impacts, alongside strategies to mitigate these effects effectively.

#### **5.5.1 Impact on Air Quality Potential Issues:**

- Emissions of volatile organic compounds (VOCs) and hazardous air pollutants (HAPs) from solvents and chemical reactions.
- Dust generation from material handling and transportation.
- Odors from certain chemicals affecting surrounding communities.

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**Mitigation Measures:**

- ✓ Use closed systems and sealed containers to minimize VOC emissions.
- ✓ Install scrubbers to control air pollutants.
- ✓ Ensure proper ventilation in storage and production areas.
- ✓ Implement dust suppression techniques, such as water sprays and covered conveyor belts.
- ✓ Conduct regular air quality monitoring to track emissions and ensure compliance with standards.

**5.5.2 Impact on Noise****Potential Issues:**

- Noise from machinery, pumps, and vehicle movement can affect workers and nearby residents.
- Prolonged exposure may lead to hearing impairments and discomfort in the workplace.

**Mitigation Measures:**

- ✓ Install noise barriers and silencers on noisy equipment.
- ✓ Maintain equipment regularly to reduce excessive noise.
- ✓ Enforce mandatory use of ear protection (PPE) for workers in high-noise areas.
- ✓ Schedule transportation and high-noise operations during non-peak hours to minimize disturbance.
- ✓ Monitor noise levels to ensure compliance with workplace safety standards.

**5.5.3 Solid Waste Management****Potential Issues:**

- Accumulation of hazardous waste, including used chemicals, sludge from treatment plants, and contaminated containers.
- Generation of non-hazardous waste, such as packaging material, plastic drums, and paper waste.
- Improper disposal leading to soil contamination and health risks.

**Mitigation Measures:**

- 
- ✓ Implement a waste management plan with segregation of hazardous and non-hazardous waste.
  - ✓ Ensure safe disposal of hazardous waste through certified vendors.
  - ✓ Promote waste reduction and recycling of packaging materials.
  - ✓ Store hazardous waste in designated storage areas with proper labeling.

#### **5.5.4 Impacts of Wastewater Potential Issues:**

- Discharge of process wastewater containing residual chemicals, acids, and stabilizers.
- Potential contamination of groundwater and nearby water bodies if effluent is improperly handled.

#### **Mitigation Measures:**

- ✓ Install an Effluent Treatment Plant (ETP) to treat wastewater before discharge.
- ✓ Ensure proper drainage systems to prevent spills or leaks into soil and water bodies.
- ✓ Conduct periodic testing of wastewater quality to meet environmental regulations.
- ✓ Train staff on proper handling of liquid waste to avoid accidental spills.

#### **5.5.5 Health & Safety of Workers Potential Issues:**

- Exposure to toxic fumes, flammable materials, and corrosive chemicals can pose health risks.
- Risk of fire and explosions due to improper handling of chemicals.
- Potential for slips, trips, and falls in the production area.

#### **Mitigation Measures:**

- ✓ Conduct regular safety training on chemical handling and emergency response.
- ✓ Equip workers with Personal Protective Equipment (PPE), including gloves, goggles, and masks.
- ✓ Install fire detection and suppression systems, including fire extinguishers and sprinklers.
- ✓ Develop and implement a Safety Management Plan and conduct periodic safety drills.
- ✓ Ensure proper storage of flammable and hazardous chemicals with adequate signage.

#### **5.5.6 Impact on Flora and Fauna**

##### **Potential Issues:**

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The presence of common trees and animals in the area suggests a need to minimize ecological disturbance.

**Mitigation Measures:**

Post-construction tree planting and measures to avoid unnecessary habitat damage will help preserve local flora and fauna.

**5.5.7 Soil Contamination**

- Leakage or accidental spills of chemicals leading to contamination of soil.
- Poor waste disposal practices resulting in accumulation of toxic residues in the soil.

**Mitigation Measures:**

- ✓ Implement secondary containment systems for storage tanks to prevent leaks.
- ✓ Use spill kits and absorbents for immediate cleanup of accidental spills.
- ✓ Conduct regular soil quality testing to detect any signs of contamination.
- ✓ Train staff on safe material handling and emergency spill response.

**5.6 Environmental Enhancement Measures**

The implementation is designed with strong emphasis on environmental stewardship and safety. To mitigate potential environmental impacts and promote a safe, healthy workplace, the project will incorporate the following enhancement measures during both the construction and operational phases:

- At the workplace workers and employers have enough information, knowledge, and training regarding first aid treatment in case of any emergency. The project provides proper medical facilities to workers and staff to cope with any incidental accidents and tackle them.
- Drugs and narcotics are strictly prohibited during working hours in working areas.
- The staff/attendants of the machinery will use proper protective gear.
- Sprinkling water will be done on dusty roads and tracks.
- PPEs will be provided during construction activity.
- Constructional waste and domestic solid waste will be disposed of or utilized properly.
- Local people will be informed in advance when work is about to start in an area.
- Machinery will never be left unattended.

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- Efforts should also be made to discuss traffic conditions so that regular traffic is not disturbed. Transporters engaged in the project would be forced to adhere to the load specifications of the access road. No overloading would be allowed in any case.
  - Safety signs and boards will be placed during construction.
  - Proper SOPs will be followed with a proper schedule along with the HSE conditions.
  - The area will be restored with native plants. A proper tree plantation plan will be formulated to save the environment.
  - Solid waste will be handed over to contractors and an agreement will be made.
  - Noise will be controlled by adopting proper measures.
  - PPEs will be provided for workers during work.
  - Safety signs will be placed at all locations where required.
  - First aid facilities will be made available.
  - Any possible measure will be adopted to make the project safe and environmentally friendly.

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## **6 ENVIRONMENTAL MANAGEMENT AND MONITORING PROGRAM**

This chapter provides a detailed environmental management plan and strategies. The objective of the Environmental Management Plan (EMP) is to address all the major environmental issues and provide a framework for the implementation of the proposed mitigation measures during the operational phase of the project.

### **6.1 Objective of Environmental Monitoring Plan**

The objectives of the EMMP are multi-faceted, focusing on the comprehensive management of environmental aspects associated with the project:

- Defining Roles and Responsibilities
- Mitigation Measures
- Monitoring Mechanism
- Communication and Documentation
- Training and Capacity Building
- Management and Implementation

By addressing these objectives, the EMMP serves as a comprehensive guide for the project team to not only comply with regulatory requirements but also to adopt best practices in environmental management. This proactive approach to environmental protection will help to minimize the project's ecological footprint, promote sustainability, and contribute positively to the local community and environment.

## 6.2 Environment Management and Monitoring Plan (EMMP)

Table 4 EMMP

ENVIRONMENT MANAGEMENT AND MONITORING PLAN				
S. #.	IMPACT	MITIGATION MEASURE	RESPONSIBILITY	
			IMPLEMENTATION	MONITORING
A	<b>CONSTRUCTION PHASE</b>			
1.	<b>AIR QUALITY</b>			
	Dust, SO <sub>2</sub> , NO <sub>x</sub> & CO emissions from trucks, cause health issues to workers. Particulate matter will be generated during the Construction.	<ul style="list-style-type: none"> <li>Spray by water trucks to minimize the dust.</li> <li>Maintenance of construction machinery should be made mandatory to reduce emissions.</li> <li>Haul-trucks carrying earth, sand, aggregate and other materials will be kept covered with tarpaulin to reduce dust pollution.</li> </ul>	Contractor	Proponent through Consultant
2.	<b>NOISE</b>			
	The impact of noise generated during construction	<ul style="list-style-type: none"> <li>Engines of vehicles visiting project site should be properly tuned-up. The green zone of plants will also help decrease sound levels.</li> </ul>	Contractor	Proponent through Consultant

<b>3. OCCUPATIONAL HEALTH &amp; SAFETY</b>				
	<p>There will always be the possibility of hazard to health and safety of workers to occur during construction stage, lying of piles, and machines installation.</p>	<ul style="list-style-type: none"> <li>• First aid facilities should be readily available for the workers at the site. The contractor will ensure the availability of transport and driver to handle any mishap which may occur.</li> <li>• Relevant safety devices like belts, gloves and testers should be strictly used by the Labor force at the work site.</li> <li>• Implement training programs that support the achievement of the staff and personnel's competency in relation to HSE.</li> </ul>	Contractor	Proponent through Consultant
<b>4. DISPOSAL OF CONSTRUCTION DEBRIS</b>				
	<p>Each phase of the development shall produce solid waste, disposal of which, if not managed properly could have negative impacts on the site and surrounding area.</p>	<ul style="list-style-type: none"> <li>• A site waste management plan should be made the responsibility of the contractor. The waste should be properly segregated and separated to encourage recycling of some useful waste materials.</li> <li>• Train or educate the involved stakeholders on the importance and means of waste management and handling.</li> </ul>	Contractor	Proponent through Consultant

5.	<b>GROUND WATER QUALITY</b>			
	No appreciable impacts on the ground water quality are anticipated.	<ul style="list-style-type: none"> <li>Avoid accidental spills through good work practice.</li> </ul>	Contractor	Proponent through Consultant
6.	<b>SOIL CONTAMINATION</b>			
	Any improper storage or handling of materials including paints, fuels, solvents, oil, cement, etc. would result in soil contamination.	<ul style="list-style-type: none"> <li>The contractor should be required to impart proper training to their workforce in the storage and handling of materials</li> </ul>	Contractor	Proponent through Consultant
7.	<b>FLORA &amp; FAUNA</b>			
	No negative impact on the ecological environment will take place on account of cutting of any trees in the project area and clearing of vegetation from the site.	<ul style="list-style-type: none"> <li>Trees and ornamental plants shall be planted along the project boundary which will increase the aesthetic value of the site and will combat pollution.</li> <li>Landscaping is deemed to be a powerful mitigation activity with a positive impact.</li> </ul>	Contractor	Proponent through Consultant
8.	<b>SOCIO-ECONOMIC ENVIRONMENT</b>			

	Several categories of employees will be required during the construction phase. This would have a positive impact on the local economy and on regional unemployment.	<ul style="list-style-type: none"> <li>The socially responsible attitude of the project management towards local people and resources can make project people friendly.</li> <li>Awareness and educational programs introduced by the project management can reduce the fear among the people regarding non-skilled people.</li> </ul>	Contractor & Proponent	SIE
<b>B.</b>	<b>OPERATIONAL STAGE</b>			
1.	<b>AIR QUALITY</b>			
	Air pollution is due to transport and vehicle.	<ul style="list-style-type: none"> <li>Proper maintenance and tuning of the vehicles can reduce it.</li> </ul>	Proponent	EPA
2.	<b>NOISE QUALITY</b>			
	Noise due to movement of vehicles, during traffic of materials	<ul style="list-style-type: none"> <li>Plantation along with boundary will make buffer zone to avoid noise.</li> </ul>	Proponent	EPA
3.	<b>OCCUPATION, HEALTH, AND SAFETY</b>			

	There will always be the possibility regarding hazards to health and safety of workers to occur during the operational phase of the project.	<ul style="list-style-type: none"> <li>• All the workers involved in the transport of the materials will be suggested to wear boots, gloves, safety cap to avoid injury.</li> <li>• Plantation of trees along the boundary walls will help in reducing the noise levels to enough extent. All the vehicles should be properly tuned up and regular maintenance and periodic monitoring must be done.</li> </ul>	Proponent	EPA
4.	<b>SOLID WASTE</b>			
	The domestic solid waste may negatively impact the site, the workers, the visitors, and the factory surrounding in different ways including aesthetically, occupationally as well as from health, safety, and environment point of view.	<ul style="list-style-type: none"> <li>• Domestic solid waste will be collected in waste bins.</li> <li>• Must use protective gloves while carrying the containers to avoid any hazardous effect.</li> </ul>	Proponent	EPA
5.	<b>WASTEWATER QUALITY</b>			
	Domestic wastewater will be produced.	<ul style="list-style-type: none"> <li>• Domestic wastewater will be disposed of after treatment through septic tank.</li> <li>• Wastewater will meet PEQS.</li> </ul>	Proponent	EPA
6.	<b>WATER QUALITY</b>			

	Due to mixing of contaminant sedimentation, will cause pollution. Water quality decreases.	<ul style="list-style-type: none"> <li>• Septic tanks will be installed for the treatment of wastewater.</li> <li>• No excess water will be extracted</li> </ul>		
7.	<b>FLORA AND FAUNA</b>			
	Excessive plantation shall be done on the walls.	<ul style="list-style-type: none"> <li>• The process of plantation should be kept sustainable throughout project life.</li> </ul>	Proponent	EPA
8.	<b>SOCIO-ECONOMIC ENVIRONMENT</b>			
	A few employees will be required in the operational phase, and this would have a positive impact on the local economy and on regional unemployment.	<ul style="list-style-type: none"> <li>• The management of the project can capitalize the positive attitude of people of the study area towards this project by offering them maximum employment opportunities.</li> <li>• Measurements and steps should be taken to keep undisturbed the privacy of adjoining workplaces.</li> </ul>	Proponent	EPA

### 6.3 Proposed schedule for implementation (Tentative)

- ❖ **Stage I:** The clearing of land, and preparation of land for construction activity.
- ❖ **Stage II:** During this phase, machinery will be brought to the site and installed.
- ❖ **Stage III:** In this phase all the outstanding activities will be completed, and construction activities will be initiated.
- ❖ **Stage IV:** After completing construction, employees will be hired, and staff will be assigned their respective work. The operation activities will be initiated.

### 6.4 Environmental Budget

Table 5 Environmental Budget

Sr.no.	Environmental Components	Quantity	Pak. Rs.	Details/ Basis
1	<b>Tree Plantation/ Landscaping</b>	500-1000	300,000	Cost includes plantation and maintenance up to three years
2	<b>Solid Waste Management</b>	L.S.	150,000	Lump sum
3	<b>Wastewater management</b>	L.S.	100,000	Lump sum
4	<b>Health &amp; Safety Measures</b>	L.S.	155,000	Lump sum
5	<b>Miscellaneous Cost</b>	L.S.	50,000	Lump sum
6	<b>Air Quality Monitoring</b>	2	35,000	2 samples @ 5000/Sample
7	<b>Water &amp; Wastewater Quality Monitoring</b>	2	35,000	2 samples @ 5000/Sample
8	<b>Noise Level Monitoring</b>	2	25,000	2 samples @ 5000/Sample
9	<b>Soil Tests</b>	2	35,000	2 samples @ 5000/Sample
10	<b>Training</b>		65,000	Lump sum
11	<b>External Monitoring</b>		50,000	Lump sum

	<b>Total Environmental and Social Management Cost</b>	<b>Approx. 1.0 million PKR</b>
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## **6.5 Environment Management Team**

### **Responsibilities of Proponent**

The project owner (proponent) will be responsible for the environmental management and supervisory affairs during the installation and operational phase of the project. Environment personnel designated by the management of project will look after the environment related issues during the operational phase. The responsibilities of environmental personnel are as follows:

1. Monitoring progress of the project as per planned schedule of activities
2. Exercising oversight over the implementation of environmental mitigation measures by the contractor
3. Documenting the experience in the implementation of the environmental process
4. Preparing training materials and implementing programs
5. Maintaining interfaces with the other lined departments/ stakeholders
6. Reporting the status of EMP implementation to the management

### **Responsibilities of project contractor:**

Contractor appointed for the commissioning of the project including the auxiliary facilities is responsible for:

- Implementation of all provisions of the EMMP and with any environmental and other codes of conduct required by the project.
- Provision of proper Personal Protective Equipment (PPE) to the workers and train them for their proper use.

## **6.6 Monitoring Program to Access Performance**

Following functionaries will be involved in the implementation of EMP or to access output:

1. The project owner (proponent) as the project proponent and owner of the EMP.
2. Project excavation contractor(s) as executors of the EMP during installation phase of the project.
3. Transportation & Maintenance (O&M) and the health, safety, and environment team of the project as an executor of the EMP during the transportation phase of the project.

### 6.7 EMP Reporting and Review Procedure

Category	Impact	Project Activity	Monitoring Mechanism	Frequency	Monitoring Agency
<b>Construction and Operational Phase</b>					
Land Resource	Solid Waste	Implementation of Solid waste Management system	Record keeping and timely transfer of waste from bags to the disposal Site for disposal	Daily	Manager HSE/Project Proponent
	Soil Contamination	Implementation of Management Plan	Visual monitoring and complete soil analysis	Daily and annually	
Ecological	Flora	Uprooting of trees	Inventory of uprooted	During Baseline	
Air Resource	Air Emission	Dust emissions during Construction and Operation	Monitoring of the emissions as per applicable standards Water sprinkling will be done regularly to avoid dust emissions	Once before start of operation and after that as when required during operation	
	Dust				
Noise	Noise Pollution	Development/operational material transportation	As per applicable standards	Fortnightly	
Water Quality	Wastewater generation	Domestic wastewater, due to construction activities	Water quality testing	Monthly	
Health and Safety	Health risk	During construction and operational phase mainly due to more chemical usage	Keep record of workers as they use PPE's and follow safety signs and instructions	Daily	
Resource		During construction phase	Trees and vegetation during operation phase	Survey, once in a year and after the completion of the Project	

## 6.8 Training Schedule

Proponent provides periodic Environmental and HSE training to workers working in their existing plants. The management of Proponent feels HSE is important for moral, legal, and financial reasons. The management of proponent has developed strict SOPs for Health and Safety of workers. These SOPs include SOPs for Personal protective equipment's, Risk Assessment, permit to work, SOP for work at height, Fire Safety and Prevention, Confined Space entry etc. A comprehensive annual training calendar has also been developed for training on topics of HSE for management as well as labors. A training log will be maintained by Site engineer and contractors.

Participants	Date, Time & Location	Training Topics	Schedule	Responsible Authority
Staff of team management and contractor	As specified	<ul style="list-style-type: none"> <li>• Introduction to the project and EMMP.</li> <li>• EMMP communication, documentation, monitoring, and reporting requirements.</li> </ul>	Every month	Project manager
All site personnel	As specified	<ul style="list-style-type: none"> <li>• Site induction training on HSE system and requirements</li> <li>• Environmental sensitivities of the project area</li> <li>• Communication of environmental problems to corresponding officials</li> <li>• Waste disposal</li> </ul>	After every week	Project manager
Drivers	As specified	<ul style="list-style-type: none"> <li>• Road safety</li> <li>• Road restrictions</li> <li>• Vehicle restrictions</li> <li>• Waste disposal.</li> <li>• Defensive driving</li> </ul>	After every 3 months	Project manager
Camp Staff	As specified	<ul style="list-style-type: none"> <li>• Camp operations.</li> <li>• Waste disposal.</li> <li>• Good housekeeping</li> </ul>	Monthly	Project manager

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## 7 STAKEHOLDERS CONSULTATION

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

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

### 7.1 Objective of Consultation

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

### 7.2 Proponent's Environment Management Team

Sr. No.	Managers	Responsibilities
1	Contract Manager	<ul style="list-style-type: none"><li>• Implementation of EMP</li><li>• Environmental issues identification during pre- construction phase.</li><li>• Communication EMP to all employees.</li></ul>

2	Contractor	<ul style="list-style-type: none"> <li>• Ensure that the control measures identified during environmental surveys are implemented as they are relevant to their work/visit.</li> <li>• Ensure that the project management team is notified of any non-conformance of control measures or environmental incident where the environment has been put at risk.</li> </ul>
3	Site manager	<ul style="list-style-type: none"> <li>• Ensure site material and safe handling of hazardous waste.</li> <li>• Controlled access arrangement to avoid hazards.</li> <li>• Emergency arrangements to avoid any unfortunate incident.</li> <li>• First aid facilities/services should be available on-site.</li> <li>• Ensure good standards of workmanship.</li> </ul>
4	Site HSE advisor	<ul style="list-style-type: none"> <li>• Management plan to be followed and implemented.</li> <li>• Daily checks &amp; weekly checks.</li> <li>• Regular consultation with workers.</li> </ul>
5	Site Environment advisor	<ul style="list-style-type: none"> <li>• According to legislation and consent develop EMP.</li> <li>• Ensure application of EMP.</li> <li>• Carry out regular site inspection.</li> </ul>
6	Public Contact Officer	<ul style="list-style-type: none"> <li>• First point of contact for members of the public.</li> <li>• Arrange and manage public forums.</li> <li>• Maintain relations with stakeholders.</li> <li>• Door to door surveys as appropriate.</li> <li>• Coordination with work.</li> </ul>

### 7.3 The responsible Authority

Overall responsibility for implementation of EMP will be that of project proponent. He will appoint an HSE/Project Manager of relevant qualification. HSE/Project Manager will act as Environmental Manager and will manage all HSE condition at the PEQS.

### 7.4 Other Department and Agencies

For the impact analysis detailed meetings were held with the management of said project, local community, education institutes, health institutes, hospital, and NGOs. Issues were discussed that may affect the environment and the implementation of the project. All possible mitigation measures were considered and incorporated in the Environmental Management Plan.

Sr. No.	Designation	Concerns
<b>1.</b>	<b>Environment Protection Department (EPD)</b>	
	General Manager	<p>To reduce environmental impacts following points are summarized:</p> <ul style="list-style-type: none"> <li>• Solid waste should be managed in Environmentally friendly manner.</li> <li>• Wastewater should be treated effectively &amp; approval should be acquired from concerned agency before disposing of it in a nearby drain.</li> <li>• HSE* at the site should be managed effectively.</li> <li>• No impact is being foreseen due to the selected location.</li> <li>• Locals should be given job opportunities.</li> </ul>
	Environmental Inspector	
<b>2.</b>	<b>Social Welfare Department (SWD)</b>	
	Deputy Director Officer	<p>Following comments are suggested by the Deputy Director on the behalf of SWD:</p> <ul style="list-style-type: none"> <li>• Final goods should be affordable for the locals.</li> <li>• The project should facilitate locals and they should be economical.</li> <li>• Job opportunities should be given to the locals.</li> <li>• Wages should be given according to the work assigned to them.</li> <li>• Life insurance of the workers should be given as well as all the facilities should be given as per labor laws</li> </ul>
<b>3.</b>	<b>Irrigation Department</b>	
	Subdivision	<p>Following comments were suggested:</p> <ul style="list-style-type: none"> <li>• Untreated wastewater should not be disposed of in the nearby drains without proper treatment.</li> <li>• Beneficial as job opportunities will be available to the residents.</li> </ul>
	Executive Engineer	
<b>4.</b>	<b>Forest Department</b>	
	District Forest Officer	<p>Following recommendation were suggested by the forest department:</p> <ul style="list-style-type: none"> <li>• Planation and landscape activities should be carried out on a broader scale.</li> <li>• Proper drainage system must be available at site</li> </ul>
HSE*	Health and Safety Engineer	

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## **7.5 Affected and Wider Community**

There is no affected community present in the radius of our study area. Team has consulted with the inhabitants of the different areas. They provided positive remarks regarding the subject project and in favor of the subject activity for the project.

Stakeholders' participation Performa's and socioeconomic questionnaire were filled by the inhabitants to evaluate the project socio-economic impacts. The stakeholder category involves nearby residents, different industries, shopkeepers. The issues discussed with them are mostly related to the following:

- Activities of project.
- Impacts caused due to certain activities during construction and operational phase.
- The proposed mitigation measures.

## **7.6 Views, Concerns and Suggestions of Various Stakeholders**

The major socio-economic concerns and problems of the affected persons of various communities have been given in tabulated form along with their main concerns and remarks. Community showed a lot of concerns; a few are being mentioned here:

- Removal of shrubs and trees should be avoided, if any, to the extent possible in the case of clearance green zones should be established within the facility. Indigenous trees around the facility should be planted to control air pollution and as the compensation of construction activity.
- The project will become the source of income for local to earn their livelihood easily and honorably, so locals should be preferred.
- For the solid waste management and waste disposal, proper disposal techniques should be adopted.
- Water spraying/sprinkling should be done on the regular basis during construction phase to avoid dust emissions.
- Employment opportunities will be generated and locals should be hired on the priority basis.
- The air pollution is one of the major impacts from which Punjab is being affected at the large scale. So, ambient air quality should be monitored regularly and air pollution expected to generate from the operation should be mitigated.

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- Good relations with the local communities will be promoted by encouraging. Contractor to provide opportunities for skilled and unskilled employment to the locals as well as on-job training.
  - Noise generated activities should be carried out during day hours.

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## CONCLUSION

The aim of the project is to operate electric conductors and allied material unit to meet the demand of the market. The name of the project is M/s T&D Pvt. Ltd. located at Mouza Mari, Tehsil Shalimar, District Lahore. The project involves the transformers. The project falls under the category of Environmental Impacts Assessment (EIA).

**At the end of study, it has been found that:**

- Environmental monitoring by the project proponent and a third party will also ensure that the project runs in accordance with the legal requirements.
- There's no sensitive area/element near the project site.
- The noise levels will be kept well within the required limiting values of the PEQS Pakistan.
- This project will create job opportunities during operation stages leading towards reduction of poverty.
- EMP, as recommended in this EIA Report, is to be put in place during operational stage of the project.
- All the protective measures for workers' health and safety will be followed.
- The availability of water for the project will be ensured without affecting the needs of the people around the project area.
- Proper safety measures will be followed.

## GLOSSARY

Accommodate	(Of a building or other area) provide lodging or sufficient space for. "The cottages accommodate up to six people"
Assessment	The action of assessing someone or something. "The assessment of educational needs"
Aspects	A distinct feature or element in a problem
Adverse	Preventing success or development; harmful; unfavorable. "Taxes are having an adverse effect on storage"
Authorized	Having official permission or approval. "An authorized dealer"
Amendment	A minor change or addition designed to improve a text, piece of legislation, etc. "an amendment to existing bail laws"
Ambient Air	Ambient air quality refers to the quality of outdoor air in our surrounding environment. It is typically measured near ground level, away from direct sources of pollution
Archaeological	The scientific study of material remains (as fossil relics, artifacts, and monuments) of past human life and activities
Annunciation	A formal public statement
Baseline	The existing conditions against which impacts of the proposed action and its alternatives can be compared.
Crushing	Deform, pulverize, or force inwards by compressing forcefully. "You can crush a pill between two spoons"
Containers	An object for holding or transporting something. "The cakes will keep for up to two weeks if kept in an airtight container"
Compliance	Acting according to certain accepted standards
Discrepancies	A difference between conflicting fact, claims or opinions
Disposal	the action or process of getting rid of something
Dumped	Deposit or dispose of (rubbish, waste, or unwanted material), typically in a careless or hurried way
Effluent	Any material in solid, liquid, or gaseous form or combination thereof being discharged from industrial activity or any other source and includes a slurry, suspension or vapor

Environmental impact statement (EIS)	A document prepared to analyze the impacts on the environment of a proposed action and released to the public for review and comment. An EIS must meet the requirements of NEPA, CEQ, and the directives of the agency responsible for the proposed action.
Emission	The storage and discharge of something, especially gas, or radiation.” The effects of lead emission on health”
Evaluated	Estimate or determine the nature, value, quality, ability, extent, or Significance
Graded	Arranged in a sequence of grades or ranks; "stratified areas of the distribution"
Generation	The storage or creation of something
Incinerator	A furnace or a container for burning waste materials
Inadequate	Not capable or competent; lacking
Implementation	The process of putting a decision or plan into effect; execution
Intends	To have in mind as something to be done or brought about, plan: to design or mean for a particular purpose, use, recipient, etc.
Landfill site	For the disposal of solid waste in which refuse is buried between layers of dirt to fill in or reclaim low-lying ground
Legislation	Law enacted by a legislative body
Mobilization	To release or make available, as cells or chemical substances
Mitigation	The action of lessening in severity or intensity
Noise	Loud, unpleasant, unexpected, or undesired sound that disrupts or interferes with normal human activities
Potential	Having or showing the capacity to develop into something in the future
Pedestrian	A person who goes or travels on foot; walker
Proponent	The person who proposes or intends to undertake a project
Sanitary	Relating to the conditions that affect hygiene and health, especially the supply of sewage facilities and clean drinking water
Segregate	Set apart from the rest or from each other; isolate or divide. "Disabled people should not be segregated from the rest of society
Settlement	An official agreement intended to resolve a dispute or conflict. "Unions succeeded in reaching a pay settlement

Ton	A short or net ton is equal to 2,000 pounds; a long or British ton is 2,240 pounds; a metric ton is approximately 2 to 205 pounds
Transportation	The action of transporting someone or something or the process of being Transported. "The era of global mass transportation"
Ultimate	Being or happening at the end of a process; final. "Their ultimate aim was to force his resignation"
Violations	the action of violating someone or something
Working place	From the out by side of the last open crosscut to the face
Flora	All the plant life in a particular region or period
Fauna	All the animal life in a particular region or period
Demarcated	Separately clearly, as if by boundaries
Screening	The display of a motion picture
Substitutions	An event in which one thing is substituted
Smelting	extract (metal) from its ore by a process involving heating and melting
Regulations	An authorized rule
Recycling	process of converting waste materials into new materials and objects
Stakeholders	A person or organization with an interest or concern in something
Rehabilitation	The conversion of waste land into land suitable for use of habitation or Cultivation

## LIST OF ABBREVIATION

AA	Ambient Air
APHA	American Public Health Association
AOI	Area of Influence
BOD <sub>5</sub>	Biological Oxygen Demand
CMS	Convention on Migratory Species
COD	Chemical Oxygen Demand
dB(A)	Decibel
EA	Environmental Assessment
EHS	Environmental Health Safety
EIA	Environmental Impact Assessment
EPD	Environmental Protection Department
PEPA	Pakistan Environmental Protection Act
EPA	Environmental Protection Agency
ESIA	Environmental and Social Impact Assessment
ESA	Environmental and Social Assessment
ESMP	Environmental/Social Management Plan
EMP	Environmental Management Plan
GIS	Geographical Information System
GOP	Government of Pakistan
GPS	Global Positioning System
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
HSE	Health Safety & Environment
HWMS	Hazardous Waste Management System
IEE	Initial Environmental Examination
IAIA	International Association for Impact Assessment
IWM	Industrial Waste Management
IUCN	International Union for Conservation of Nature
KM	Kilometers

LGO	Local Government Ordinance
MEAS	Multilateral Environmental Agreements
MSDS	Material Safety Data Sheets
NEQS	National Environmental Quality Standards
PPE	Personal Protective Equipment
PEQS	Punjab Environmental Quality Standards
NEAP	National Environmental Assessment Plan
Q&EHS	Quality, Environment, Health & Safety
O & M	Operation and Maintenance
PKR	Pak Rupees
PPM	Parts Per Millions
PEPC	Pakistan Environmental Protection Council/Punjab
QA/QC	Quality Assurance/Quality Control
RAP	Resettlement Action Plan
SWM	Solid Waste Management
TDS	Total Dissolved Solids
UNFCCC	United Nation Framework Convention on Climate Change
UNCC	United Nation Convention to Combat Desertification
UNEP	United Nations Environmental Programs
GOP	Government of Pakistan
WHO	World Health Organization
R&R	Rehabilitation and Resettlement
WWTP	Wastewater Treatment Plant

**LIST OF PEOPLE CONSULTED WITH WRITTEN FEEDBACK**

Sr.#	Name	Concerns
1.	Kamran Ali Khan	<p>During the survey in the study area following concerns of the local community were noted:</p> <ul style="list-style-type: none"> <li>• Air pollution should be controlled effectively such as emissions generated from power generating activities.</li> <li>• Locals should be preferred for the job opportunities.</li> <li>• Wastewater should be treated prior to final disposal in nearby drain.</li> <li>• Solid waste should be managed effectively by adopting the standard practices of the area.</li> <li>• An effective EMMP should be designed and enforced with true spirit.</li> <li>• Health of the workers should be ensured.</li> <li>• Planation should be carried out at extensive scale.</li> <li>• Noisy activities should be confined.</li> <li>• Skilled and non-skilled persons both should get job.</li> </ul>
2.	Muhammad Waqas	
3.	Qaiser Farooq	
4.	Ghulam Mujtaba	
5.	Mehboob Alam Shahid	
6.	Muhammad Latif	
7.	Mazhar Hussain	
8.	Shahbaz Khan	
9.	Waseem Ahmed	
10.	Rab Nawaz	
11.	ALLAH Yar	
12.	Ahmed Saeed	
13.	Muhammad Jabbar	
14.	Muhammad Ramzan	
15.	Ali Khan	

## **SOURCE OF DATA**

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