



Volume-1

EIA

Environmental Impact Assessment
(Volume-1 & 2)

PIONEER DENIM LIMITED
(Garments Division)

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Annexure attached in **Volume II** (Separately)

Abbreviation

3R	Reduce, Reuse, Recycle
ADB	Asian Development Bank
BBS	Bangladesh Bureau of Statistics
BMD	Bangladesh Meteorological Department
BWDB	Bangladesh Water Development Board
CDM	Clean Development Mechanism
CAS	Chemical Abstracts service
DC	Deputy Commissioner
DG	Director General
DOE	Department of Environment
ECA	Environmental Conservation Act
ECC	Environmental Clearance Certificate
ECR	Environment Conservation Rules 1997
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMS	Environmental Management System
EQS	Environmental Quality Standard
GIS	Geographic Information System
GOB	Government of Bangladesh
GPS	Global Positioning System
IEC	Important Environmental Component
IEE	Initial Environmental Examination
KII	Key Informant Interview
LGED	Local Government Engineering Department
MoEFCC	Ministry of Environment, Forest and Climate Change
MSDS	Materials Safety data Sheet
NEMAP	National Environment Management Action Plan
NGO	Non-Government Organization

NWMP	National Water Management Plan
PAP	Project Affected Person
PCP	Project Concept Paper
PDB	Power Development Board
PDL	Pioneer Denim Limited (Garment Division)
RAS	Restricted Substance List
SWM	Solid Waste Management
SRDI	Soil Resource Development Institute
TOR	Terms of Reference
WMP	Waste Management Plan



Glossary

Adverse impact: An impact that is considered undesirable.

Ambient air: Surrounding air.

Aquatic: Growing or living in or near water.

Bangla: Bengali language.

Baseline (or existing) conditions: The „baseline“ essentially comprises the factual understanding and interpretation of existing environmental, social and health conditions of where the business activity is proposed. Understanding the baseline shall also include those trends present within it, and especially how changes could occur regardless of the presence of the project, i.e. the „No-development Option“.

Bazar: Market.

Bigha: 20 katha

Beel: A „back swamp“ or depression. Can be either perennial or seasonal.

Beneficial impacts: Impacts, which are considered to be desirable and useful.

Biological diversity: The variety of life forms, the different plants, animals and microorganisms, genes they contain and the ecosystems they form. It is usually considered at three levels: genetic diversity, species diversity and ecological diversity.

Ecosystem: A dynamic complex of plant, animal, fungal and microorganism communities and associated non-living environment interacting as an ecological unit.

Emission: The total amount of solid, liquid or gaseous pollutant emitted into the atmosphere from a given source within a given time, as indicated, for e.g., in grams per cubic meter of gas or by a relative measure, upon discharge from the source.

Endangered species: Species in danger of extinction and whose survival is unlikely if the existing conditions continue to operate. Included among those are species whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to suffer from immediate danger of extinction.

Environmental effects: The measurable changes, in the natural system of productivity and environmental quality, resulting from a development activity.

Environmental impact assessment (EIA) / Environmental assessment: The systematic, reproducible and interdisciplinary identification, prediction and evaluation, mitigation and management of impacts from a proposed development and its reasonable alternatives, sometimes known as environmental assessment.

Environmental Impact: An estimate or judgment of the significance and value of environmental effects for natural, socio-economic and human receptors. Environment Management Plan (EMP): A Plan to undertake an array of follow-up activities which

provide for the sound environmental management of a project/ intervention so that adverse environmental impacts are minimized and mitigated; beneficial environmental effects are maximized; and sustainable development is ensured.

Environmental Management: Managing the productive use of natural resources without reducing their productivity and quality.

Erosion: Process in which wind and water removes materials from their original place; for instance, soil washed away from an agricultural field.

Evaluation: The process of looking back at what has been really done or accomplished.

Fauna: A collective term denoting the animals occurring in a particular region or period.

Field Reconnaissance: A field activity that confirms the information gathered through secondary sources. This field study is essentially a rapid appraisal.

Flora: All of the plants found in a given area.

Green Building: The project of increasing the efficiency with which buildings and their sites use energy, water, and materials and reducing building impacts on human health and the environment over the entire life cycle of the building.

Habitat: The natural home or environment for a plant or animal.

Household: A household is identified as a dwelling unit where one or more persons live and eat together with common cooking arrangement. Persons living in the same dwelling unit having separate cooking arrangements constitute separate household.

Important Environmental Component (IEC): These are environmental components of biophysical or socio-economic importance to one or more interested parties. The use of important environmental components helps to focus the environmental assessment.

Initial Environmental Assessment / Evaluation: Preliminary analysis undertaken to ascertain whether there are sufficient likely significant adverse impacts to warrant a „full“ EIA. In some countries, use of initial assessment forms a meaning of “screening” proposed projects.

Khal: Small Channel, canal.

Katha: 720 Sft

Land use: Types include agriculture, horticulture, settlement, pisciculture and industries.

Mauza: A Bangla word for the smallest government administrative area corresponding to village revenue unit.

Mitigation: An action, which may prevent or minimize adverse impacts and enhance beneficial impacts.

Negative Impact: Negative change from the existing situation due to the project.

Public involvement / Public consultation: A range of techniques that can be used to inform, consult or interact with stakeholders“ affected / to be affected by a proposal. **Reversible impact:** An environmental impact that recovers either through natural process or with human assistance (e.g. cutting off fish migration by an embankment might be reversible at a later stage if a proper regulator is built).

Stakeholders: Those who may be potentially affected by a proposal, e.g. Local people, the proponent, government agencies, NGOs, donors and others, all parties who may be affected by the project or to take an interest in it.

Taka: Unit of Bangladeshi currency.

Terrestrial: Living on land.

The Project: KC Spinning Mills Limited (Including proposed dyeing section)

Thana: Sub-district level of government administration, comprising several unions under district.

Union: Smallest unit of local self-government comprising several villages.

Upazila: Sub-district name. Upozila introduced in 1982.

Zila: Bengali word of district.

Executive Summary

Executive Summary

This Environmental Impact Assessment (EIA) report has been prepared for the proposed project titled “Pioneer Denim Limited (Garment Division) to be implemented at Horitola, Shahpur Bazar, Madhabpur Upazila, Habiganj District. The geographical coordinates of the project site are 24°13'36.58" N latitude and 91°21'53.67" E longitude.

The EIA study has been conducted to fulfill the regulatory requirements of the Department of Environment (DoE) under the Environment Conservation Act (ECA), 1995 and Environment Conservation Rules (ECR), 2023, for obtaining Environmental Clearance Certificate. According to the ECR 2023, Schedule-1 the project falls within Red Category (a washing project, Textile/clothing washing unit (daily production capacity above 15 tons) falls under the "Red category", for which carrying out an environmental Impact assessment (EIA) is mandatory. The study also complies with other applicable national legal, policy, and institutional frameworks relevant to environmental protection, water resource management, wastewater discharge, solid waste management, and occupational health and safety.

The purpose of this EIA is to identify, predict, and evaluate potential environmental and social impacts arising from the construction and operation of the project and to recommend appropriate mitigation, monitoring, and management measures to ensure environmentally sound and sustainable project implementation.

Pioneer Denim Limited (Garment Division) is a reputed manufacturer of 100% export-oriented denim garments industry engaged in cutting, printing/embroidery, sewing, and washing operations. The proposed expansion and operational optimization of the project aim to enhance production capacity to meet increasing international market demand while maintaining compliance with national environmental regulations and international buyer requirements.

It's located on 55 acres of land. Current employees are 4,200 which will be increased about 15,000 by 2027. There are 22 buildings and 13 sheds and one of the largest biological ETP plants in Bangladesh with 21,600 m³/day capacity, some of which are under construction. The main products of the project are different kinds of denim garments. The project will increase production capacity from 30,000 to 300,000 pieces per day by 2028 and is expected to generate significant local employment and economic benefits.

Project location & site

The project site is located at 24°13'36.58"N, 91°21'53.67"E in Sylhet Division. The project site is about 112 KM away from Osmani International Airport Sylhet Hwy/AH1/AH2/N2 & Chattogram Sea port 263 KM (Via N1). From Sylhet city the project is about 104 Km (via Dhaka-Sylhet Hwy/AH1/AH2/N2).

The project site is located in an industrially developing area with good road connectivity and access to utilities. The surrounding land use consists mainly of mixed industrial, commercial, and residential developments. No Ecologically Critical Area (ECA), protected forest, wildlife sanctuary, wetland of international importance, or archaeological site exists within the immediate project influence area.

The Khowai River is the nearest major surface water body in the wider area; however, there is no direct discharge of untreated effluent from the project to the river.

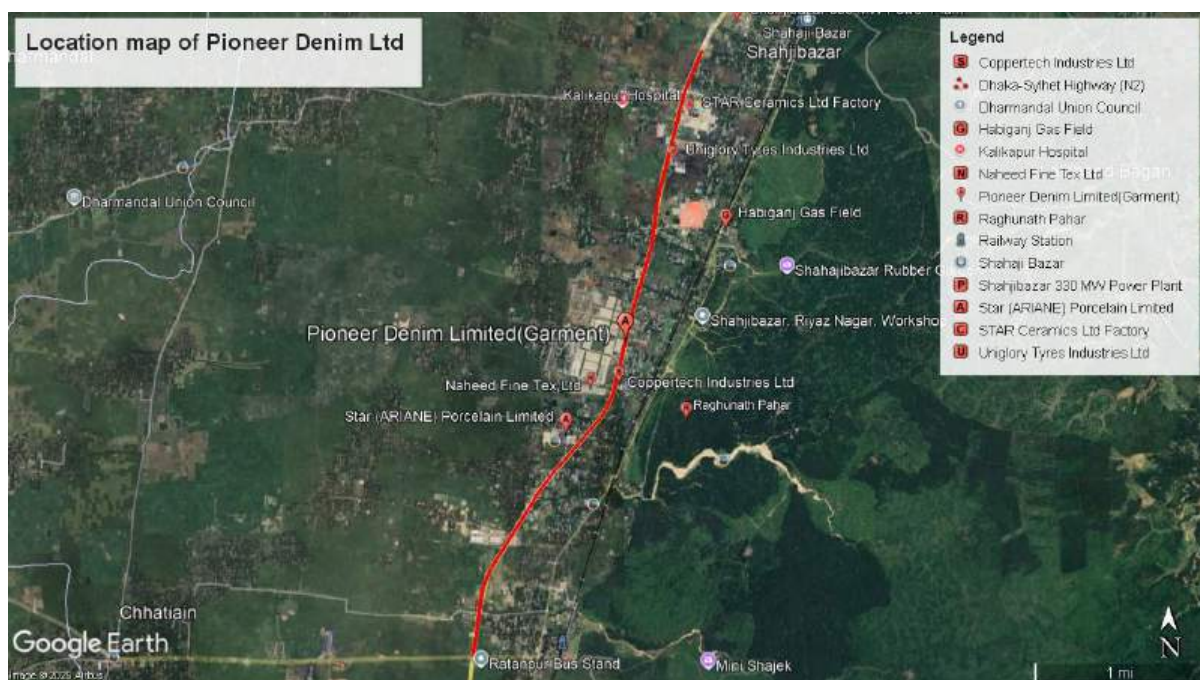


Figure: Location of the project at 24°13'36.58"N, 91°21'53.67"E (Source: Google Earth)

Objectives of EIA Study

The objective of the EIA study is to develop a well-balanced environmental management plan to reduce environmental impacts and enhance positive impacts of the project to comply with the Environmental Quality Standard (EQS) of Bangladesh and also an outline of environmental monitoring requirements for operational and any future construction phases of the project.

EIA Study Methodology

The EIA is conducted by following steps-

- To assess the existing environmental conditions of the project site and its adjacent areas in order to establish a baseline framework against which potential environmental impacts due to the implementation of the project would be compared.
- To identify and assess environmental impacts resulting from the project during its construction and operation phase.
- To develop a well-balanced environmental management plan with recommendations for mitigating adverse impacts and enhancing positive impacts and outlining Environmental monitoring requirements both during future construction and operational phase of the project.
- To identify issues that may require further studies.

Description of existing baseline information

Socio-economic condition

The proposed project is located in a predominantly rural area where the local economy is mainly dependent on agriculture, fishing, and informal employment. Income levels are moderate, and seasonal under employment is common. The industrial and natural resource sectors provide formal and informal employment opportunities. Residents are engaged in factory work, rubber plantation management, gas and energy related operations, as well as traditional agriculture. The project area is situated within a rural settlement setting. Settlements are composed of small to medium-sized homesteads, typically surrounded by agricultural land, ponds, and vegetation. Housing structures are predominantly semi-pucca and kutcha, constructed using brick, tin, bamboo, and CI sheets.

Existing land use

The existing land use at the study area is predominantly rural agricultural land, with actively cultivated fields and scattered residential structures. Local water features such as small canals (khals) and ponds are present in the broader vicinity, supporting irrigation and local livelihoods. The project land predominantly consists of previously converted industrial/commercial land with some portions historically used for agriculture and rural settlements. No ecologically sensitive areas within the immediate vicinity.

Baseline Environmental Conditions

Physiography

The project site lies within the Surma–Kushiyara Floodplain physiographic region of northeastern Bangladesh. The area is characterized by relatively flat alluvial plains formed by sediment deposition from regional river systems. The physiography is suitable for industrial development, with no steep slopes, hillocks, or erosion-prone landforms within the project area. Seasonal inundation may occur in low-lying surrounding areas during heavy monsoon rainfall; however, the project site itself remains generally flood-free due to its slightly elevated ground level and existing drainage facilities.

Topography

The topography of the project area is flat to gently undulating, with an average ground elevation typical of Madhabpur Upazila. The natural slope is mild and facilitates surface runoff during the monsoon season toward nearby drainage channels and khals. No significant topographical constraints such as sharp gradients or unstable terrain were identified that could adversely affect construction or operation of the project facilities.

Soil Type and Characteristics

The soil in the project area is predominantly alluvial soil, consisting mainly of silty clay to clay loam with moderate permeability. This soil type is common in floodplain regions and is suitable for industrial construction when proper foundation design and drainage measures are applied. No evidence of soil contamination or salinity was observed at the site. The soil conditions are favorable for supporting factory buildings, internal roads, and treatment facilities, subject to standard engineering practices.

Surface Water Environment

There are no permanent surface water bodies within the project premises. Surface runoff during the monsoon season drains through nearby local khals, which ultimately connect to regional river systems. The Khowai River is the nearest major river in the wider project influence area. The project does not discharge untreated wastewater into any surface water body. All industrial and domestic wastewater will be treated through ETP and STP facilities to comply with DoE standards before reuse or controlled discharge.

Groundwater Environment

Groundwater is the primary source of water for industrial and domestic use in the project. The groundwater table exhibits **seasonal fluctuation**, with higher levels during the monsoon and lower levels during the dry season. Hydrogeological assessment indicates that groundwater abstraction at the proposed rate is within the sustainable yield of the local aquifer provided that abstraction is properly managed and monitored. A groundwater monitoring plan has been incorporated into the Environmental Management Plan (EMP) in line with WARPO requirements

Biological Environment

The project area does not fall within any Ecologically Critical Area (ECA), wildlife sanctuary, protected forest, or environmentally sensitive habitat. The biological environment within and around the project site is limited and mainly consists of Homestead vegetation Roadside plantation species, Common grasses and shrubs.

No endangered, rare or protected flora or fauna species were identified within the project influence area. The project activities are not expected to cause significant adverse impacts on local biodiversity.

Ambient air quality

Air quality in the project area has been measured during Environmental study. The air quality data measured 23 & 24 January 2026 for 8 hours at **study** area. It shows that SPM, PM₁₀, NO_x and SO₂ ambient concentrations are low compared to the GOB Air Quality Standard.

Noise level

The EIA Team (Environmental Team) has measured the sound level from 23 & 24 January, 2026 during day time. Noise quality has been measured instantly on the side by noise meter. At each location 8 to 10 times reading were taken for a day (24 hours/day) within project area. The data shows that the noise level is within limit of GOB (DOE) guidelines.

Flora and fauna

The project area is distributed with local common plant and animal species. High density of plant species in the homesteads is observed within 5km of the project site. Some aquatic plant species are distributed in the ponds, ditches and marshland area.

There are several native bird species in the project area. Many major canals, branch canals, ditches, ponds, streams are found across the study area which contains common fishes. Mammals and reptiles are very common in the project area. The environmental team interviewed with the local people and found that mongoose is rarely seen in the project area. It is noted that there is no endangered species in the project site.

Industries in the project impact area

The area has a significant industrial presence, including factories and production facilities. Prominent industries include RAK Print, Star Ceramic, Star Forsaline, Charu Ceramic, Square Textile & Denim, Pioneer Denim, and TK Group, showcasing the area's strength in manufacturing, ceramics, textiles, and printing

Public consultation

Public consultation was conducted in accordance with the Environmental Conservation Rules (ECR) 2023 and DoE guidelines to inform stakeholders about the proposed project. Local residents and community representatives generally supported the project due to expected employment and economic benefits. Concerns were raised regarding drainage, wastewater and solid waste management, groundwater use, and construction-related dust and noise. Concerns related to environmental pollution were addressed through commitments to effective wastewater treatment and environmental monitoring.

Socio-economic- Environmental Benefits

- Generation of foreign currency earnings through export of denim products
- Enhancement of national export competitiveness
- Creation of direct and indirect employment opportunities
- Support to local businesses, suppliers, and service providers
- Development of local infrastructure and utilities
- Increased revenue generation for the local municipal council
- Promotion of local economic growth and livelihood opportunities
- Efficient and planned utilization of natural resources
- Improvement of local aesthetics through site development and landscaping
- Contribution to overall eco-social development of the area
- Enhancement of national denim production capacity

- Support for sustainable and environmentally compliant industrial growth in the Habiganj region

Potential environmental impacts and mitigation measures:

Major environmental component that may be affected by the project activity is water, acoustic environment, air etc. Some of the major environmental impacts and proposed mitigation measure is shown below:

Affected Environmental Component / Concern	Anticipated Impact	Proposed/Implemented mitigation/ Enhancement Measures
Acoustic Environment	Noise pollution	<ul style="list-style-type: none"> ❖ Noise shielding by barriers or buildings ❖ Strict use of PPEs inside noisy areas ❖ Regular noise quality monitoring ❖ Awareness training.
Air Quality	Air Pollution	<ul style="list-style-type: none"> ❖ Proper management of solid waste ❖ Effective control of vehicular traffic ❖ Burning good quality fuel ❖ Awareness and training
Water Environment	Water pollution	<ul style="list-style-type: none"> ❖ Take care of ETP & STP of the project. ❖ Ensure proper sanitation facilities ❖ Increase awareness and training ❖ regular check plumbing system. ❖ Good water practice (3R) ❖ Ground water level Monitoring ❖ Technical Study for Surface/Ground Water in regular interval
Solid Waste Generation	Air, Water and Soil Pollution	<ul style="list-style-type: none"> ❖ Proper solid waste management system ❖ Sufficient number of waste handling bins ❖ Awareness and training ❖ Follow 3R strategy.
Traffic congestion		<ul style="list-style-type: none"> ❖ Traffic management plan should be Established. ❖ Everybody should abide by traffic rules ❖ Awareness and training

Environmental Management Plan

A comprehensive monitoring plan has also been suggested in the report. The present study found the adverse environmental impacts are totally manageable. Hence considering commitment from project authority to take any actions necessary to conserve environmental conditions at PDL is not imposing any adverse impact to the surrounding environment.

In order to minimize major adverse impacts, the following management plan have been developed

- Water and Wastewater Management; as 3R
- Noise Management Plan;
- Solid Waste Management Plan as 3R

Institutional Arrangement:

Institutional Arrangement (IA) has to be ensured for EMP implementation and for conducting meaningful environmental monitoring. Well defined roles and responsibilities and adequate institutional arrangements are central to the effective implementation of the environmental safeguard measures.

Environmental Monitoring Cost:

The achievement of environmental performance will be ensured through proper operation and maintenance of final design components and utilities. The associated costs will be integrated within the capital and operating budgets of the project.

Conclusions

The potential impacts related to wastewater discharge, solid waste generation, air emissions, and noise from the proposed project are largely reversible in nature, provided that appropriate mitigation measures such as effluent treatment, waste management, emission control, Occupational health and safety and noise abatement are implemented. Land and soil impacts are considered partly reversible, as soil quality can be restored through remediation measures; however, long-term contamination by persistent pollutants may cause localized irreversible effects. Overall, with proper environmental management, the project impacts are expected to be reversible and manageable

There would be a number of positive impacts of the project through employment generation, support to local industries, contribution to GDP, benefit to local economy and social implement.

Finally, it can be concluded that the location of Pioneer Denim Limited (Garment Division). is environmentally acceptable and it is expected that PDL will follow all environmental & social compatible steps during operation and maintenance by which it sets a positive example as an environment friendly area.

Chapter 1



1.0 Introduction & Project Background

Pioneer Denim Ltd (Garment Division) is part of the Badsha Group of Industries, one of the world's largest denim manufacturers. From spinning to weaving to garmenting, their vertically integrated setup delivers high-quality products while leading the industry in sustainable innovation.

Pioneer Denim Limited has been awarded as the world's largest LEED Platinum certified textile mill. Vertically integrated from fiber to fashion means that Pioneer Denim can deliver high-quality, top-notch innovations, competitive prices, short lead times and professional service to make the best possible commercial and sustainable product for your consumers.

In 1976, a vision was born: to build an industry that set new standards for innovation, quality, and sustainability. What began as a humble textile operation has grown into one of the largest and most diversified conglomerates in Bangladesh, specializing in Textiles and Ready-Made Garments.

For nearly five decades, Badsha Group have embraced our Bangladeshi production heritage, evolving beyond traditional manufacturing to create a fully integrated production ecosystem. From spinning the finest yarn to producing high-quality denim, knitwear, and garment accessories, every step of our journey reflects our dedication to craftsmanship and excellence.

The Badsha Group's commitment to innovation and sustainability has earned us numerous industry awards, recognizing our state-of-the-art technology, premium service, and high manufacturing standards.

PDL supreme service means we can deliver fast turnarounds, low minimums or high volumes, to suit your collection requirements. From yarn to finished garments, we uphold the highest international standards, delivering products that meet today's needs while paving the way for a more responsible future.

After getting the very good response and support from our valuable clients on dedication to quality and commitment to excellence the project proponent has decided to start a new unit name as Pioneer Denim Ltd (Garment Division). With a view to providing very high-quality product to the international market, PDL emerged in 2023 and has started manufacturing and exporting from same year. Having all vertical setups as a full denim project situated in a single 55-acre premise Finally getting goods response from its valuable clients by providing them denim fabrics & garments. It is the country's one of the few elite private sectors which not only

serves the international buyers with the height of professionalism but also contributes in terms of wealth, welfare and Eco-friendliness to its homeland. The industry has readymade garment section of its own named Pioneer Denim Ltd.

The proponent would like to setup a washing unit as well as increase production capacity for its own. The Production capacity of proposed washing unite will be 30000 pcs/day and is expected to reach up to 300000 pieces per day by 2028. The setup will be equipped with fully automated & most modern washing technology that assured the quality & efficient service. PDL will be fully compliant with international labor and environmental standards. Pioneer Denim Ltd (Garment Division) will safeguard the environment and fully treats all effluent.

It is well recognized that each industrial development has impacts on the natural environmental directly or indirectly. So, before taking up of any project, the environment aspects of the proposed development activities must be taken into consideration and due attention must be paid to protect the environment. The first step in this process is to identify the potential impacts of the project and evaluate the intensity of the impacts so that suitable effective measures can be taken in the early stage to mitigate adverse impacts. Here it is important point that from the beginning of factory the company is maintaining all the documents which requirement by the Government and International buyers.

The proposed project “Pioneer Denim Limited (Garment Division) including washing unit will be constructed at Horitola, Shahpur Bazar, Madhabpur, Habiganj.

1.1 Legislative Requirements

Environment Conservation Act, 1995 (ECA“95) is currently one of the main legislative documents relating to environmental protection in Bangladesh. Under this act, „No industrial unit or project shall be established or adopted without obtaining environmental clearance, in the manner prescribed by the rules, from Director General“. Compliance with the provision of this Act is the responsibility of Department of Environment (DOE). A set of the relevant rules to implement the ECA“ 95 had been promulgated in August 1997. On March 5, 2023, Environmental Conservation Rules 2023 has been enacted by the Bangladesh's Department of Environment, under Bangladesh Environment Conservation Act, 1995. The Rules are effective immediately by repealing the Environmental Conservation Rules 1997.

The rules mainly consist of:

- Categorized list (green, Yellow, orange and red) of the projects.
- Application format to take environmental clearance.
- Ambient standards in relation to water pollution, air pollution and noise, as well as permitted discharge/emission levels of water and air pollutants and noise by industries.

According to the Bangladesh Environment Conservation Rules 2023, Schedule-1 List of different categories of industrial establishments and projects (Note: Sub-rule (2) of Rule 5, proviso to Sub-rule (2) of Rule 5, Sub-rule (4) of Rule 12 and Sub-rule (3) of Rule 13) a washing project (Textile/clothing washing unit (daily production capacity above 15 tons) falls under the "Red category", for which carrying out an environmental Impact assessment (EIA) is mandatory for getting environmental clearance from the Department of Environment (DOE).

Being committed to environmental protection PDL from the beginning has taken positive actions to meet ECA, '95, ECR, '2023, and other environment protection rules and regulations. PDL has taken NOC for garments manufacturing (Memorial No.-22.02.3600.156.72.34.22-03 Date:15.01.2023) & ToR approval from DoE as per ECR 2023 to conduct EIA to get ECC including washing section. previous NOC & approved ToR of the proposed project attached in Annexure I & II.

1.2 Objectives of EIA Study

Proper location, process and waste abatement and control are very important for each development activities and environment. To ensure this Environmental Impact Assessment (EIA) is a very effective tool, which delineates what needs to be done to make a development activity suitably located and operated in an environment friendly way.

The overall objective of this EIA report is to identify major environmental impacts resulting from the implementation of the project and to recommend mitigation measures to avoid or reduce adverse environmental impacts and to enhance positive impacts. Briefly the specific objectives of this EIA are to:

- ✓ To assess the proposed environmental conditions of the project site and its adjacent areas in order to establish a baseline framework against which potential environmental impacts due to the implementation of the project would be compared.
- ✓ To identify and assess environmental impacts resulting from the project during its

development or future construction phase.

- ✓ To identify, and assess environmental impacts resulting from the project during its daily operational phase.
- ✓ To develop a well-balanced environmental management plan with recommendations for mitigating adverse impacts and enhancing positive impacts and outlining environmental monitoring requirements both during construction and operational phase of the project.
- ✓ To identify issues that may require further studies.

1.3 Scope of Work

Scope of study of EIA for the industrial project under the PDL is as follows:

- a) Categorization of the project according to ECR '2023
- b) Review of existing information (relevant all documents);
- c) Provide a full description of the project (such as project location, layout, components, construction materials, etc.);
- d) Provide a description of the environment (such as baseline data on physical, biological and socioeconomic characteristics of the construction site along with area of influence);
- e) Address occupational health and safety (H & S) requirements;
- f) Identify relevant stakeholders to be consulted during preconstruction, construction and operation phases of the project;
- g) Design and conduct a public consultation.
- h) Ensure that all provisions of GOB applicable policies are complied with,
- i) Devise a mitigation plan for all project-related impacts;
- j) Prepare EIA in accordance with the DoE guidelines;
- k) Development of an Environmental Management Plan; and
- l) Assess PDL institutional capacity to execute and monitor the EMP and recommend necessary institutional capacity building including additional professional for environmental Management.

1.4 EIA Study Methodology

Based on the above Scope of Work, the following steps are followed during the EIA process:

- Undertaking a rapid field survey toward collection of Social and Environmental information and data pertaining to the project area.
- Review of the previously conducted environmental studies in the project area
- collection involved identifying and collecting available published material and documents. Information on various environmental aspects (like soil, geology, hydrogeology, hydrology, drainage pattern, ecology etc.) meteorology, and socio-economic aspects from different government departments, institutions, literatures etc.
- Understanding the technical and environmental aspects of the project facilities;
- Identification of potential environmental impacts (along with residual impacts and cumulative impacts, if any) and
- evaluation of socio-economic consequences of such impacts.

Multiple data collection techniques are adopted to collect primary as well as secondary information required the preparation of EIA report. Detailed information about the project is gathered from published literature (on line) by PDL and from key individuals involved in the project.

Field visits were carried out by the EIA Team to obtain firsthand information on the surrounding environment of the project site. During this field visit, formal and informal discussions were carried out with people in and around the project site. Climatic data of the project area was collected from the Bangladesh Meteorological Department.

After evaluation of impacts, mitigation measures have been devised for all potential adverse impacts that could result from the proposed project activities. Mitigation measures have been developed separately for adverse impacts during construction and operation phases. Finally, an environmental management plan (EMP), including monitoring requirements, has been developed.

1.5 The EIA Team

The EIA is carried out by a team of consultants from the ATCL, The Consultant formed a multidisciplinary team of professionals having experience in conducting Environmental Impact Assessment in this type of project.

A group of multidisciplinary Specialists from PDL (Architect, Geotechnical Engineer, transportation expert) and field workers has assisted the study team.

Sl. No	Name of the Expert	Qualification	Position/Expertise	Year of Experience
1	Mohd. Mortuza Khan	Bachelor of Social Science Govt.BL University College. Khulna	Consultant CEO of ATCL.	Since 2008.
2	Md. Habib Ullah Bahar	BSc (Hons) MSc (Chemistry) NU MSc. Environmental Sciences & Management Jahangirnagar University GIS (Fundamental) Dhaka University Lead Auditor ISO 14001:2015 (EMS) ISO 45001:2018 (OHSMS)	Team leader EIA Consultant Env, Expert	17 years
3	Engr. Md Aktaruzzaman	BSc. Mechanical Engineer. KUET	Team Member & Consultant Waste water expert	23 years
4	Perves Ahmed	BSc.in Civil Engineering (AUST) MSc Environmental Sciences & Management Jahangirnagar University	EIA team member Civil Engineer	6 years
5	Manowara Khatun	MSc, (Botany) National University	EIA team member Biologist	8 years
6	Tamanna Akter	BSc (Hons) MSc (Math) Dhaka University	EIA team member Data analyst	8 years
7	Md. Shamsul Alom	Bachelor of Social Science	EIA team member Social compliance (RMG)	19 ears

1.6 Limitations

Services performed by the consultant are conducted in a manner consistent with that level of care and skill generally exercised by members of the engineering and consulting profession. The report may not exhaustively cover an investigation of all possible circumstances that may

exist. However, an effort is made to discover all meaningful areas under the stipulated time available.

In evaluating subject site, consultant relies in good faith on information provided by client's management or employees. The Consultant assume that the information provided is factual, accurate and accepts no responsibility for any deficiency, misstatement or inaccuracies contained in this report as a result of omission or misrepresentation of any person interviewed or contacted. However, the consultant notifies the contradictions and errors in the data, where it seems appropriate.

It should be recognized that the information given in the report is time specific and with the passage of time the relevancy of data and analysis may suffer. Specific circumstances and condition of site can change due to which conclusion and opinions may also change.

1.7 Acknowledgement

The EIA report has been prepared basically with the support from Pioneer Denim Ltd (Garment Division) authority and also from various government agencies including Bangladesh Meteorological Department (BMD), Soil Resource Development Institute (SRDI), Bangladesh Bureau of Statistics (BBS), Bangladesh Water Development Board (BWDB), Department of Environment (DOE) and Department of Agriculture Extension (DAE), Disaster Management, Bureau (DMB), Bangladesh etc.

Chapter - 2



*Policy and Legal
Consideration*

2.0 POLICY AND LEGAL CONSIDERATIONS

2.1 Introduction

Development projects are governed by some legal and institutional requirements. So, considerations of relevant legal provisions, policies, strategies and institutional issues are very important for any project proponent or developer before they actually execute a program or plan, and obviously at the operational stages of projects the no project can deny these rules which set the boundary limits for each project. The proponent has to be well aware of these requirements and comply with the provisions as applicable and necessary. The following sections review the relevant national legislations and policies along with some international laws.

2.2 Environmental Compliance, Bangladesh

Bangladesh is one of the least developed countries with a low resource base, a burgeoning population with a very low land-man ratio, often threatened by both natural & anthropogenic stresses. Like all other nations of the world Bangladesh also acted to the global call for the protection and conservation of natural environment & ecology. Industrial development significantly contributes towards economic growth of a country. It brings along with it a host of environmental problem too. It is increasingly being recognized in Bangladesh as in other part of the world that for development to be meaningful & sustainable over a longer period environmental concern must be integrated into all development policies.

The Ministry of Environment and Forest is the nodal ministry that supervises the implementation of environmental and forestry programs in Bangladesh. The Department of Environment (DOE) carries out policy analysis, planning and evaluation, program coordination, and monitoring and evaluation of the environmental programs. The Forest Department in the ministry deals with the forestry programs.

In Bangladesh, the environmental aspects of any project are mainly governed by: the Environmental Conservation Act, 1995, the Environmental Conservation Rules, 2023 and the Forest Act, 1927.

The requirement for undertaking environmental studies has been specified under the ECA, 1995 and the ECR, 2023. Section 12 of ECA, 1995 stipulates that "No industrial unit or project shall be established or undertaken without obtaining environmental clearance from the Director General, Department of Environment (DG, DOE) in the manner prescribed by the rules".

2.3 Relevant Major National Environmental Acts, Policies and Rules:

Including ECA, 1995 and the ECR, 2023, depending on applicability, the entrepreneur has to adhere to and may require taking approvals of other previous and existing policies, ordinances, acts and rules.

2.3.1 The National Conservation Strategy

National Conservation Strategy (Gob/IUCN, 1992) was drafted in late 1991 and submitted to the Government in early 1992. For sustainable development in industrial sector, the report offered various recommendations; some of those are as follows:

- Industries based on nonrenewable resources should be made to adopt technology which conserves raw materials, and existing industries should be given incentives to install technical fixes to reduce wastage rate
- All industries, especially those based on imported raw materials, should be subjected to EIA and adoption of pollution prevention/control technologies should be enforced.
- No hazardous or toxic materials/wastes should be imported for use as raw material.
- Import of appropriate and environmentally sound technology should be ensured.
- Complete dependence on imported technology & machinery for industrial development should gradually be reduced so that industrial development is sustainable with local skills and resources.

2.3.2 The National Environmental Management Plan (NEMP), 1995

The National Environmental Management Plan (NEMP) was developed as the framework of programs and interventions aimed at implementing NEP. Under this Plan, various program outlines were drawn up and activities incorporated. The main aims of the Plan were:

- ✓ Better management of scarce resources;
- ✓ Checking the rate of environmental degradation;
- ✓ Improving the natural and manmade environment;
- ✓ Conserving habitats and biodiversity;
- ✓ Promoting sustainable development; and
- ✓ Improving quality indicators of human life.

2.3.3 The Environmental Conservation Act, 1995

The Bangladesh Environmental Conservation Act of 1995, an umbrella legislation enacted to provide for conservation of the environment, improvement of environmental standards and control and mitigation of environmental pollution. The DOE was created under the Act. The provisions of the Act authorize the Director General (DG) of Department of Environment to undertake any activity he deems fit and necessary to conserve and enhance the quality of environment and to control, prevent and mitigate pollution.

The main provisions of the Act have been listed in table 2.1.

Table 2.1: Various Provisions of the Bangladesh Environmental Conservation Act, 1995

Section	provision
Section 3	A Department of Environment, headed by a Director General (DG), should be established by the government for carrying out the purposes of this Act.
Section 4	The powers and functions of the DG will include taking necessary measures for conservation and protection of environment and issuing directions to concerned persons, to be carried out within a specified time limit, including that of closure after sending a written notice.
Section 4a	The DG or any other authorized person may seek assistance from law-enforcing agencies in case of non-compliance with directions of closure. In such cases, the electricity, gas, telephone and water services for the non-compliant party can be discontinued.
Section 5	The government can declare an area ecologically critical, and issue a notice specifying the activities or processes that cannot be initiated or continued in it.
Section 6	This section specifies the restrictions regarding (a) vehicles emitting smoke injurious to environment and (b) manufacture, sale etc. of articles injurious to environment.
Section 7	The DG may seek compensation and/or corrective measures from the concerned person whose act/emission has caused direct/indirect injury to the ecosystem, failing which a civil suit and/or criminal case can be filed in a competent court.
Section 8	This section allows a person affected or likely to be affected by environmental pollution or degradation to apply to the DG for remedy.
Section 9	The person responsible and the person in charge of the place of occurrence of accidental pollution shall take measures to control or mitigate it, expenses for which are payable to the DG.
Section 10	Any person generally or specially authorized by the DG shall have the right to enter any building.

Section 11	A person authorized by the DG may, in the manner prescribed by rules, collect from any factory, premises or other place any sample of air, water, soil or other substance for analysis.
Section 12	An Environmental Clearance Certificate must be obtained from the DG for the establishment and undertaking of an industrial project.
Section 13	The government may formulate and publish environmental guidelines for conservation and improvement of environment and control and mitigation of pollution.
Section 14	This section allows a person aggrieved by a notice, order or direction issued under this Act to appeal to the appellate authority constituted by the government, within 30 days from its issuance.
Section 15	This section specifies the penalty to be paid for various offences.
Section 16	When a company violates any provision of this Act or fails to perform its duties in accordance with a notice issued under this Act or the Rules, it will amount to a violation.
Section 17	This section introduces the grounds for taking cognizance of an offence and claim for compensation by a court.
Section 18	An action taken by the government or the DG, which caused or is likely to cause injury to any person, cannot be legally contested, if taken in good faith.
Section 19	The government may delegate its powers to the DG, who may delegate his to any other officer of the department.
Section 20	The government is vested with the power to make various rules for carrying out the purposes of this Act.

Source: *The Bangladesh Environmental Conservation Act, 1995*

2.3.4 The Environmental Conservation Rules (ECR), 2023

The Environment Conservation Rules, 2023 are the latest set of rules promulgated under the Environment Conservation Act, 1995. ECR, 2023 provide additional guidance for specific components of the Act. The rules mainly consist of:

- ✓ The national Environmental Quality Standards (EQS) for ambient air, surface water, groundwater, drinking water, industrial effluents, emissions, noise and vehicular exhaust;
- ✓ Categorization of industries, development projects and other activities on the basis of pollution activities of the proposed or proposed industries/development projects/activities
- ✓ Procedure for obtaining environmental clearance;

- ✓ Requirement for undertaking IEE and EIA as well as formulating EMP according to categories of industries/development projects/activities;
- ✓ Procedure for damage-claim by persons affected or likely to be affected due to polluting activities or activities causing hindrance to normal civic life.
- ✓ The Rules incorporate "inclusion lists" of projects requiring varying degrees of environmental investigation.

Classification of industrial establishments and projects for the purpose of granting locational and environmental clearances. Industrial establishments and projects shall be divided into the following categories, namely

- (a) Green;
- (b) yellow
- (c) Orange
- (d) Red.

Green: Green class industrial establishments or projects shall mean all such industrial establishments or projects which have relatively little impact on the environment and human health and there is an opportunity to adopt environmental pollution mitigation measures for such industrial establishments or projects.

Yellow: yellow class industrial establishments or projects shall mean all such industrial establishments or projects which have a moderate impact on the environment and human health and to avoid such effects, these industrial establishments or projects need to take environmental pollution mitigation measures

Orange: Orange class industrial establishments or projects shall mean all such industrial establishments or projects which have substantial impact on the environment and human health, which need to be avoided for the purpose of environmental protection and the environmental impact of such industrial establishments or projects by adopting appropriate environmental pollution mitigation measures. must be reduced; And

Red: All industrial establishments or projects under the red category that have a severe impact on the environment and human health, which need to be avoided to an appropriate extent for environmental protection, and significant environmental pollution mitigation measures must be taken to reduce the environmental impact of those industrial establishments or projects.

Industries/development projects/activities which fall in RED category are those which may cause significant adverse environmental impacts and are therefore required to submit an EIA report. It should be noted that they might obtain an environmental site clearance on the basis of an IEE report,

and subsequently submit an EIA report for obtaining environmental clearance along with other necessary papers. Certain criteria and conditions have also been established by the Department of Environment (DOE) for siting an industrial plant or project. These are as follows:

- Location of the industry should be in an area that is/will be designated as an industrial zone, under the town and country planning regulations.
- While selecting sites for red and orange categories, a few considerations are to be kept in mind environmentally/ otherwise sensitive areas: nearest human settlement highway/railway boundary and high tide line (coastal regions) or natural/modified flood plain boundary.
- Forest land and prime agricultural land should be avoided as far as practicable.
- The plant should adequately provide for storage of solid wastes, treatment of wastewater, use of treated wastewater (if feasible) and a green belt around the perimeter.
- Highly polluting industrial plants should not be located in the vicinity of a recharge area/aquifer, catchment area of public water supply reservoir, habitat of an endangered species, areas prone to floods/earthquakes and areas of frequent inversions.
- Other factors also need to be considered like induced growth around the industrial site, views of the likely project-affected people, effects on availability of proposed infrastructural facilities to the local population, and assimilative capacity of the receiving body of water
- It is advisable to shortlist a few potential sites keeping in mind the above criteria, and then select a site with the minimal environmental impacts.

Environmental standards in operation in Bangladesh is also Promulgated under the Environment Conservation Rules 1997. There are standards prescribed for varying water sources, ambient air, noise, odor, industrial effluent and emission discharges, vehicular Emission etc.

The Bangladesh standards intend to impose restrictions on the volume and concentrations of wastewater/solid waste/gaseous emission etc. discharged into the environment. In addition, a number of surrogate pollution parameters like Biochemical Oxygen Demand, or Chemical Oxygen Demand; Total Suspended Solids, etc. are specified in terms of concentration and/or total allowable quality discharged in case of waste water/solid waste. Additionally, specific parameters depending on the manufacturing process are specified such as phenol, cyanide, copper, zinc, chromium etc. Air emission quality standards refer mostly to concentration of

mass emission of various types of particulates, sulfur dioxide, and oxides of nitrogen and in some cases volatile organic compounds and other substances.

The Bangladesh standards in general are less stringent compared to the developed countries. This is in view to promote and encourage industrialization in the country. The Bangladesh standards are not for any specific period of time. There is no provision for partial compliance too. Standards for Water, ambient air, noise and stack emissions etc. are shown in Table 2.2 to 2.6.

2.3.5 The Environment Court Act, 2000

This Act was enacted to provide for the establishment of environment courts. These courts have the power to impose whatever actions/restrictions/penalties they deem necessary for compliance with the objectives of the ECA. Further, any offence under the Act is treated in accordance with the Criminal Procedure Code, and the environment courts would be deemed to be criminal courts. However, in cases relating to compensation, the courts would follow the Civil Procedure Code and consequently, be deemed as civil courts. The environment courts also have the ability to convert fines into compensation.

2.3.6 National Environmental Policy (NEP), 2018

The National Environmental Policy (NEP) has been updated in 2018. The environmental policy is a comprehensive framework of environmental action, together with a set of broad sectoral action guidelines.

The objectives of the updated environmental policy are as follows:

- Natural equilibrium provision and overall development of the country through environmental protection and sustainable management;
- Spreading of adaptation programs to reduce the adverse effects of climate change in the country;
- Encouraging collection and promotion of low carbon emission technology in the country;
- Identifying and controlling all types of environmental pollution and degradation causing activities;
- Ensuring environmental improvement in all fields;
- Ensuring sustainable, long-term and environmentally friendly use of all-natural resources;

- Exploring and expanding the areas of mutual cooperation in the regional and international arena for the development of the global environment;
- Building the environmental education, capacity building, public awareness and public opinion to protect the environment;
- Considering public-private partnership for the development of the environment;
- Maintaining and streamlining the environmental policies and strategies among other policy strategies for the interest of sustainable development;
- Developing human resources capable of dealing with all kinds of environmental and environmental issues, including climate change;
- Ensuring Environmental Impact Assessment and Strategic Environmental Assessment in all necessary sectors;
- Discouraging the introduction of foreign and invasive species of animals and plants, if necessary, make decisions through adequate research;
- Getting involved with all international environmental initiatives and to take necessary actions at local and national levels;
- Taking action to reduce poverty through environmental protection; and
- strengthening observations on proper compliance with environmental rules and regulations.

The updated environmental policy includes twenty-four sectors and areas. They are:

- Land Resources Management
- Water Resources Management
- Air Pollution Control
- Safe Food and Water
- Agriculture
- Public Health and Health Services
- Accommodation, Housing and Urbanization
- Education and Mass Awareness
- Forest and Wildlife
- Biodiversity, Ecosystem Conservation and Biosafety

- Hill Ecosystem,
- Fisheries and Livestock
- Coastal and marine ecosystem
- Ecotourism
- Industrial Development
- Energy and Mineral Resources
- Communication and Transportation
- Human Resources Management
- Climate Change Preparedness and Adaptation
- Disaster Management
- Science, Research, Information and Communication Technologies
- Management of Chemical Substances
- Other Pollution Control
- Environment Friendly Economic Development, Sustainable Production and Consumption.
- It also provides implementation plan/activities for these sectors. The policy includes an outline of organizational set-up and national environmental policy compliance for different sectors.

2.4 Other Relevant Acts, Policies and Rules:

Any industry in the country is also required to comply with the industrial and export/import policy of the country. The industry is also required to comply with the Factories and Establishment Act and to undertake the license from concerned licensing authority. In addition to the above National rules and regulations PDL in its operational phase must comply with other national acts, policies and rules, some of those are as follows:

2.4.1 The Boilers Act 1923

This requires that, no owner of boiler shall use the boiler or permit it to be used, unless it has been registered in accordance with the provisions of this act. The Act mentions, among other things, that, the authorizing certificate ceases to be in force when any accident occurs to the boiler, when any structural alternation is made. The punishment is Taka ten thousand and may

be extendable to taka two thousand per day for the period of violation. The boiler user cannot use the boiler not rest without the certificate, but also at a higher pressure than allowed. The boiler owner is to inform the inspector within twenty-four hours in case of any accident.

The penal code 1860 (Chapter XIV of offences affective the public health, safety, convenience, decency and morals).

Article 277: Failing Water or public Spring or Reservoir-

Whoever voluntarily corrupts or fouls the water of any public spring or reservoir, so as to render it less fit for the purpose for which it is ordinarily used, shall be punished with imprisonment of either description for a term which it is ordinary used, shall be punished with imprisonment of either description for a term which may extend to three months, or with fine which may extend to five hundred taka or with both.

Article 284: Negligent Conduct with Respect to Poisonous Substance-

Whoever does, with any poisonous substance, any act in a manner so rash or negligent as to endanger human life, or to be likely to cause hurt injury to any person, or knowingly or negligently omits to take such order with any poisonous substance in his possession as is sufficient to guard against probable danger to human life from such poisonous substance, shall be punished with imprisonment of either description for term which may extend to sic months, or with fine, which may extend to one thousand taka, or with both.

“Article 285: Negligent Conduct with Respect to Fire or Combustible Matter-

Whoever does, with fire or any combustible matter, any act so rashly or negligently as to endanger human life, or to be likely to cause hurt or injury to any other person, or knowingly or negligently omits to take such order with any fire or any combustible matter in his possession as is sufficient to guard against probable danger to human life from such fire or combustible matter, shall be punished with imprisonment of either description for a term which may extend to six months, or with fine which may extend to one thousand taka, or with both.

Article 286: Negligent Conduct with Respect to Explosive Substance-

Whoever does, with fire or any explosive, any act so rashly or negligently as to endanger human life, or to be likely to cause hurt or injury to any other person, or knowingly or negligently omits to take such order with any explosive substance in his possession as is sufficient to guard against any probable danger to human life from that substance, shall be punished with imprisonment of either description for a term which may extend to one thousand taka, or with both.

2.4.2 The Factory Act 1965

This is an act to repeal and with certain amendments, re-enact the *Factories Act, 1934*.

This Act requires section 12(I) that “every factory shall be kept clean and free from effluvia arising from any drain privy or other nuisance and in particular accumulation of dirt and refuse shall be remove daily”. Section 13(I) specify that, “effective arrangement shall be made in every factory for the disposal of wastes and effluent due to the manufacturing process carried ion therein”.

Further section 14(I) mentions that, effective and suitable provision shall be made in every factory for securing and maintaining every work-room)

- a) Adequate ventilation by the circulation of fresh air, and
- b) Such temperature as will secure to worker therein reasonable conditions of comfort and prevent injury to health, and in particular
 - i) The walls and roofs shall be of such materials and so designed that such temperature shall not be exceeded but kept as low a practicable;
 - ii) Where the nature of the work carried on in the factory involves, or is likely to involve, the production of excessively high temperature, such adequate measures as are practicable, shall be taken to protect the workers therefore by separating the process which produces such temperature from the work-room by insulating the hot parts or by other effective means.

Section 15.1 of the Act stipulates,

- i) In every factory in which, by reason of the manufacturing process carried on, there is given off any dust or fume or other impurity of such a nature and to such and extent as is likely to be injurious or offensives to the workers employed therein, effective measures shall be taken to prevent its accumulation in any workroom and its inhalation by workers, and if any exhaust appliance is necessary for this purpose, it shall be applied as near as possible to the point of origin of the dust, fume or other impurity, and such point shall be enclosed so far as possible.
- ii) In any factory no stationary internal combustion engine shall be operated unless the exhaust is conducted into open air, and no internal combustion engine shall be operated in any room unless effective measures have been taken to prevent such accumulation

of fumes there from as are likely to be injurious to the workers employed in the work-room.

Further, section 17 asks for workspace requirement.

- 1) No work room in any factory shall be overcrowded to an extent injurious to the health of the workers employed there in.
- 2) Without prejudice to the generally of the provision of sub-section (1) there shall be provided for every worker employed in a work –room
 - a) At least three hundred fifty cubic feet to space in the case of a factory in existence on the date of the commencement of this Act; and
 - b) At least five hundred cubic feet of space in the case of a factory built after the commencement of this Act. In every factory
- i) Sufficient latrines and urinals of prescribed types shall be provided conveniently situated and accessible to workers at all times while they are in the factory In every factory the following shall be securely fenced by the safeguards of substantial construction which shall be kept in position while the parts of machinery required to be fenced are in motion or in use, namely
 - a) Every moving part of a prime mover, and every fly wheel connected to a prime mover;
 - b) The head face and tailrace of every water wheel and water turbine;
 - c) Any part of a stock bar which projects beyond the head stock of a lathe; and
 - d) Unless they are in such position or of such construction as to be as safe to every person employed in the factory as they would be if they were securely fenced
 - i. Every part of an electric generator. a motor or rotary converter;
 - ii. Every part of transmission machinery; and
 - iii. Every dangerous part of any machinery.

Where in any factory any manufacturing process produces dust, gas, fume or vapor of such character and to such extent as to be likely to explode on ignition, all practicable measures shall be taken to prevent any such explosion by

- a) Effective enclosure or the plant or machinery used in the process;
- b) Removal or prevention of the accumulation of such dust, gas, fume or vapor;
- c) Exclusion or effective enclose of all possible sources of ignition.

2.4.3 Forest Policy (1994)

The National Forest Policy of 1994 is the amended and revised version of the National Forest Policy of 1977 in the light of the National Forestry Master Plan. The major target of the policy is to conserve the existing forest areas and bring about 20% of the country's land area under the forestation Program and increase the reserve forest land by 10% by the year 2015 through coordinated efforts of GO-NGOs and active participation of the people.

Amendments of the existing laws (acts, rules and regulations) relating to the forestry sector and creation of new laws for sectoral activities have been recognized as important conditions for achieving the policy goals and objectives. The Forestry Policy also recognizes the importance of fulfilling the, responsibilities and commitments under International Conventions, Treaties and Protocols (ICTPs).

2.4.4 Groundwater Management Ordinance, 1985

The Groundwater Management Ordinance, 1985 regulates the installation and operation of tubewells and groundwater abstraction to prevent over-exploitation of aquifers. The Ordinance requires prior permission for deep tubewell installation and groundwater extraction in designated or restricted areas. It also empowers authorities to monitor abstraction rates and impose restrictions if adverse impacts such as groundwater depletion or interference with nearby wells are observed. Compliance with this Ordinance is essential for sustainable groundwater use associated with the proposed project.

2.4.5 National Water Policy (1999)

The *National Water Policy, 1999* emphasizes efficient and equitable use of water resources, protection of water quality, and sustainable management of surface and groundwater. The policy supports integrated water resources management and prioritizes water use for drinking, sanitation, agriculture, industry, and ecosystem needs. The proposed project aligns with the objectives of this policy by adopting water conservation measures and minimizing adverse impacts on local water resources.

2.4.6 Bangladesh Water Act, 2013

The *Bangladesh Water Act, 2013* provides the overarching legal framework for the integrated, equitable, and sustainable management of all water resources, including surface water and groundwater. The Act mandates prior approval for abstraction, use, diversion, and discharge of water, and emphasizes conservation of water bodies, maintenance of environmental flow, and

prevention of water pollution. It empowers the Government to regulate water use to prevent over-extraction and to protect public and ecological interests. In the context of this project, the Act requires assessment of water availability, evaluation of potential impacts on existing users, and implementation of mitigation and monitoring measures to ensure sustainable water resource management.

2.4.7 Bangladesh Water Rules, 2018

The *Bangladesh Water Rules, 2018*, formulated under the Bangladesh Water Act, 2013, provide detailed procedures for implementation and regulatory compliance. The Rules define the process for obtaining water use clearance, technical documentation requirements, and conditions related to abstraction, discharge, monitoring, and reporting. They also establish provisions for inspection and enforcement to ensure compliance with approved limits. For EIA purposes, the Rules guide the submission of hydrogeological data, water balance analysis, pumping test results, and monitoring plans to ensure that project activities do not adversely affect surrounding water resources or local communities.

Table 2.2: Standards for Inland Surface Water

	Best Practice based classification	PH	DO	BOD	NO3-N	NH4-N	PO4-P	Total Cr	Pb	Hg	Total Coliform number/100 ml	TDS	COD
1	Source of drinking water for supply only after disinfecting:	6.5-8.5	≥6	≤2	7.0	0.1	1.0	0.02	0.03	0.001	≤100	1000	10
2	Water usable for recreational activity	6.5-8.5	≥5	≥3	7.0	0.3	0.5	0.2	0.05	0.001	≥50	1000	10
3	Source of drinking water for supply after conventional treatment:	6-9	≥5	≤3	7.0	0.3	0.5	0.02	0.03	0.001	≤5000	1000	25
4	Water usable by fisheries:	6-9	≥5	≥6	7.0	0.3	0.5	0.05	0.1	0.004	≥5000	1000	50
5	Water usable by various process and cooling industries	6.5-8.5	≥1	12	-	2.7	-	0.1	0.1	0.05	-	1000	100
6	Water usable for irrigation:	6.5-8.5	-	≥12	5.0	1.5	2.0	0.1	0.1	0.002	≥50,000	1000	100

Source: Schedule 2, Environmental Conservation Rules, 2023

Notes:

1. In water used for pisi-culture, maximum limit of presence of ammonia as Nitrogen is 1.2 mg/l.
2. Electrical conductivity for irrigation water – 2250 μmhos/cm (at a temperature of 25°C); Sodium less than 26%; boron less than 0.2%

Table 2.3 Standards for Drinking Water

Sl.	Parameter	Unit	Standards
1	Aluminum	mg/L	0.2
2	Ammonia (NH ₃)	”	1.5
3	Arsenic	”	0.05
4	Barium	”	0.70
5	Benzene	”	0.01
6	Boron	”	1.0
7	Cadmium	”	0.003
8	Calcium	”	75
9	Chloride	”	250*
10	<i>Chlorinated alkanes</i>	”	
11	<i>Chlorinated phenols</i>	”	
12	Chlorine (residual)	”	0.2
13	Chloroform	”	0.09
14	Chromium (total)	”	0.05
15	Coliform (fecal)	n/100 ml	0
16	Coliform (total)	n/100 ml	0
17	Color	Hazen	15
18	Copper	mg/l	1.5
19	Cyanide		0.05
20	Fluoride	”	1
21	Hardness (as CaCO ₃)	”	500
22	Iron	”	0.3 – 1.0
23	Kjeldahl Nitrogen (total)	”	1
24	Lead	”	0.01
25	Magnesium	”	30 – 35
26	Manganese	”	0.4
27	Mercury	mg/l	0.001
28	Nickel	”	0.05
29	Nitrate	”	45
30	Nitrite	”	1
31	Odor	”	Odorless
32	Oil and grease	”	0.01
33	pH	”	6.5-8.5
34	Phenolic compounds	”	.002
35	Potassium	”	12
36	Radioactive materials(gross alpha	Bq/l	0.1
37	Radioactive materials(gross beta	Bq/l	1.0
38	Selenium	mg/l	0.01
39	Silver	”	0.02
40	Sodium	”	200
41	Suspended Solid	”	10
42	Sulfide	”	0.5
43	Sulfate	”	250
43	Total dissolved solids	”	1000
44	Temperature	°C	20-30

45	Tin	mg/l	2
46	Turbidity	JTU	5
47	Zinc	mg/l	5
48	Aldrin/Dieldrin	Microgram	0.03
49	Anionic detergents	mg/l	0.2

Table 2.4 Standards for Sewage Discharge

Parameters	Unit	Number per 100 ml
Temperature	Degrees centigrade	30
pH	-	6-9
BOD	mg/l	30
COD	mg/l	125
Suspended solids (SS)	mg/l	100
Oil & Grease	mg/l	10
Nitrate	„	50
Phosphate	„	15
Coli form	Number per 100 ml	1000

Source: Schedule 3, Environmental Conservation Rules, 2023

Notes: • This limit shall be applicable to discharges into surface and inland waters bodies.

• Sewage shall be chlorinated before final discharge.

Table 2.5: Standards for Sound

S.	Category for sound	Standards determined	
		Day	Night
a.	Silent Zone (Sensitive areas such as parks, school,	45	35
b.	Residential areas	50	40
c.	Mixed areas (mainly residential area, and also	60	50
d.	Commercial areas	70	60
e.	Industrial areas	75	70

Source: Schedule 4, Environmental Conservation Rules, 1997

Notes:

1. The time from 6 a.m. to 9 p.m. is counted as daytime.

2. The time from 9 p.m. to 6 a.m. is counted as night time.3. Area up to a radius of 100 meters around hospitals or educational institutions or special institutions/establishments identified/to be identified by the Government is designated as Silent Zones where use of horns of vehicles or other audio signals, and loudspeakers are prohibited.

Table 2.6: Ambient Air Quality Standards

Sl.	Air pollutant	Standard	Average Time
a.	CO	05 mg / m ³ ⁽¹⁾	8 hours
		20 mg / m ³ ⁽¹⁾	1 hour
b	pb	0.25 µg / m ³ ⁽²⁾	Yearly
		0.50 µg / m ³ ⁽¹⁾	24 hours
c	NO ₂	40 µg / m ³ ⁽²⁾	Yearly
		80 µg / m ³ ⁽¹⁾	24 hours
d	PM ₁₀	50 µg / m ³ ⁽²⁾	Yearly
		150 µg / m ³ ⁽¹⁾	24 hours
e	PM _{2.5}	35 µg / m ³ ⁽²⁾	Yearly
		65 µg / m ³ ⁽¹⁾	24 hours
f	O ₃	180 µg / m ³ ⁽¹⁾	1 hour
		100 µg / m ³ ⁽¹⁾	8 hours
g	SO ₂	250 µg / m ³ ⁽¹⁾	1 hour
		80 µg / m ³ ⁽¹⁾	8 hours
h	NH ₃	100 µg / m ³ ⁽²⁾	Yearly
		400 µg / m ³ ⁽¹⁾	24 hours

Source: Schedule 1, Air Pollution (Control) Rules, 2022

Note: * Air quality in this table means Ambient Air Quality Standards).

(1) shall not exceed more than once in an average year.

(2) The target will be achieved when the annual average is within the prescribed standard.

2.4.8 Bangladesh National Building Code (BNBC), 2020:

Buildings, be it for housing, industry, education, health care or any other use, constitute the major part of construction for physical infrastructure development of the country. A substantial portion of national resource is invested in building construction in both public and private sectors. In order to ensure optimum return of this investment and to achieve satisfactory performance of the building in terms of safety, serviceability, health, sanitation and general welfare of the people, building construction needs to be controlled and regulated.

With a view to bringing in control and ensuring a uniform standard of building construction practice in the country, the Bangladesh National Building Code (BNBC) was prepared in 1993 under the aegis of the Ministry of Housing and Public Works. BNBC is a 1000-page detailed document specifying safe and acceptable practices in all aspects of building design and construction for various uses or occupancy. Government promulgated Building Code as legally binding on all concerned by S.R.O. No. 84-Law/2006 dated 22 May 2006 published in the Bangladesh Gazette on 15 November 2006.

In the light of the advancements in engineering and technology that has meanwhile taken place and the changed socio-environmental scenario in the country, the Building Code prepared in

1993 needs updating and revision to keep pace with time. The need has become especially significant in view of the fact that the Building Code is now the law of the land, and no more a reference document. An outdated law cannot achieve its intended purpose.

The main objective of the project is to revise and update the provisions of the Bangladesh National Code to keep pace with present needs. The work will comprise the following three components:

Review, revision and updating of the Bangladesh National Building Code 1993 to bring it at par with the present state-of-the-art paying due consideration to local needs and practices. Review of Building Construction Act 1952 with the latest amendments and preparation of draft of an amended/updated version of the Act for consideration of enactment by competent authority.

Review of present administrative arrangement for implementing the provisions of Building Construction Act at various levels, rural, union, upazila, district and metropolitan, for both private and government developments. Recommendation of an effective yet achievable administrative arrangement to ensure compliance of the Building Construction Act at all levels.

Bangladesh National Building Code (BNBC) prepared in 1993 has ten distinct parts addressing different aspects of building construction and building services.

Part 1: Scope and Definitions

Part 2: Administration and Enforcement

Part 3: General Building Requirements, Control and Regulation

Part 4: Fire Protection

Part 5: Building Materials

Part 6: Structural Design

Part 7: Construction Practices and Safety

Part 8: Building Services

Part 9: Alteration, Addition to and Change of Use of Existing Buildings

Part 10: Signs and Outdoor Display

A building code is a set of rules that specify minimum standards for the construction of buildings. Buildings must conform to the code to obtain permission from the regulatory authority, usually from a local government body. The purpose of the code is to establish minimum standards for design, construction, quality of materials, use and occupancy, location and maintenance of buildings in order to safeguard, within achievable limits, life, limb, health,

property and public welfare. The building code becomes law of a particular jurisdiction when formally enacted by the appropriate governmental authority.

Building codes are generally intended to be applied by architects, engineers, interior designers, constructors and regulators but are also used for various purposes by safety inspectors, environmental scientists, real estate developers, subcontractors, manufacturers of building products and materials, insurance companies, facility managers, tenants and others. Codes regulate the design and construction of structures were adopted into law. In Bangladesh, building codes are developed by the government agencies and then enforced across the country by the government.

The first Bangladesh National Building Code was developed in 1993 and was enacted in 2006 followed by amendment of the Building Construction Act-1952. As a living document, the building code needs to be updated periodically within an interval of 4-5 years. The developed and enacted BNBC has already been updated.

Government promulgated Building Code as legally binding on all concerned by S.R.O. No.55-Law/2020. dated 18-02-2020 published in the Bangladesh Gazette on 11 February 2021.

Some important topics that BNBC 2020 code has touched upon are:

- ‘Outline of Bangladesh Building Regulatory Authority (BBRA)’ in the chapter ‘Organization and Enforcement’
- Table on ‘Jurisdiction of Building Officials of Designated Offices/Authorities’
- Table on ‘Eligible Registered Professionals for Signing Design, Drawings/Documents’
- Chapter on ‘Energy Efficiency and Sustainability’
- Chapter on ‘Maintenance Management, Repairs, Retrofitting and Strengthening of Buildings’
- Chapter on ‘Rainwater Management’
- Chapter on ‘Steel-Concrete Composite Structural Members’
- Chapter on ‘Bamboo Structures’
- ‘Universal Accessibility’ as appendix

- Revised figure on ‘Basic Wind Speed Map’
- Revised figure on ‘Seismic Zone Bangladesh’

2.4.9 Fire Prevention and Extinction Act- 2003

The legislated are as follows:

1. This act will be referred to Fire Prevention and Extinction Act, 2013.
2. Definition:
3. Keeping firefighting brigade:
4. License of warehouse and workshop:
5. Cancellation of license, etc.:
6. License is not transferable:
7. Plan approval of Multistoried or commercial building, etc.:
8. Rules regarding existed multistoried or commercial building:
9. Apply some power at the time of fire extinction:
10. Serving due to pay of service charge:
11. Forbidden of using water to the fire extinguishing works:
12. Entrance etc. power:
13. Investigation of the Fire Catching etc.
14. Aid giving organization with the assistance co-operation of the Brigade:
15. Member of the Department not treat as a labor:
16. Public Serving:
17. Punishment due to break of the rules of section
18. Punished due to not maintain terms of the License:
19. Officer and employee of the department and in the section
20. Not to make punishment and such kinds of punishment:
21. Reservation of Fire materials, processing, sorting and reduction etc. punishment:
22. Compensation etc. demand is non-acceptable:
23. Occurrence of crime by the company:

The Fire Prevention and Extinction Act 2003 come in year 2003. The Act mentioned the provisions for all the buildings, including high-rises and commercial establishments, to have sufficient firefighting equipment and confirm the measures of public security.

The rules mentioned that buildings must have an emergency exit, elevator and emergency electricity supply. Also, each of the high-rise must have an individual control room and gas and heat detection system. According to the rules, every high rise must have some trained employees to operate the equipment's in case of fire occurrence.

In addition, this fixes up some standards, requirements and location of an emergency exit at the individual building level and also provides the option to keep the directional marking to the emergency exist.

2.4.10 Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2008 and revised in 2009

This action plan addresses the following strategies

- Food security, social protection and health to ensure that the poorest and most vulnerable in society, including women and children, are protected from climate change. All programs focus on the needs of this group for food security, safe housing, employment and access to basic services, including health.
- Comprehensive disaster management plan to further strengthen the country's already proven disaster management systems to deal with increasingly frequent and severe natural calamities.
- Research and Knowledge management to predict the likely scale and timing of climate change impacts on different sectors of the economy and socioeconomic groups; to underpin future investment strategies, and to ensure that Bangladesh is networked into the latest global thinking on climate change.
- Mitigation and low carbon development to evolve low carbon development options and implement these as the country's economy grows over the coming decades.
- Capacity building and Institutional strengthening to enhance the capacity government ministries, civil society and private sector to meet the challenge of climate change

2.4.11 National Land-use Policy, 2001

The Government of Bangladesh has adopted national Land use Policy, 2001. The salient features of the policy objectives relevant to the proposed policy are as follows:

- To prevent the current tendency of gradual and consistent decrease of cultivable land for the production of food to meet the demand of expanding population;
- To ensure that land use is in harmony with natural environment;
- To use land resources in the best possible way and to play supplementary role in controlling the consistent increase in the number of lands less people towards the elimination of poverty and the increase of employment;
- To protect natural forest areas, prevent river erosion and destruction of hills;

- To prevent land pollution; and
- To ensure the minimal use of land for construction of both government and nongovernment buildings.

2.5 Other relevant policies, Act, Rules, Regulation

The Summary of Applicable Environmental Regulations of Govt relating to the project are presented in table-2.7

Table 2.7: Applicable Environmental/Others Regulations of Govt

SI No	Applicable Regulations	Key Features
1	Land Management Manual 1990	<p>Sections 326 and 327 of the Land Management Manual 1990.</p> <p>Deputy Commissioner (DC) permission is required for certain changes in land use and transactions to ensure proper land administration and protection of government interest. Sections 326 and 327 of the <i>Land Management Manual, 1990</i> govern this approval.</p> <p>Section 326 – Requirement of DC Permission This section stipulates that prior permission of the Deputy Commissioner is mandatory for:</p> <ul style="list-style-type: none"> • Change of land use (e.g., agricultural land to non-agricultural/industrial/housing use). • Transfer, lease, or conversion of specific categories of land, especially: <ul style="list-style-type: none"> ○ Government land (Kha’s land) ○ Leased land ○ Land within notified/controlled areas • Development projects (housing, industrial, commercial) where land classification or use is altered. <p>The objective is to ensure that land use complies with approved planning norms, revenue records, and public interest.</p> <p>Section 327 – Procedure for Granting Permission Applicability to the Project: Project proponent has taken permission for the use of agricultural land for non-agricultural purposes from DC office.</p>

2	Bangladesh Labor Act, 2006 and Rules, 2015	<p>This Act applies to the proposed project as it will involve a major construction and erection of structures. The occupational health and safety of the workers is covered under this Act. It is mandatory for every establishment to keep its workers abreast of work risk(s) through by providing all workers with personal protection equipment.</p> <p>The Labour Law 2006 does not permit any children under the age of 14 years to work. The Bangladesh Labor Act 2006 consolidated and repealed 25 previous labor-related laws, including the Dock Laborers Act, 1934, the Factories Act, 1965, among others.</p> <p>Applicability to the Project: The project will comply with the requirements of Labor Act 2006 and Rules 2015 accordingly.</p>
3	Ozone Depleting Substances Rules (2004)	<p>Addresses issues related to Green House Gas (GHG) emission by phasing out the use of Ozone-depleting substances and ultimately banning the use of Ozone-depleting substances.</p> <p>Applicability to the Project: Use alternate material for CFC</p>
4	National Biodiversity Strategy and Action Plan (2004)	Conserve, and restore the biodiversity of the country; Maintain and improve environmental
5	Solid Waste Management Rules, 2021	<p>The Solid Waste Management Rules, 2021 provide the legal framework for environmentally sound collection, segregation, transportation, recycling, treatment, and disposal of solid waste in Bangladesh. The Rules mandate waste segregation at source, preparation of solid waste management plans, and application of the 3R principles (Reduce, Reuse, Recycle). They also introduce Extended Producer Responsibility (EPR) and define compliance, monitoring, and penalty provisions to prevent environmental pollution and protect public health.</p> <p>The project will comply with 3R strategy.</p>
6	National 3R Strategy	

2.6 Location Clearance and Environmental Clearance Procedure in Bangladesh

Only the DG, DOE has the authority to directly issue an Environmental Clearance Certificate (ECC). The project proponent should apply to the concerned Divisional Officer of the DOE along with the appropriate fee (as specified in Schedule 6 of ECR 2023). The general procedures for getting ECC are shown in figure 2.1. For new environmental certificate issue procedure may be fixed after discussion with DOE.

Under the Environmental Conservation Act (1995) and Rules (2023), the project will be required to obtain a site clearance as well as an environmental clearance. The procedure for obtaining environmental clearance is given in the Figure bellows.

The proposed project has been planned and will be implemented in full compliance with the *Environmental Conservation Act, 1995, Environmental Conservation Rules, 1997, Bangladesh Water Act, 2013, Bangladesh Water Rules, 2018*, and other applicable national & international Act, Rules, policies. All required permits and clearances will be obtained prior to project implementation, and environmental management and monitoring measures will be implemented to ensure sustainable and environmentally sound project operation.

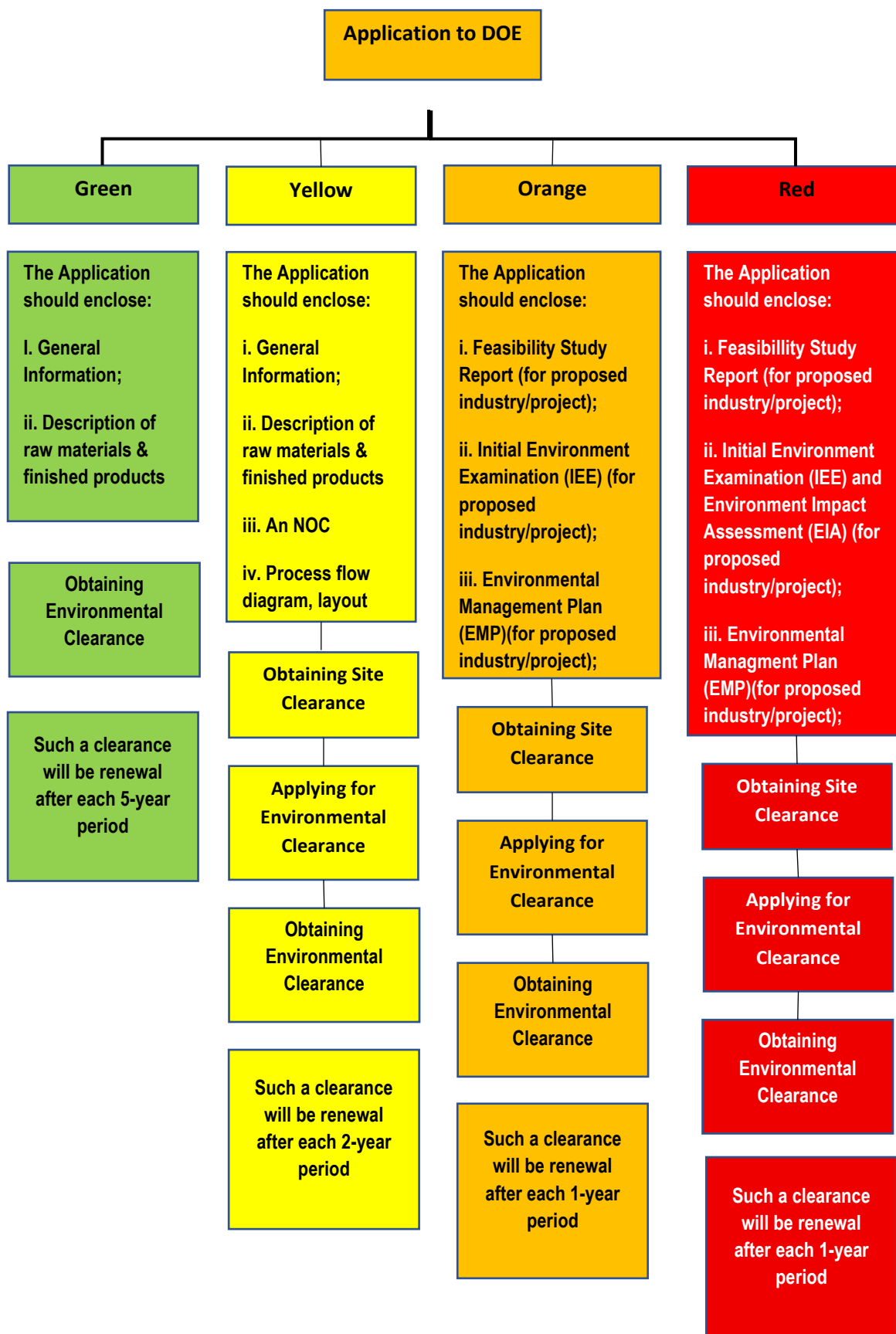


Figure: 2.1 Process of Getting Environmental Clearance Certificate



Chapter 3

Description of the Project

3.0 DESCRIPTION OF THE PROJECT

3.1 Project Definition

Pioneer Denim Limited (Garment Division) is a reputed manufacturer of 100% export-oriented denim garments industry.

The proposed project “Pioneer Denim Limited (Garment Division) including washing unit will be constructed at Horitola, Shahpur Bazar, Madhabpur, Habiganj, the project is a denim composite vertically integrated with its state-of-the-art denim fabric to garment manufacturing facilities. It's located on 55 acres of land. At present 4200 employees are engaged in the company. There are 22 buildings and 13 sheds, some of which are under construction. This is a smart and strategic move often called "Backward Vertical Integration" in the textile industry.

The project will directly support the Government of Bangladesh's industrial development goals under the National Industrial Policy, Export Growth Strategy, and Vision 2041, which emphasize value-added manufacturing, backward linkage industries, and diversified export products. Establishing this facility is strategic due to its strong connectivity, availability of skilled labor, and compatibility with surrounding land uses.

Pioneer Denim Limited (Garment Division) facilitates cutting, printing/embroidery, sewing, washing for 30000 pieces per day and is expected to reach up to 300000 pieces per day by 2028.

Pioneer Denim Limited (Garment Division) has a world class production unit including one of the largest biological ETP plants in Bangladesh with a capacity of 21600 m³/per day (Partially operational and under construction).

Statement of Need

The proposed establishment of Pioneer Denim Ltd (Garment Division). is essential to meet the growing national and international demand for high-quality denim fabric. Bangladesh's textile and garments sector is a cornerstone of the national economy, contributing significantly to GDP, employment, and export earnings. With global buyers increasingly seeking reliable, sustainable, and high-capacity denim suppliers, there is a pressing need to expand modern production facilities equipped with efficient technology and robust environmental management systems.

The facility has existing list of buyers is a major asset and a core reason for the expansion of RMG Sector. The vertically integrated model attracts larger international brands that prioritize reliability, speed, and transparency in their supply chain. Many buyers prefer a "one-stop-shop" supplier who can handle the entire order from raw material to finished product.

In addition to economic gains, the project fulfills a critical need for environmentally responsible textile manufacturing. The integration of a modern Effluent Treatment Plant (ETP), emission control systems, and sustainable resource management ensures compliance with DoE standards and demonstrates commitment to reducing the environmental footprint of textile production.

The benefits of the proposed project

- Earn foreign currency
- Strengthen export competitiveness
- Creation of jobs
- Support of local businesses;
- Infrastructure development;
- Revenue to Local Municipal Council
- Generate substantial employment and local economic development
- Proper utilization of natural resources
- Beautification of locality
- Overall Eco social development
- Enhance national production capacity for denim
- Support sustainable, compliant industrial growth in Habiganj region

3.2 Location of the project

The proposed project "Pioneer Denim Limited (Garment Division) including washing unit will be constructed at Horitola, Shahpur Bazar, Madhabpur, Habiganj. The project site is located at 24°13'36.58"N, 91°21'53.67"E in Sylhet Division. The project site is about 112 KM away from Osmani International Airport Sylhet Hwy/AH1/AH2/N2 & Chattogram Sea port 263 KM (Via N1). From Sylhet city the project is about 104 Km (via Dhaka-Sylhet Hwy/AH1/AH2/N2). The Khowai River is the nearest major surface water body which is 2.5–3.5 km (General direction from project site: North-west) away from the project. Dhaka – Sylhet National Hwy Just Eastern side of PDL.

Copper tech Industries Ltd, Dharmandal Union Council, Habiganj Gas Field, Kalikapur Hospital, Raghunath Pahar, Railway Station, Shahjibazar 330 MW Power Plant, STAR Ceramics Ltd Factory, Shahaji Bazar, Star (ARIANE) Porcelain Limited, Nahid fine Tex Limited. Within 3 KM of the project

3.3 Basic Information of the Project

The proponent has taken NOC from Local Authority, Fire Service and Civil Defense, Gas Transmission and Distribution System are available at the site. Thus, all infrastructural facilities have been materialized there. The EIA Report of the PDL presented here primarily focuses on impacts resulting from the construction, and future operation of project facilities on the surrounding environment. Basic information of the project is shown in Table 3.1.

Table 3.1: Basic Information of the project (PDL).

1. a. Name of the project:	Pioneer Denim Limited (Garment Division)
b. New Proposed Units	100% export-oriented denim garments including washing unit.
c. Contact Person:	Md. Badsha Mia (Managing Director)
2. a. Project Location:	Horitola, Shahpur Bazar, Madhabpur, Habiganj, Sylhet-3333
3. Project value:	500 crore Taka
4. Year of Establishment	2023
5. a. No. of Employees:	4200
b. Employees Engaged in Environmental Management	10
6. Total Land Area	2428946 SFT
A Total covered area	1249806 SFT
B. Total green Area	593152 SFT, Road-585988 SFT
7. Type of Industry:	100% export-oriented Manufacturing
8. Category:	Red
9. Land use by surroundings:	Mixed Zone
10. Product	Denim garments
11. Washing Capacity (Proposed):	Denim garments: 300000 Pcs/day

12. a. Daily Water Requirements:	Production :1250 m ³ /day (Existing Use), 18000 m ³ by 2027. Domestic: 100 m ³ /day (Existing Use), 300 m ³ by 2027. Utility: 150 m ³ /day (Existing Use), 550 m ³ by 2027.
b. Source:	Ground Water, Own Deep Tube well. (10 No)
13. a. Amount of Wastewater (effluent):	18300 m ³ /day (approx.) during full operation.
b. Mode of Wastewater Treatment:	Biological ETP/STP
c. ETP Capacity.	21600m ³ /day (900 m ³ /hr.)
14. Power Requirements: Generator Capacity	1350 Kwh 1500 kw 5 no's
15. Boiler capacity	15.5-ton 4 no's
16. WTP Capacity	7200 m ³ /day.
17. STP capacity	1200 m ³ /day (Proposed)
17. Fire reservoir	Natural pond within project 7 adjacent to the project
18. Gas Consumption	1240m ³ m ³ /day
19. Management of Occupational Health Hazard:	Workers are provided with safety cloths and medical facilities. Make the workers aware of hazardous materials and proper handling methods. Provide PPE. Provide musk, aprons, ear plug and hand gloves to the workers. Provide regular health inspection among workers. promote
20. Disaster Management Plan:	Emergency routes with fire hydrants and fire safety equipment like fire extinguisher & firefighting system. Sufficient water reservoir, hose pipe and fire extinguisher are set up for factory area. Install LPS (If required).

Trade, Fire, Factory license and NOC from local authority attached in **Annexure III-VI**.

3.4 Project components

Pioneer Denim Limited (Garment Division) is a fully-fashioned High-Tec denim composite vertically integrated with its state-of-the-art denim fabric to garment manufacturing facilities. The major infrastructures within the complex include: Administration / Office, Production Floor, Solid Waste Storage, Day Care Center, Effluent Treatment Plant, Water Treatment Plant, utility building etc.

The factory area is about 55 acr. The building and other civil works of the project will comprise of the following:

Table 3.2: Project component

SL NO	NAME OF BUILDING	NO OF FLOORS	COVERED AREA (SFT)
1	R & D Building (6 Storied)	6	37789
2	Gate Building-01 (2 Storied)	2	2899
3	Admin Building (7 Storied)	7	14271
4	RMS Shed-01	1	937
5	Gate Building-02 (2 Storied)	2	1615
6	RMS Shed-02	1	937
7	Cutting-Sewing Building (7 Storied)	7	82905
8	Finishing Building (7 Storied)	7	72254
9	Accessories Store Building (5 Storied)	5	26487
10	Chemical Store Building (5 Storied)	5	21746
11	Water Treatment Plant (WTP)-01	1	6860
12	Fire Pump & Fire House	1	4196
13	Rain Water Harvesting-01	1	6135
14	Washing Shed-01 & Single Storied RCC Building	1	160343
		1	31836
15	Washing Shed-02 & RCC Mezzanine	1	14973
		1	110233
16	Dry Process Shed & 2 Storied R&D	1	92230
		2	18033
17	Water Treatment Plant (WTP)-02	1	8126
18	Generator & Chiller Building-02 (2 Storied)	2	34721
19	Rain Water Harvesting-02	1	44385
20	Canteen Building-01 (5 Storied)	5	9045
21	Generator & Chiller Building-01 (2 Storied)	2	25460
22	Proposed Parking Shed	1	14538
23	Proposed Dye Process Building (5 Storied)	5	35852
24	Proposed Gate Building-04 (2 Storied)	2	1615
25	Officers Quarter (6 Storied)	6	14859
26	Medical & Training Center (2 Storied)	2	4972
27	Child Care Building (2 Storied)	2	2947
28	Embroidery Shed	1	10822
29	Workshop Shed	1	20106
30	Effluent Treatment Plant (ETP)	1	113000
		1	35366
31	Warehouse Building (6 Storied)	6	29223
32	Gate Building-3 (4 Storied)	4	6535
33	Proposed Production Building (7 Storied)	7	86089
34	Wastage Godown Shed	1	31258
35	Godown Shed	1	14208

SL NO	NAME OF OCCUPANCY	TOTAL COVERED AREA (SFT)
1	Internal Road / Passage Area	585988
2	Green Area	593152
(B) Total Open Area		1179140
SL NO	NAME OF THE PARTICULARS	TOTAL AREA (SFT)
1	(A) Total Covered Area	1249806
2	(B) Total Open Area	1179140
Total Land Area		2428946

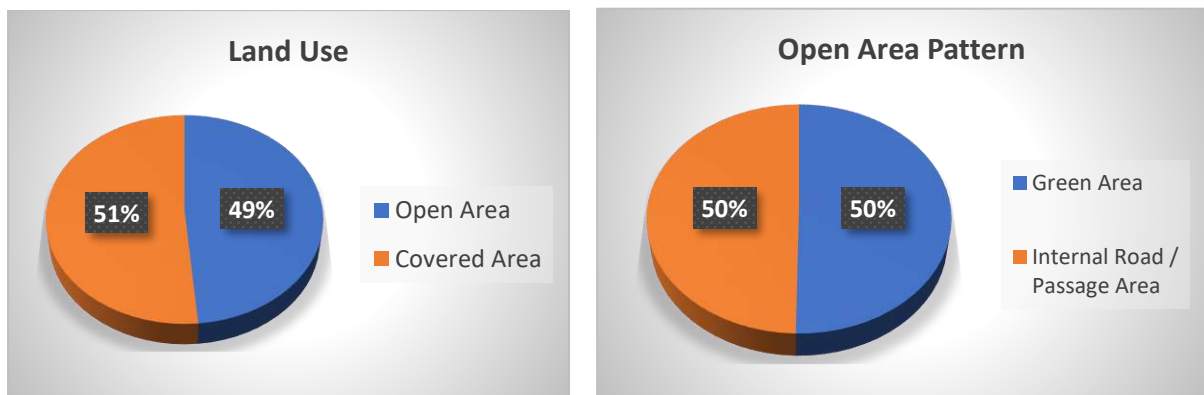


Figure:3.1: Land use status of the project

Master layout plan attached in Annexure IX.

FACTORY MASTER LAYOUT
PIONEER DENIM LIMITED (GARMENT DIVISION)
Horitola, Shahpur Bazar, Madhabpur,
Habiganj, Bangladesh



Figure:3.2 Master Layout Plan

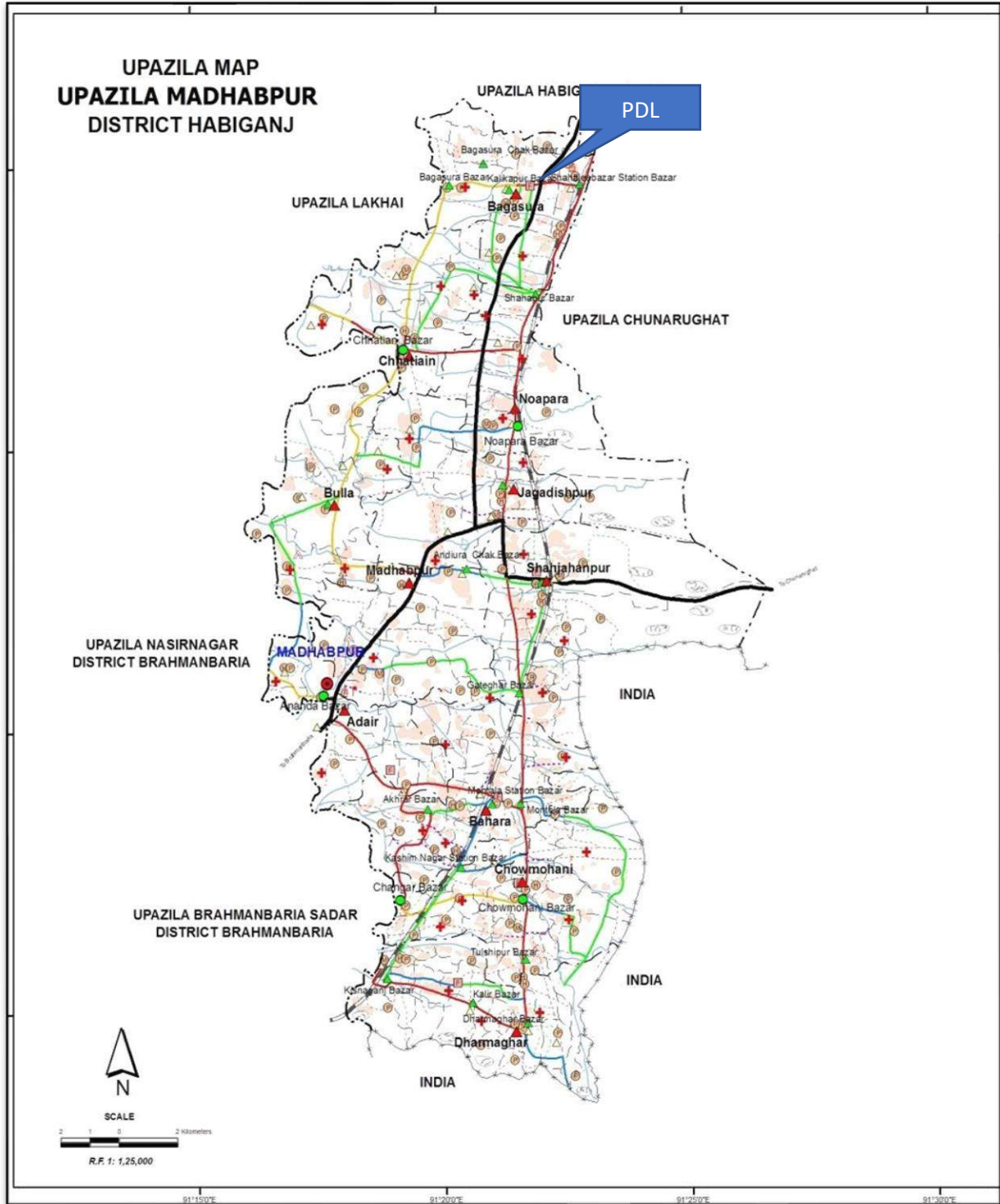


Figure 3.3 – Location map of the project (Upazila Map)

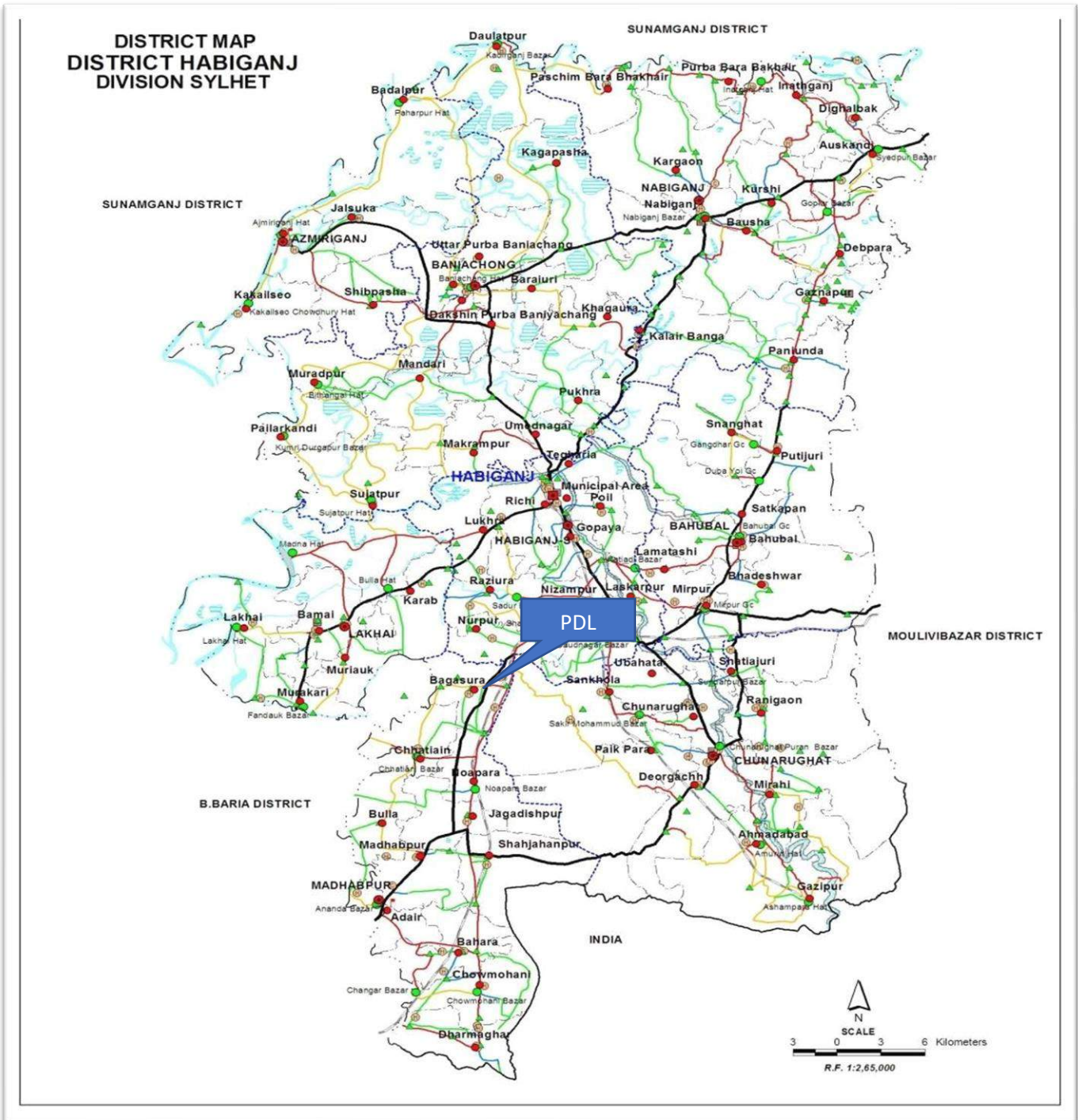


Figure 3.4 – Location map of the project (District Map)

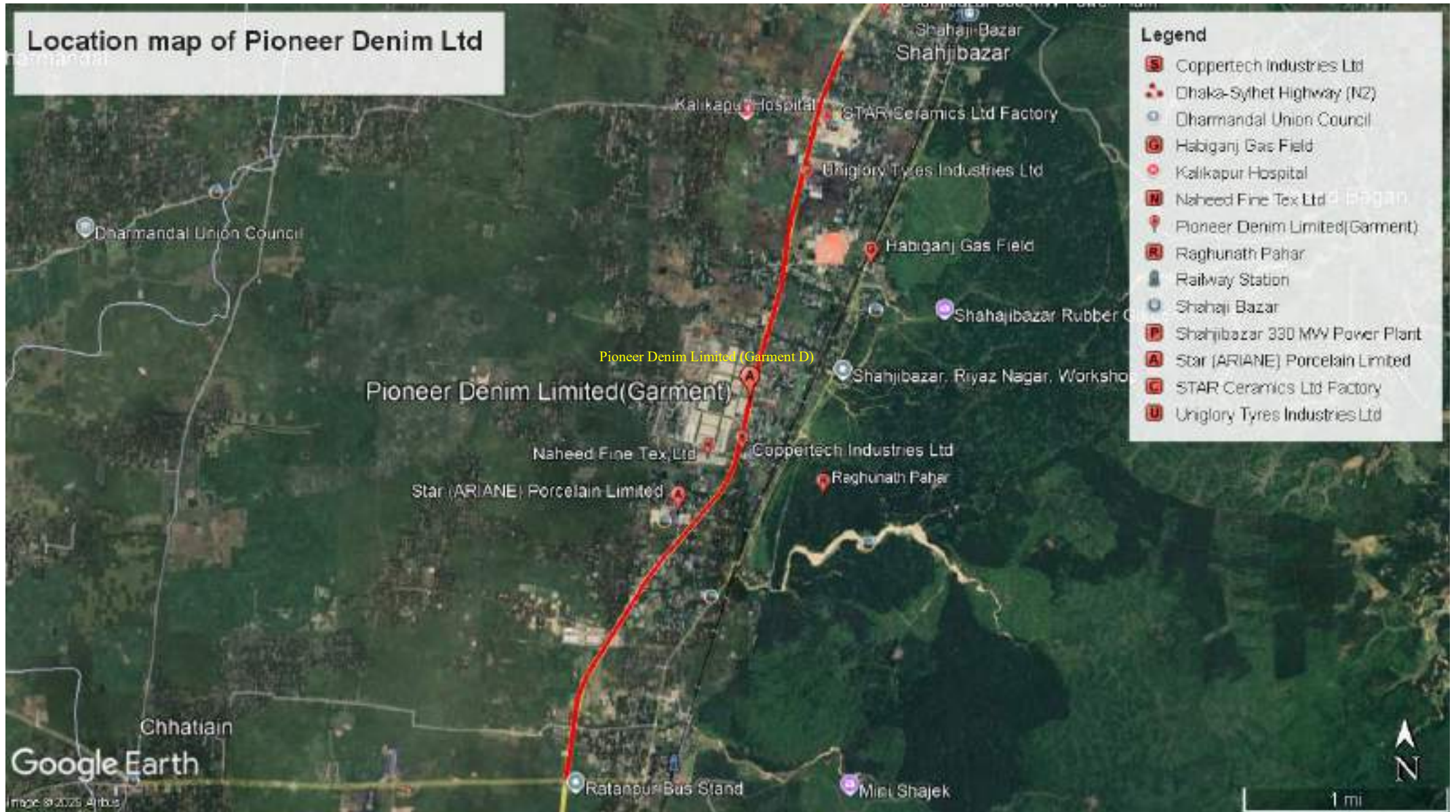


Figure 3.5: Location of the proposed site marked on Google Map (24°13'36.58"N, 91°21'53.67"E)

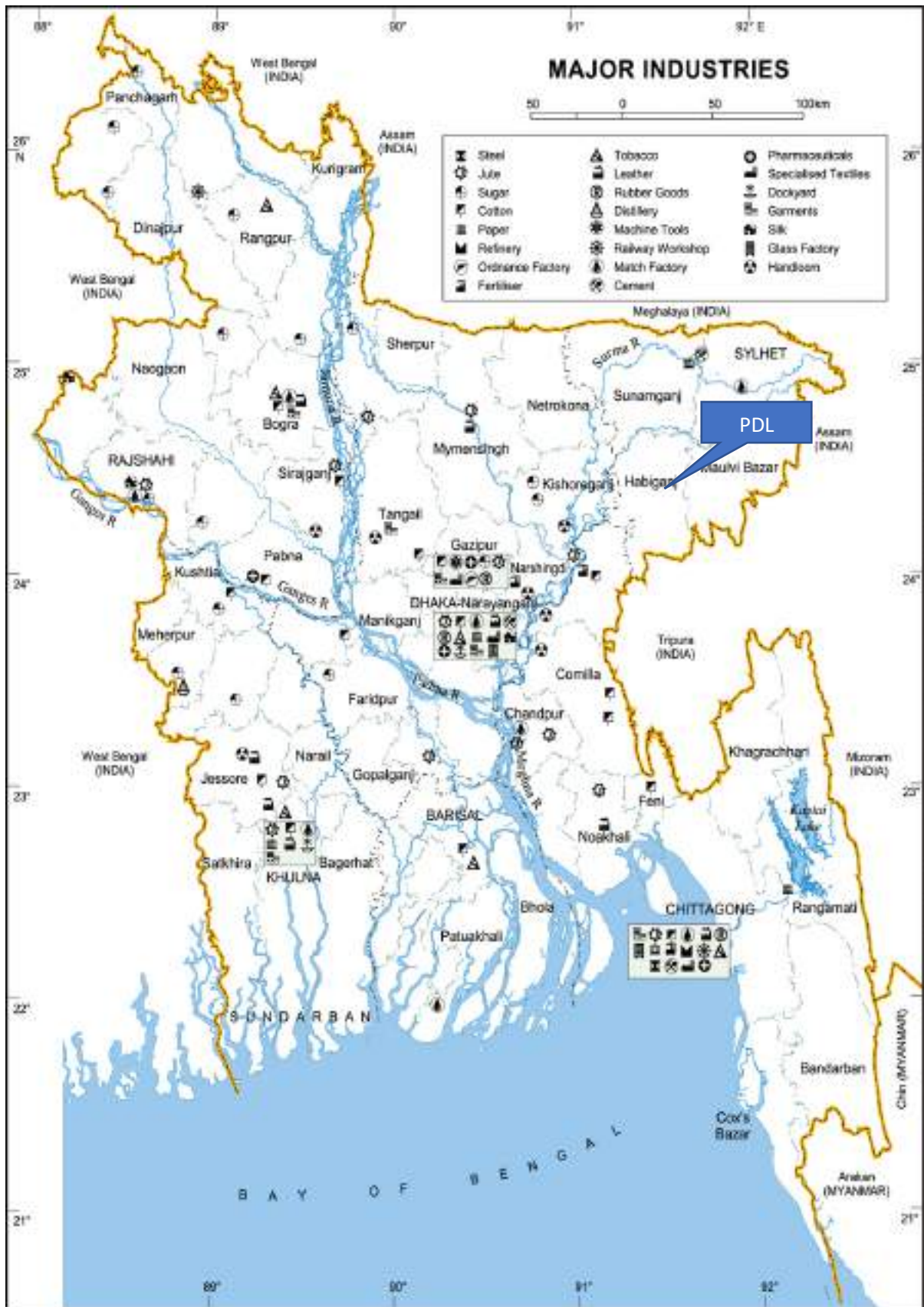


Figure 3.6: Major Industries in Bangladesh

3.5 Production Process:

Production Process of the factory represent bellow in the figure

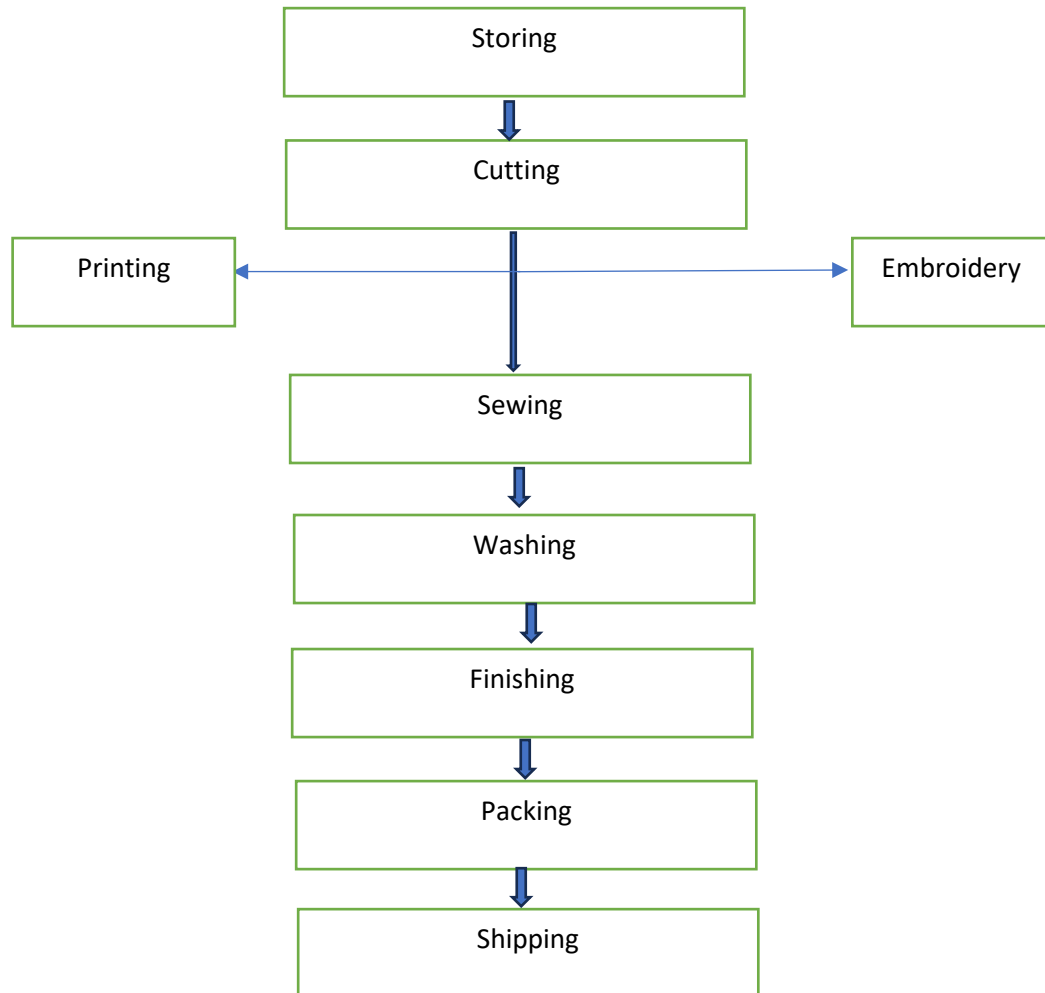


Figure 3.7: Production Process

3.6 Machineries:

There are 1803 units of machines in the project in all gauges. Selection of imported machinery have been made by the promoters themselves who have visited several countries and selected among the best manufacturers of the world at a very competitive price. The denim fabric to garment manufacturing facilities of Pioneer Denim Limited (Garment Division) is equipped with world's latest brand machinery. Intensive online inspections at different stages during and after manufacturing process are carried out invariably to achieve the desired quality.

The justification of the balancing of the selected machinery is reflected in the enclosed spin and weave plan. These machines are environment friendly capable to work efficiently. List of existing machinery and production capacity of PDL given bellow.

The manufacturing process is equipped with cutting edge, modern, high-tech machinery from Japan, U.S.A, Germany, Italy, Switzerland and Belgium to ensure best quality.

List of machinery Attached in Annexure: VIII

3.6.1: Local Machinery and equipment:

In addition to the imported machinery the project will also require some local machinery and equipment which will consist of ducting materials and Other hardware for the air-conditioning plant, fabrication components for electrical sub-station and control panels, electrical cables, PVC pipes, joints for laying cables, weighting scales, boiler-pumps, motors, piping for Deep Tube-well firefighting equipment, trolleys, storage racks for spa-es and consumable items, electrical fillings, lighting, etc.

3.6.2: Installation:

The sponsors have entered into contracts with the suppliers regarding erection, installation and commissioning of the main machinery and other machinery and the terms of the contract is that the suppliers' Engineers & technicians will supervise installation, adjustment and testing as well as finished product acceptance. Machine layout attached in Annexure XI

3.7 Organogram of Project:

In order to carry out its mission, global and departmental goals and objectives, every company shall build a formal structure depicting different hierarchy of management, supervision, and employee (staff) levels. This very structure is referred to as organization chart. Moreover, the organization chart shows reporting relationships span of management and staff/line functions.

Every organization chart shall be flexible, to reflect the ever-changing environmental dynamics and, hence be able to survive. In accordance, organization charts shall be reviewed periodically in order to determine whether the actual organization still match the environment needs (i.e. guests, employees, technology, competitor's needs.) or not. As per master organogram of the project main division are following:

Human Resources & Admin Division:

Some of the duties of the human resources division are listed below:

- ✓ Responsible for external & internal recruitment
- ✓ Calculates employees' salaries, compensation, and tax withholding.
- ✓ Administrates employees' paperwork, monitors attendance.
- ✓ Maintains good relations with Labor Unions
- ✓ Ensures employees' safety and working conditions

Factory Operation & Engineering Division:

This very department controls the plant & maintains the property's structure as well as electrical and mechanical equipment.

Finance & Account Division:

The Finance Division monitors the financial activities of the property. Some of the activities that are undertaken in the Finance Division are listed below:

- ✓ Pays outstanding invoices
- ✓ Distributes unpaid statements
- ✓ Collects amounts owed
- ✓ Processes payroll
- ✓ Accumulates operating data
- ✓ Compiles financial reports
- ✓ Makes bank deposits
- ✓ Secures cash loans
- ✓ Performs other control and processing functions

Commercial & Supply Chain Division:

Some of the activities that are undertaken in the Commercial & Supply Chain Division are listed below:

- ✓ Handling all kinds of L/C related issues, banking functions and documentation.
- ✓ Implement bank related LC, BL, Subsidy, GSP including all kinds of Commercials documentation
- ✓ Maintain liaison with C&F shipping lines & customs officials.

- ✓ Handle Port and Customs Operation effectively.
- ✓ Review or update supply chain practices in accordance with new or changing environmental policies, standards, regulations, or laws.
- ✓ Implement new or improved supply chain processes.
- ✓ To forecast demand or create supply plans that ensures availability of materials or products.
- ✓ Develop procedures for coordination of supply chain management with other functional areas, such as sales, marketing, finance, production, or quality assurance.
- ✓ Ensure safety, quality and compliance activities in workplace.

Merchandising

- ✓ **Planning** and developing merchandising strategies
- ✓ Analyzing sales figures
- ✓ Collaborating with buyers, suppliers, distributors.
- ✓ analysts to negotiate prices, quantities and time-scales.
- ✓ customers reactions and market trends to anticipate product needs.
- ✓ responsible from order analysis to shipment
- ✓ mediates marketing and production departments.
- ✓ interface between Buyer & Exporter

Marketing & Distribution Division:

Some of the activities that are undertaken in the Marketing & Distribution Division are listed below:

- a) Sales
- b) Convention Services
- c) Advertising
- d) Public Relations

Front Office:

- ✓ Register visitors
- ✓ Coordinate visitors' services
- ✓ Provide information

Security Division:

Security division personnel are usually screened from in-house personnel, security officers or retired police officers, across certain physical skills, and prior experience. Some of the functions of the security division are listed below:

- ✓ Ensures safety and security of group, visitors, and employees.

Other Divisions:

Below is a list of some possible extra or other divisions that might exist in a project: a) Internal Audit.

b) Information technology department

c) EHS Division

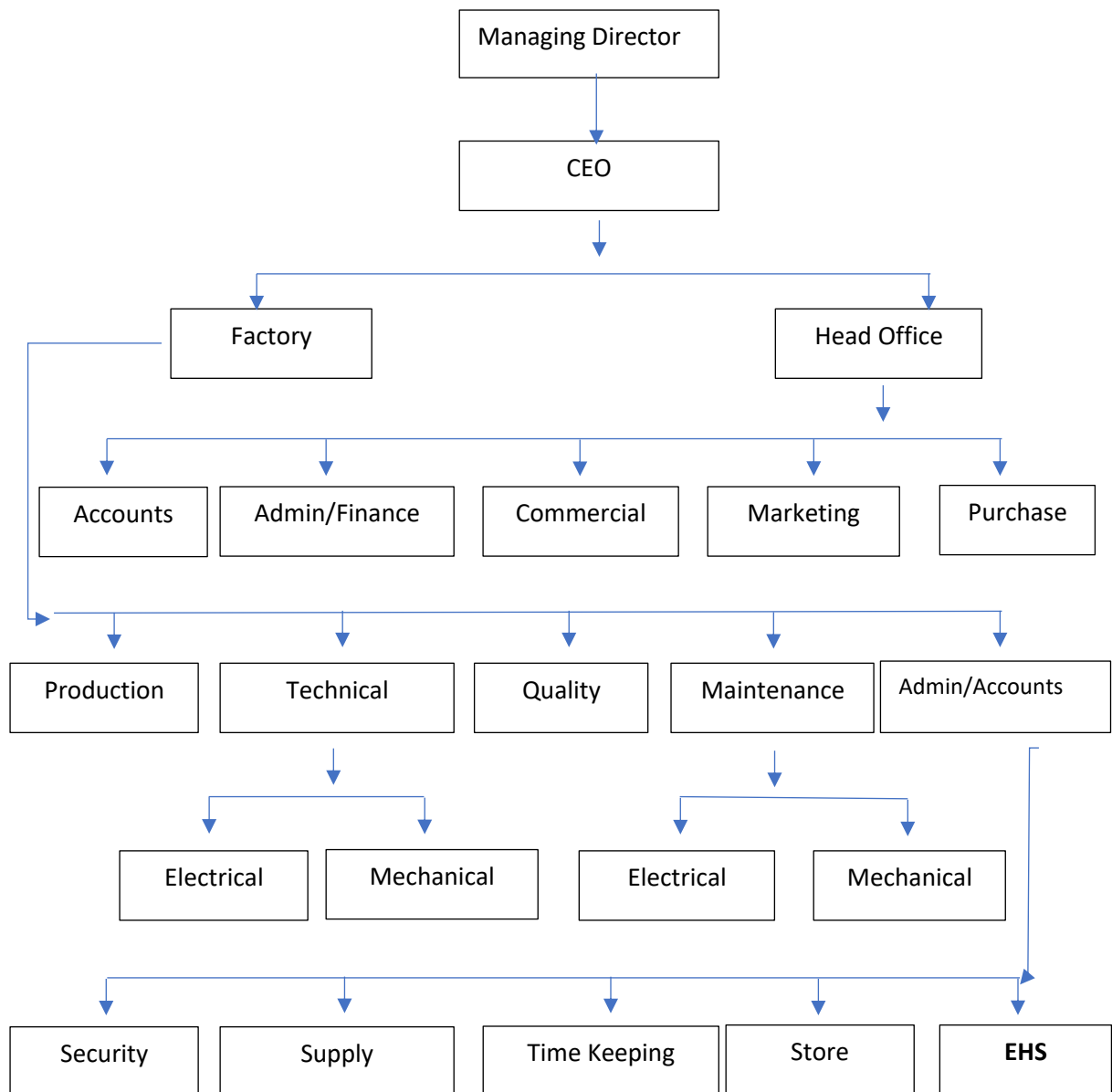


Figure:3.8: Management Flow chart

3.8 Raw Materials

This factory require mainly denim Fabric 40000 Yds, interlining 3000 Yds, Zipper 24656 Pcs, Metal Button 2000 Pcs, Plastic Button 13628 pcs, Paper and Label items 30000 pcs, sewing thread 1347 cone, Elastic/Drawstring, Lether Patch 1500, Carton 2500 Pcs, Embroidery 6000 pcs, Poly 30000 Pcs for daily production. Raw materials consumption is variable as per garments design & buyers' requirement.

All the raw materials are available in Bangladeshi market with very good quality. So, the whole requirement of raw materials will be fulfilled from local & foreign (if required) market through export LC against the master LC.

The chemicals are required for washing stages of production. The major used chemicals are Caustic soda flakes, Common Salt, Glauber's salt, Softener, Brightener, wetting agent, desizing agent, enzyme, dispersing agent and other finishing chemicals. As the chemicals quality is very important for good quality product, PDL has the plan to import the chemicals from Pakistan, Turkey, Taiwan, India, China, Indonesia, Singapore, Thailand & Germany, Italy and other suitable supplier from Local Market.

Most of the accessories like will be procured from local sources because Bangladesh has already equipped good enough by local and multinational accessories company.

Raw materials & chemical list attached in Annexure X.

3.9 Factories Structure:

Existing shed, buildings, utility building, ETP, WTP, STP and other structure within the project. The shed is following/ buildings the BNBC for earthquake and wind load. As per fire license Classification of Buildings Based on Occupancy Classification of Occupancy G2.

3.10 Personnel

Current workforce is 4,200 which will be increased. About 15,000 worker and staffs will be recruited for different sections of the project by 2027. The Company has already talked to different top-level officials of similar project in and outside of our country. Prospective recruits have shown their keen interest to join the management who will subsequently employ other staffs of the respective sections as per their choice. These staffs & officers are locally available.

3.11 Project Schedule

The factory will be setup existing restricted area (Industrial) surrounding by wall. Gas and electricity supply are also ready as the project site is an existing industry. The factory has established December 01, 2023. The project started initially the whole process at R&D building after that the rest of buildings will start soon after DoE approval. Although LGED permission has completed. The washing division has been planned to start construction from January 2025 and will finish December 2026 then it will run the project from June 2027 accordingly. Within the next two-year PDL will be fully developed and operated successfully.

3.12 Utilities

Power: The Project is already connected with the Local Electric Supply Authority. The project required 1350 KaH connected load. There are five (5) generators with capacity 1500kw each already installed as captive power for uninterrupted production to cover the full load of all units within the factory. For plant operation four (4) gas boiler is also setup in utility Building with capacity 15.5-ton. There are a WTP plant with capacity 7200 m3 which is divided into four section, three of which are operational approximately 1450 m3 ground water is being treated every day used for various processes and utilities.

Green Energy: Green energy is electric energy produced by renewable more environmentally friendly sources. Leading to less negative air, water, and natural resource impact. Typical technologies used to create green power are solar, Wind, Geothermal, Biomass and low-impact hydropower.

Improve public health and environmental quality, generating electricity from renewable energy rather than fossil fuels offers significant public health benefits. Solar systems generate electricity with no associated air pollution emissions. It is silent powered- no noise pollution. There are so many advantages of solar power. PDL will install solar panel gradually in 2026 1 MW, in 2027 2 MW and in 2028 more 2 MW. That is total 5 MW accordingly. as part of sustainable development.



Natural Gas: The main element to generate the power of this project is natural gas. The project has already got the permission and connection in factory premises from the Government for

this project. Gas mainly required for production process, Boiler & Generator. Required gas for proposed unit 1240m³/day. The proponent will increase load as per future demand.

Water: The Project will require water during the civil work implementation stage & operation stage of the project., The project requires huge quantity of water, Water required for production process specially for washing stage and human consumption which is available from its own deep tube well (10 No). Daily water consumption will be Production 18850 m³/day

3.13 ETP, WTP, STP, Car parking, Fire control and Security Area

Like other plant the main utilities that are being used at PDL are electricity, gas & water. For smooth and uninterrupted operation of the authority will setup generator, boiler, Compressor in the utility Building. For plant security a security area & fire control room has been build. The factory has available open space for car parking in the factory. The project already constructed 900 m³ /hr which is divided into four sections. The capacity of each section is 5400 m³ /day, one section is currently operational & treating 1200 m³ wastewater per day. The project proponent has decided to construction of a STP with capacity of 1200 m³/day after starting full production of the factory for domestic wastewater treatment.

3.14 Project activities

3.14.1 Project Activities during Construction Phase

- (1) Earth excavation works
- (2) Boundary wall for protection
- (3) Drainage system.
- (4) Construction of Shed.
- (5) Construction of the building,
- (6) Installation of the electro-mechanical equipment.
- (7) LPS, Firefighting system.
- (8) Interior design including furniture and furnishing works;
- (9) Internal road construction;
- (10) Security system, traffic and pedestrian management system;
- (11) Landscaping/tree plantation, etc.
- (912) WTP, STP, ETP

3.14.2 Project Activities during operation Phase

The major activities during operational phase include:

- (1) Regular operation and maintenance of the Factory

- (2) Regular operation and maintenance of STP, ETP, WTP
- (3) Internal traffic management.

3.15 Drainage System

The project will be equipped with a planned internal drainage system to manage both stormwater and wastewater in an environmentally sound manner. Stormwater runoff from roofs, paved areas, and internal roads will be collected through open lined drains provided along road edges and site periphery, designed considering peak monsoon rainfall to prevent waterlogging. Wastewater generated from the washing unit and other process areas will be conveyed through a separate closed drainage network to the Effluent Treatment Plant (ETP), ensuring complete segregation from stormwater drains. Silt traps and inspection chambers will be installed at suitable locations for effective sediment control and maintenance. Treated effluent will be managed as per regulatory requirements without causing adverse impact on surrounding land or water bodies

The proposed drainage system attached in **Annexure IX**.

3.16 Boundary Wall and Site Security

A continuous boundary wall will be constructed along the project perimeter to ensure site security, controlled access, and protection from external disturbances. The boundary wall will be designed with appropriate height and structural strength in accordance with local authority guidelines, and will include designated entry and exit gates for vehicles and personnel. Adequate setbacks will be maintained to allow peripheral drainage and inspection access. The boundary wall will also function as a protective measure against unauthorized entry, encroachment, and surface runoff intrusion from adjacent lands, contributing to overall site safety and environmental management.

3.17 Access Roads Internal Road Network

The main access of the project would be the existing Highway (Dhaka – Sylhet) situated at the west side of the project.

The internal road network of the garments factory will be designed to facilitate safe and efficient movement of raw materials, finished goods, personnel, and emergency vehicles. Roads will be constructed with durable paved surfaces (RCC/bituminous) of adequate width

and load-bearing capacity suitable for light and medium commercial vehicles. Proper camber and longitudinal slope will be maintained to ensure effective surface runoff toward the designated drainage system. Road layouts will minimize traffic congestion, ensure pedestrian safety, and provide unobstructed access to production units, warehouses, utilities, and emergency exits.

3.18 Waste Generation (Solid, Liquid & Hazardous waste)

Waste is directly linked to human development, both technologically and socially. The compositions of different wastes have varied over time and location, with industrial development and innovation being directly linked to waste materials. Examples of this include plastics and nuclear technology. Some components of waste have economical value and can be recycled once correctly recovered.

Waste is sometimes a subjective concept, because items that some people discard may have value to others. It is widely recognized that waste materials are a valuable resource, whilst there is debate as to how this value is best realized.



Figure 3.9: Waste Generation Flow Chart

3.19 Compliance:

The Project strictly maintains the compliance requirements as per ILO and Bangladesh Government rules and regulations for factory workers' safety, health and hygienic factors. All units of the group are professionally designed for apparel manufacturing with sufficient consideration to provide its worker's safe and comfortable atmosphere at work place as a high priority issue.

Table 3.3: Compliance of PDL

Sl. no	Issues of Compliance	Factory's Status
01	Internal Compliance Team	PDL has its own dedicated Internal Compliance team having a Compliance Manager who is under the direct supervision of Managing Director. All the Compliance Officers are well educated in Local Labor Law, Company law, as well as Environmental Law. They are also trained in Wages and Benefit policy, Health & Safety policy. The compliance officers conduct daily routine check of the factory and report to the Managing Director through the Compliance Manager. Compliance Manager is involved in Conducting Training Programs for workers on Compliance Issues.
02	Recruitment Policy	PDL has a written Recruitment Policy. All Recruits are above 18 years of age. It has a strong Recruitment committee, where the Managing Director directly takes part to recruit the workers and staffs considering the age first then experiences and skills.
03	Record Policy	PDL maintains Personal File for all workers and staffs with their full Bio-data and necessary particulars. The factory always arranges Card, makes record of Working Hour, Salary Statement, Leave Record, Disciplinary Action, etc.
04	Forced Labor	PDL has no any practice of use forced labor, whether in the form of prison labor, indentured labor, bonded labor or otherwise.
05	Child Labor	No person is employed here at an age younger than 18 or younger than the age for completing a certain level of education in Bangladesh where such age is higher than 18.
06	Harassment or Abuse	Every employee is treated with respect and dignity. No employee is subject to any physical, sexual, psychological or verbal harassment or abuse.
07	Nondiscrimination	No person is subject to any discrimination in employment, including hiring, salary, benefits, advancement, discipline, termination or retirement, on the basis of gender, race, religion, age, disability, sexual orientation, nationality, political opinion, or social or ethnic origin.
08	Health and Safety	PDL provides a safe and healthy working environment to prevent accidents and injury to health arising out of, linked with, or occurring in the course of work or as a result of the operation of

		employer facilities. The project believes that in a sound work place workers can give their best output to reach at the goal.
09	Freedom of Association and Collective Bargaining	The project Management recognizes and respects the right of employees to freedom of Association and Collective
10	Wages and Benefits	The Project Management also recognizes that wages are essential to meeting employees' basic needs. So The Company pays employees, at least the minimum wage required by our local law in Bangladesh prevailing industry wage, whichever is higher, and always provides legally mandated benefits. Wages and overtime charges are paid within the 7th of the following month.
11	Hours of Work	Except in extraordinary business circumstances, employees are (i) not required to work more than the lesser of (a) 48 hours per week and 12 hours overtime or (b) the limits on regular and overtime hours allowed by the law of Bangladesh, and (ii) are entitled to at least one day off in every seven-day period.
12	Overtime Compensation	In addition to their (Workers) compensation for regular hours of work, employees are compensated for overtime hours at such premium rate as is legally required in Bangladesh or at a rate equal to the double of their regular hourly compensation
13	Leave & other Facilities	The Project provides all kinds of leave benefits to its workers. PDL treats all the workers as its valuable asset. Maternity Leave Benefits, Two festival Bonus, Yearly increment of Monthly Salary, Attendance Bonus, and financial supports to all employees in accordance with the recommendations by the Social Welfare Committee. We have WPC committee and fund. Here is also welfare fund and committee.
14	Health & Hygiene	The Factory is lighted well with sufficient Tube lights, natural flow of air. All floors are well ventilated and well furnished with sufficient hygienic toilets. Toilets are cleaned and well maintained with detergent, liquid toilet cleaner and flashing with sufficient quantity of tap water. Workers are provided with pure & safe drinking water.
15	Doctor' Room	Considering the provision of health care facility for PDL workers and staffs under the prevailing labor act, The Project has a complete dispensary supported by a Medical Officer trained in medicine and gynecology and paramedics to treat the worker's health. Necessary First Aid, along with supply of emergency medicines provided at free of cost from this dispensary. In the case of long-term treatments of any worker, PDL takes the patient

		to a better hospital. Under the circumstances the authority takes necessary steps to provide full course of treatment.
16	Dining Hall	Dining hall is situated in factory premises. Numbers of Ayahs are engaged to maintain a hygienic environment taking necessary measures. workers can take their lunch easily.
17	Recreational Facilities	PDL arrange an annual picnic or special feast for the workers every year on our Bengali New Year's Day or Pahela Baishakh. All workers and staffs enjoy and celebrate the day with a festive mood. In the evening, they participate in a cultural event.
18	Safety Facilities/ Fire Fighting	All Factories have sufficient spacious exits. The Group is also staged with full range of Firefighting equipment's. Aisles are properly marked and are kept clear at all time to easily move. Fire drills are conducted every month. PDL has its own trained designated Firefighting team, First Aid, and Rescue team who can be easily distinguished by their uniform. Beside this 40% of work forces are trained on how to operate fire
19	Machine Guarding	All machines are equipped with safety guarding, Eye guard, Pulley guard and Needle guards etc.
20	Personal Protective equipment's	PDL provides Personal Protective equipment's, (PPE) such as Metallic Hand gloves, Masks for all workers, Safety goggles, Chemical-resistant mask or respirator, Chemical & Heat-resistant gloves, Earplugs or earmuffs, High-visibility vest, Safety boots with steel toe & Hard hat for relevant machine operators.
21	Workplace	Entire floors are well ventilated by installing sufficient number of air circulation devices. Workers can work in cool atmosphere.

Chapter - 4
***Description of Existing Environment & Social
Condition***

4.0 Description of Existing Environment

4.1 General Consideration

Baseline data on environment is important to understand physical, biological, cultural, economic and social environmental characteristics of the project study area. This information forms the basis to analyze the probable impacts of the project activities. Mainly the following are the objectives or outcome of examining and defining the existing environment:

For this EIA study the emphasis is given on the environmental features like land, water, air and noise quality & socioeconomic condition of study area. Considerations are given to both the environment and ancillary area that seems to be affected.

- To identify environmental and socioeconomic components that may be affected due to project activities;
- To recognize potential environmental impacts on them
- To provide a base line against which environmental conditions in the future project may be measured;
- Setting of baseline parameters in order to identify possible adverse and beneficial impacts due to the proposed project activities.

This Chapter describes the baseline physical, biological and social environment of project areas based on the findings of the baseline surveys.

4.2 Study Area

In this study, study area covers both the immediate site, and an extended area of about 1 km radius. Immediate area here is the area that is enclosed by the project perimeter which falls mainly in the Bagasura Union. The site is positioned within a semi-urban, rapidly developing industrial belt where textile and garment-related facilities are increasingly concentrated. The location benefits from proximity to markets, skilled labor sources, utilities, and logistic services available within Habiganj and adjacent districts. Geographically the project is located at 24°13'36.58"N, and 91°21'53.67"E. However, the surrounding area covers mainly Nurpur, Sankhola, Noapara, Chhatia Union. In physicochemical component, parameters included are land, water quality, air quality, climate, and noise. Primary and secondary data has been collected. In case of primary data collection emphasis has been given only to project boundary area. Secondary data has been collected from different government and non-government

organizations. Secondary data covers environmental and socioeconomic information of Madhabpur area. Figure 4.1 shows the 500m, 1 km surrounding areas of PLD.

Madhabpur is an Upazila of Habiganj District in the Division of Sylhet, Bangladesh. It is located at a distance of about 129 kilometres to the northeast of Dhaka city. Madhabpur is mostly famous for Tea Garden, Robber Garden etc

It's bordered by several adjacent thanas: to the north are Lakhai and Habiganj Sadar, to the east is Chunarughat, to the west are Brahmanbaria Sadar and Nasirnagar, and to the south it shares an international boundary with Tripura state of India. PDL is easily accessible by all kinds of transports. The project is just beside Dhaka-Sylhet Highway

4.3. Physio-Chemical Environment

4.3.1 Topography

The area lies within the north-eastern alluvial floodplain of Bangladesh, which forms part of the Surma–Meghna river basin.

The topography of the project area is generally flat to very gently undulating, typical of deltaic and floodplain environments. Ground elevation in and around the site is low, ranging approximately between 6.0 m and 9.0 m above mean sea level (amsl). No steep slopes, ridges, or prominent hillocks are present within the project footprint. The natural ground slope is very mild and predominantly directed towards nearby low-lying areas and local drainage channels. The flat terrain of the site makes it suitable for industrial development; however, due to the low relief, careful site grading and drainage planning are essential to prevent surface water stagnation during the monsoon season.

The surrounding landscape consists mainly of developed industrial land, rural settlements, and low-lying agricultural areas, interspersed with seasonal depressions and natural drainage paths. During the monsoon season, these low-lying areas and khals become hydraulically active, conveying stormwater runoff and contributing to temporary waterlogging in poorly drained zones. In contrast, during the dry season, surface runoff is minimal, and most drainage channels remain dry or carry limited base flow

Overall, the topographic characteristics of the project site are typical of the Habiganj floodplain and play a key role in determining surface water movement, drainage behavior, and potential environmental impacts, particularly in relation to wastewater management and monsoon hydrology.

No major topographical alterations such as hill cutting or deep excavation are required for the proposed development.

4.3.2 Land

4.3.2.1 Land type & Soil Classification

Land type classification is based on depth of inundation during monsoon season. In terms of depth of flooding, five classes of land type are recognized (SRDI,1998) these are High land (above flood level), Medium Highland (flooding depth 0-90 cm), Medium lowland (flooding depth 90- 180cm), Low land (flooding depth 90 – 270 cm) and very Low land (flooding depth > 270 cm). However, the land type characteristics are not uniform within the study area.

The project area falls within the alluvial floodplain land system of the Surma–Kushiyara basin. Based on elevation (approximately 10–12 m above mean sea level) and flood behavior, the land is classified as Medium Low Land (MLL) to Low Land (LL) according to standard Bangladesh land classification. Medium Low to Low Land subject to seasonal inundation or waterlogging during the monsoon period. Flat to gently sloping terrain with poor natural drainage in extreme rainfall events. Drains naturally toward local khals and ultimately to the Khowai River.

According to the Soil Map of Bangladesh, the proposed project area falls within the Non-calcareous Grey Floodplain Soil unit of the Surma–Kushiyara Floodplain. The current project area has been marked on the General Soil Map in figure 4.2.

Soil Characteristics

- Soil Origin: Recent alluvial deposits
- Soil Texture: Silty clay to clay loam
- Permeability: Low to moderate
- Bearing Capacity: Moderate in dry condition, reduced when saturated
- Soil Reaction: Slightly acidic to neutral (typical of floodplain soils)
- Organic Content: Moderate in low-lying areas

During the monsoon season, soil saturation reduces infiltration capacity, increasing surface runoff and the risk of waterlogging. In the dry season, soils remain firm and suitable for industrial use, provided proper foundation and drainage design are applied.

The combination of low land type and fine-textured alluvial soils indicates sensitivity to:

- Flooding and prolonged waterlogging
- Soil erosion during heavy rainfall
- Potential contamination if untreated wastewater infiltrates soil

Therefore, the project requires:

- Raised Finished Floor Level (FFL)
- Lined drainage and effluent channels

- Controlled wastewater discharge and soil protection measures

Several **Sub-soil Investigation & Engineering Survey** has been done under a separate study conducted by MIA Enterprise. 14 boreholes were drilled up to maximum explored depth 100 ft (01) & others 60 ft for 5-storied R & D building in March 2022, 24 boreholes depth 100 ft (05) & others 60 ft for 7-storied Cutting-Sewing Building in August 2022, 03 boreholes depth Three 100 ft for 2-storied Wash R&D Building in August 2022, 24 boreholes depth 100 ft (04) & others 60 ft for 7-storied Finishing Building in June 2022, 26 boreholes depth 100 ft (06) & others 60 & 50 ft for Washing shed-2 in March 2023, 20 boreholes depth 100 ft (04) & others 60 ft for Washing shed in June 2022, 15 boreholes depth 100 ft (03) & others 60 ft for Dry Process Building in August 2022, 06 boreholes depth 100 ft (01) & others 60 ft for Chemical Building in February 2023, 06 boreholes depth 100 ft (01) & others 60 ft for Accessories Store Building in February 2023, 04 boreholes depth are 60 ft for WTP in August 2023, 15 boreholes depth 100 ft (02) & others 60 ft for ETP in December 2023.

As per all soil investigation reports, Stratification of soil layer in bore logs. From top up to around 35ft it is grey color silty sand. The underlying soil is of brownish gray /Brown color fine to medium/little sand with clay extending up to the final depth of borings (Ref. bore logs). SPT value in all the borings are within a range that means soil layer is uniform. From the analysis, it is clear that isolated or spread footing in shallow depth can be provided for the proposed construction on that soil.

For ETP, from top up to around 40ft it is grey color silty sand. The underlying soil is of Brown color fine to medium sand with Silt extending up to the final depth of borings. SPT within a & soil layer is uniform. From the analysis, Mat foundation can be provided for the proposed construction on that soil.

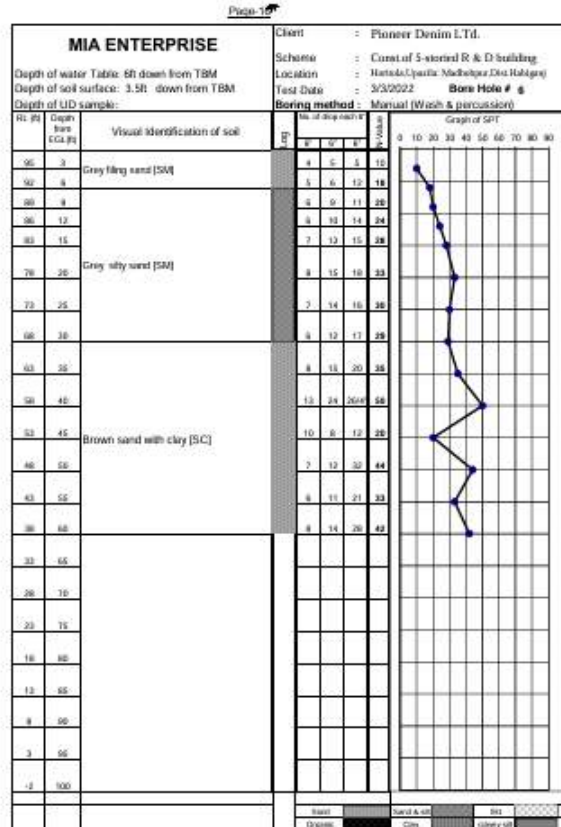
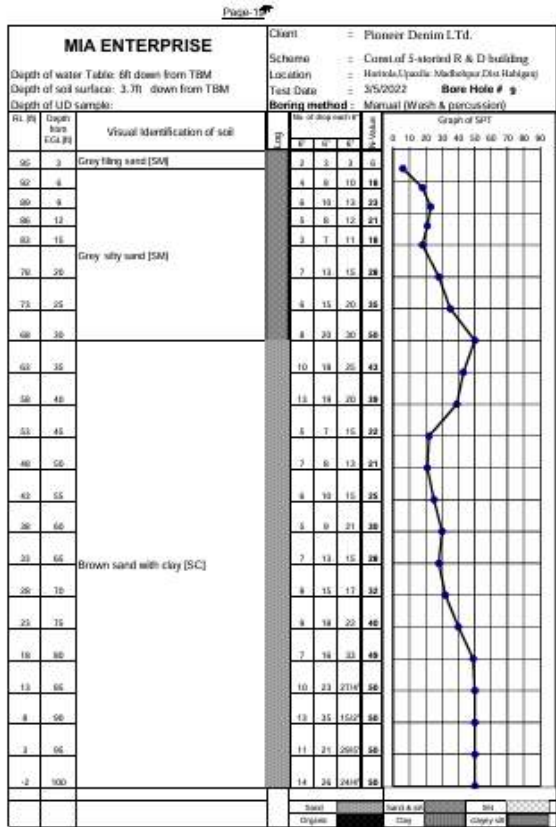


Figure 4.1: R & D building bore logs (60ft & 100 Ft)

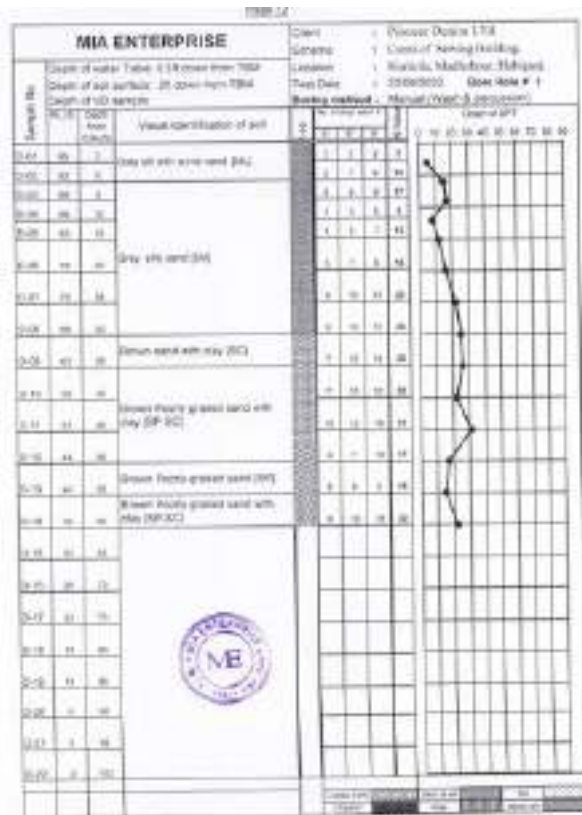




Figure 4.3: 2-storied Wash R_D Building bore logs (60ft & 100 Ft)

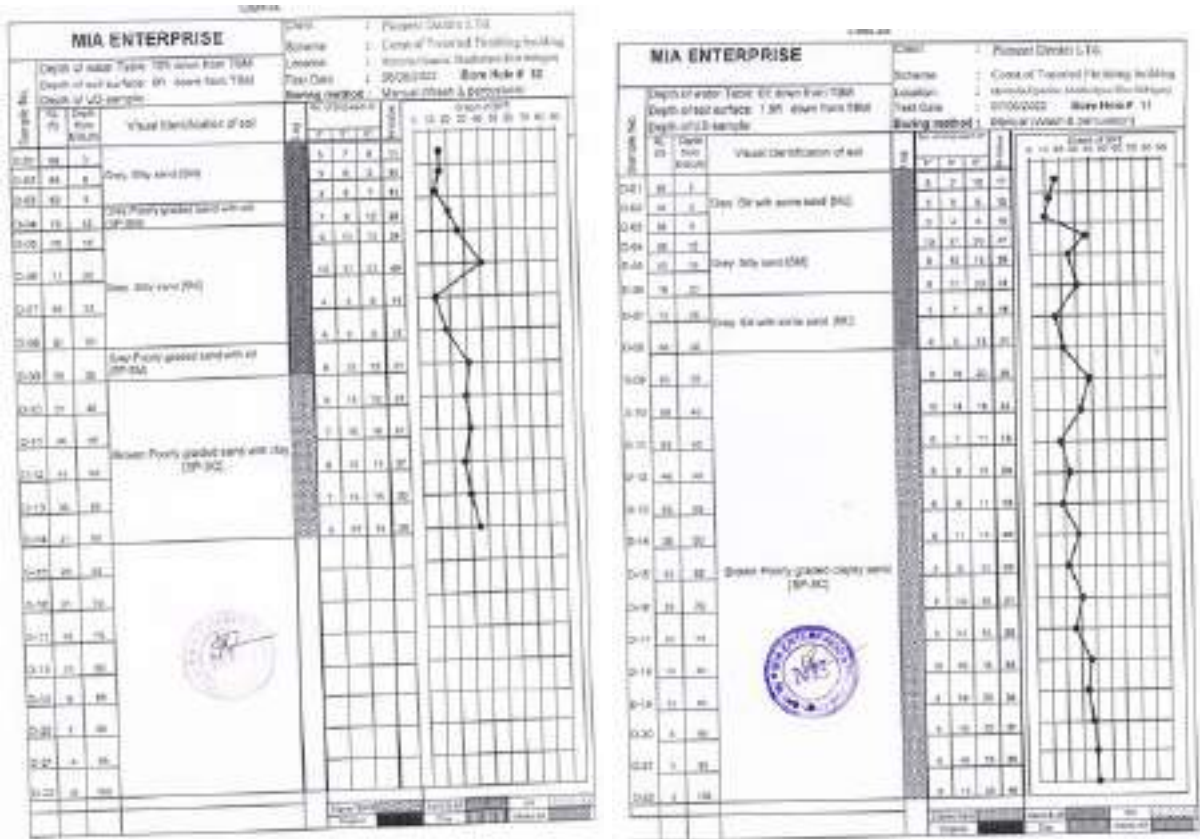


Figure 4.4: Finishing Building bore logs (60ft & 100 Ft)

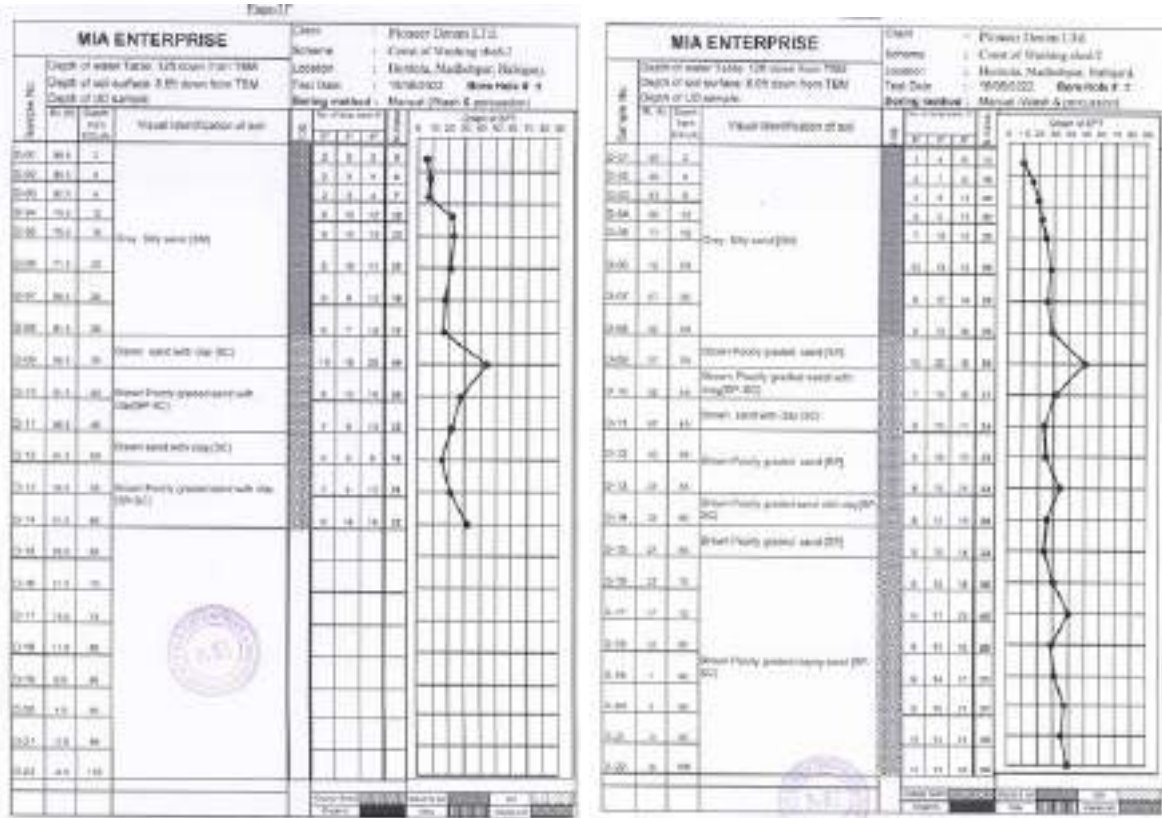


Figure 4.5: Washing shed-2 bore logs (60ft & 100 Ft)

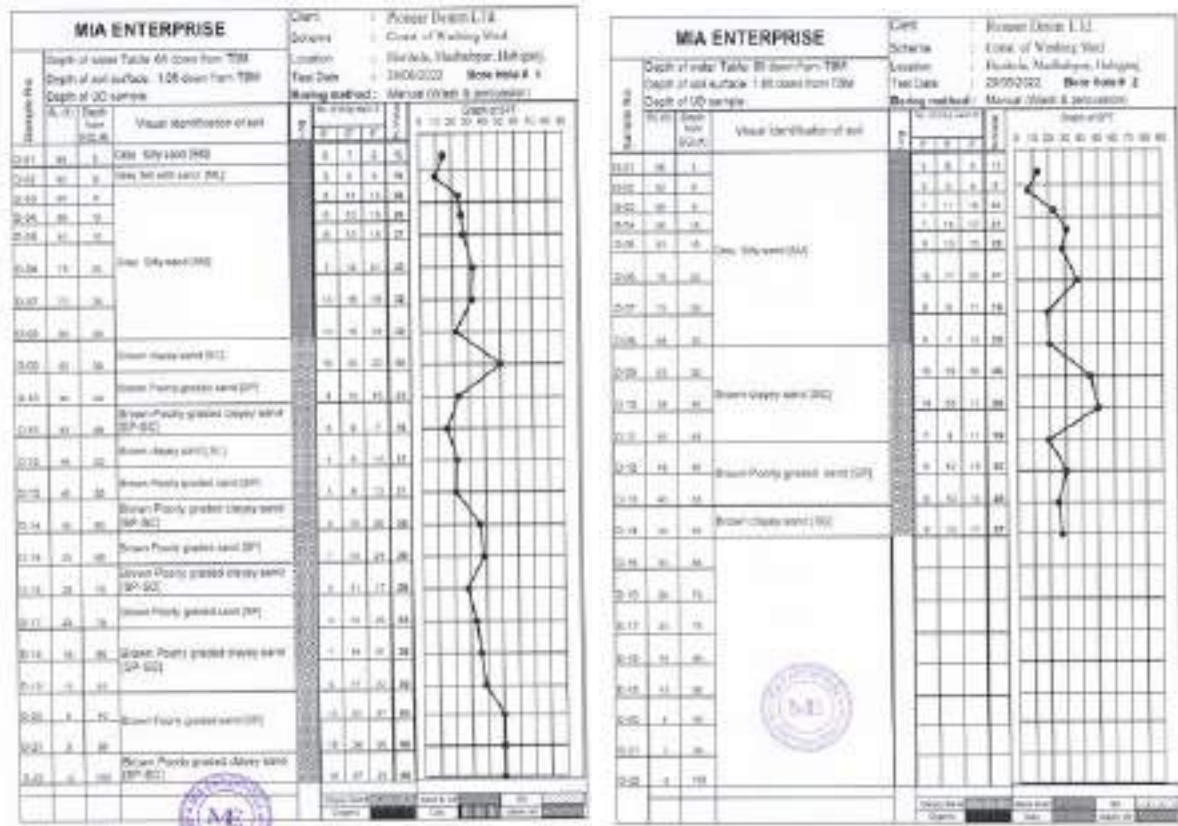


Figure 4.6: Washing Shed bore logs (60ft & 100 Ft)



Figure 4.7: Dry Process bore logs (60ft & 100 Ft)

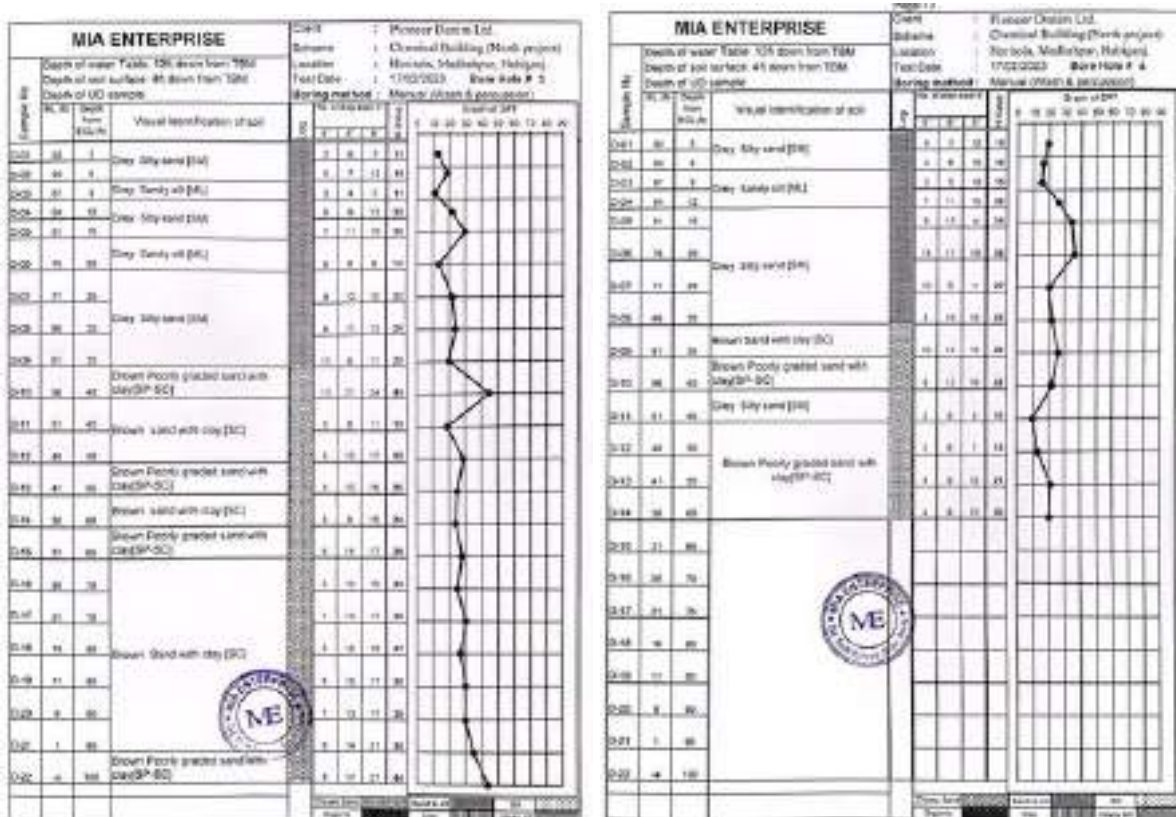


Figure 4.8: Chemical Building bore logs (60ft & 100 Ft)

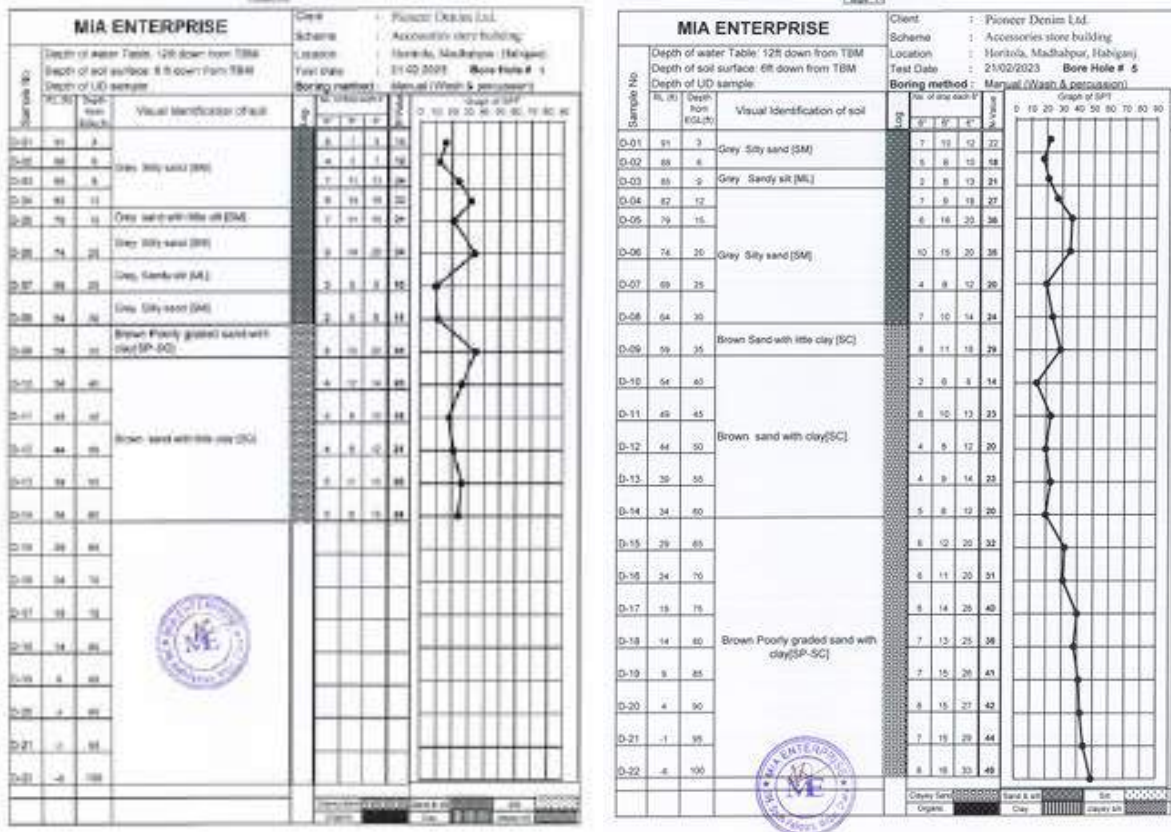


Figure 4.9: Accessories Building bore logs (60ft & 100 Ft)

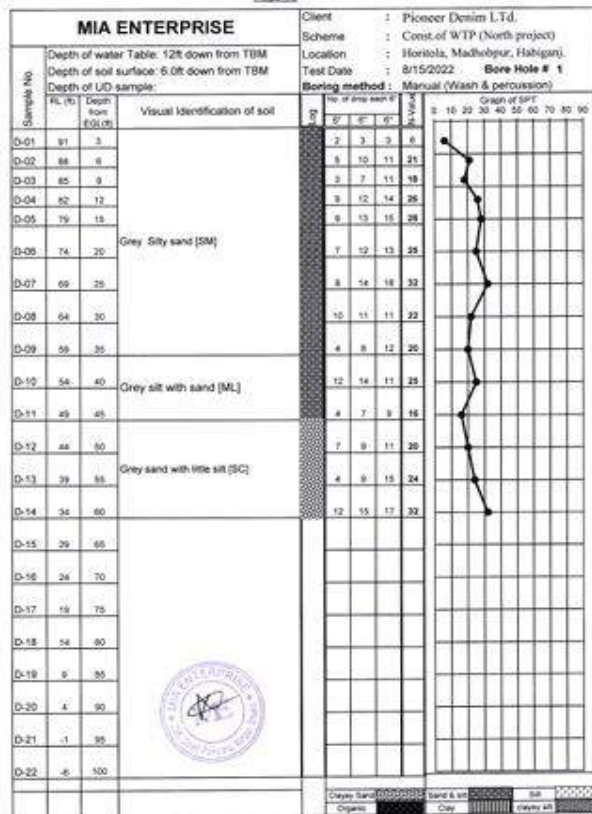


Figure 4.10: WTP Soil bore log 60ft

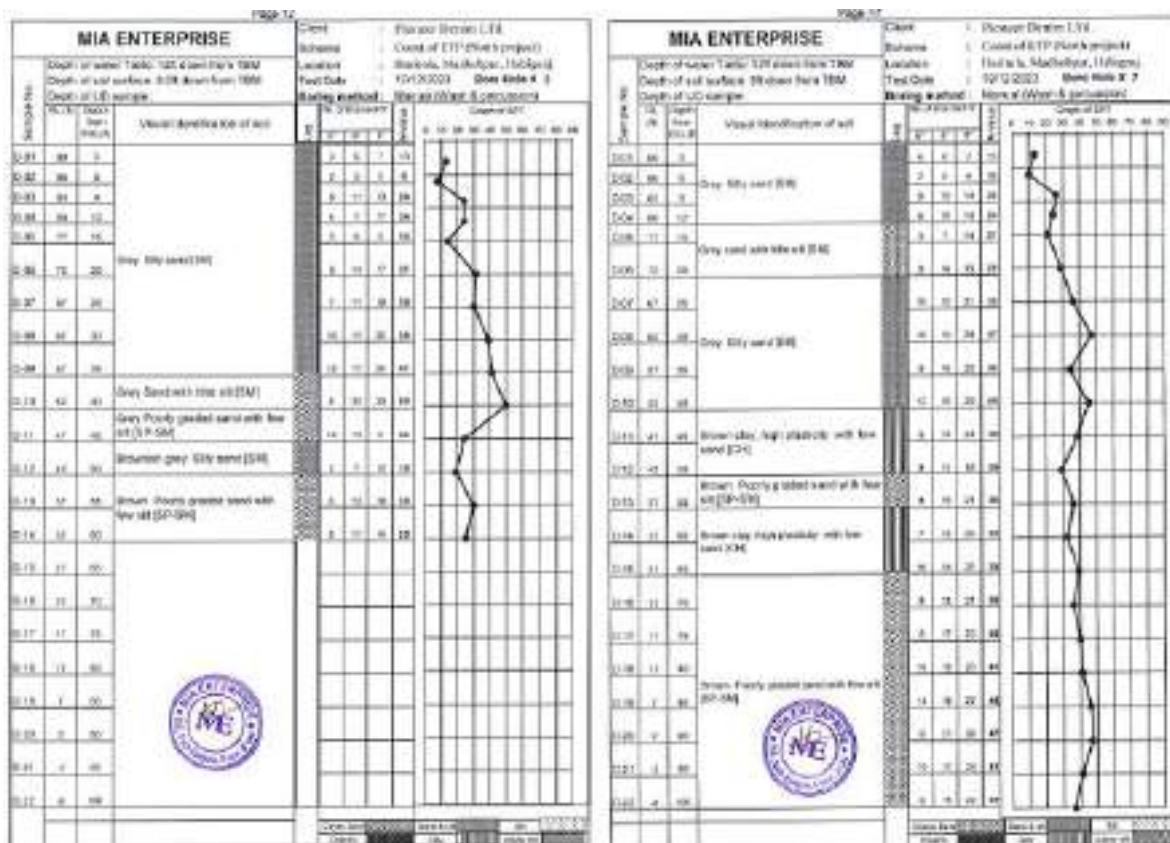


Figure 4.11: Effluent Treatment Plant (ETP) bore logs (60ft & 100 Ft)

4.3.2.2 Existing and Surrounding Land Uses

The project land predominantly consists of previously converted industrial/commercial land with some portions historically used for agriculture and rural settlements. Surrounding land use within 500–1,000 meters include:

- **Industrial activities:** small to medium-scale manufacturing, textile processing units, and warehouses.
- **Low-lying agricultural fields:** paddy fields and seasonal crop cultivation areas typical of Habiganj’s agro-ecological zone.
- **Scattered rural settlements:** small homesteads, local markets, and community facilities around Shahpur Bazar.
- **Vegetation & open spaces:** mixed vegetation, tree cover along homestead boundaries, and open fallow land.
- **Water bodies:** small ponds and channelized drainage features used for irrigation and domestic purposes.

Characteristics are typical of Madhabpur’s rural–industrial transition zone. The project site lies close to Dhaka–Sylhet Highway (N2) and surrounding industrial growth zones.

Proximity to Key Features

- **Dhaka–Sylhet Highway (N2):** just in front of the proposed project
- **Shahpur Bazar:** Within 1 km south of the project site
- **Madhabpur Upazila Center:** ~6–8 km from the site
- **Nearest Waterbodies:** Village ponds and drainage canals within 300–500 meters
- **Nearest Settlements:** Houses and homesteads located within 200–300 meters north and west

The site does not fall within any environmentally sensitive or legally protected area

Some of the notable features of the surroundings are:

- There are no monuments or features of historic interest on and around the project site;
- No features of scientific interest around the project site are found;
- There is no development of scenic or recreation facility on and around the project site.

However, the nature of the PDL project is such that its activities do not create any disturbance to other activities in areas outside its project perimeter. Hence during in-depth study for environmental impacts of the project upon surrounding environment, we can consider the project sites and immediate surrounding sites as areas of interest.

As a part of the reconnaissance survey, the consultants Team visited the project site to get a first-hand idea of the project area (Figure 4.12). The plot for the proposed project is a rectangular in shape.

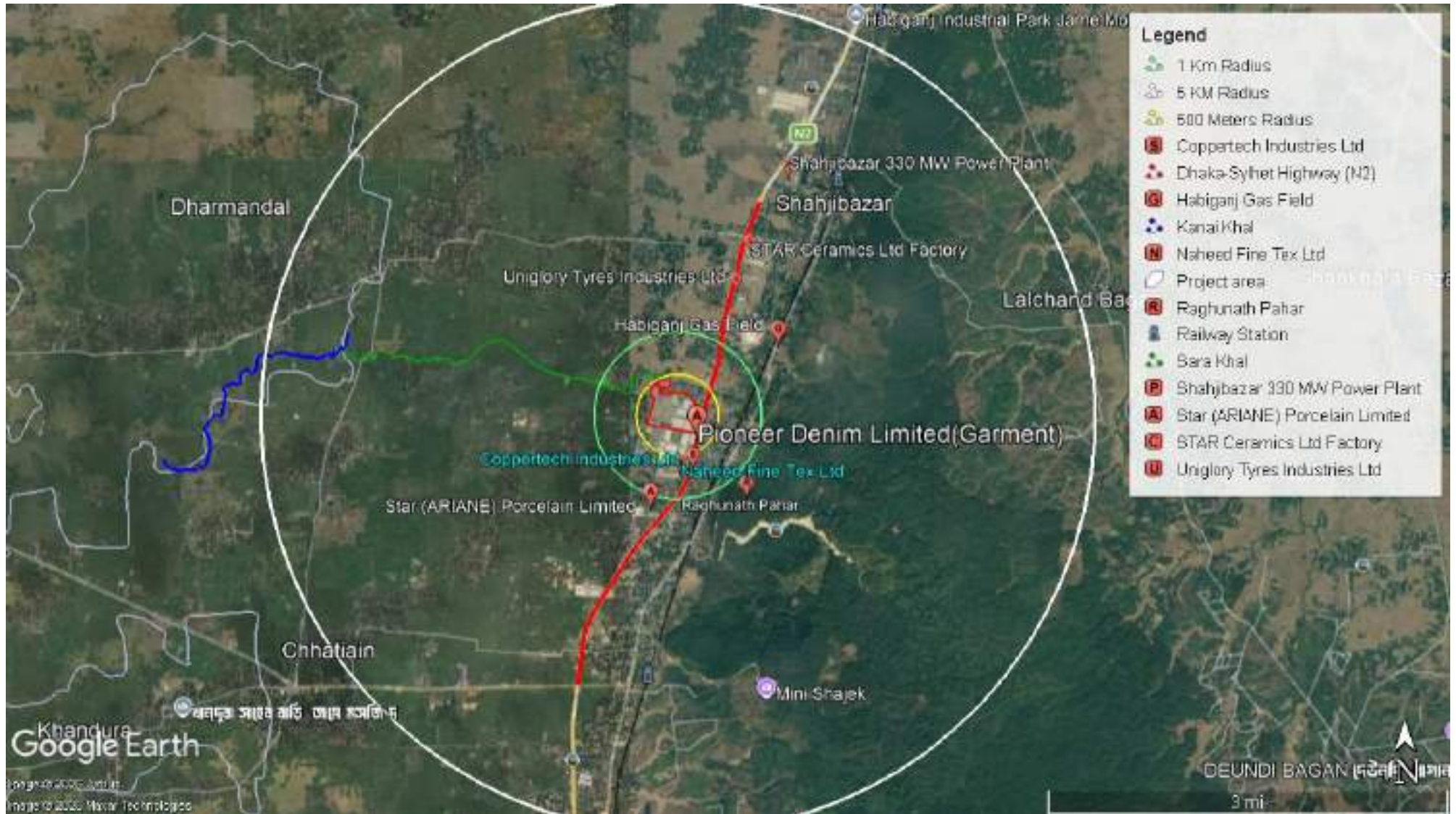


Figure 4.12: 500 m, 1km & 5 KM surroundings of the proposed unit.

Existing four direction land use of the project area



Northern Side



Southern side



Eastern Side (N2)



Western Side

4.3.3 Geology

The project site is within the Surma–Kushiyara Basin of northeastern Bangladesh. The regional geology is dominated by recent Quaternary alluvial deposits, laid down by the Khowai, Kushiyara, and associated river systems.

The underlying geological formation primarily consists of unconsolidated alluvial sediments, including layers of clay, silt, fine sand, and occasional sandy lenses. These deposits are typical of active floodplain environments and have been formed through repeated flooding, sedimentation, and channel migration over geological time. No hard rock outcrops or tectonically active structures are present within the project area.

From a geological stability perspective, the area is considered geologically stable for industrial development, provided that appropriate foundation design is adopted to account for the compressible nature of floodplain sediments.

The soils of the Tract have developed largely on Madhupur Clay; which are nutrient poor and somewhat acidic. They are red or brown in color. In most places the changes from the floodplains to the Tract is quite sharp, but in some places the floodplain soils overlie the gently inclining edges. The Madhupur Tract is extensively dissected with narrow or broad valleys extending deep into the level landscape and the Drainage pattern is clearly dendrites. The higher-level lands are known as Chala and the valleys are called Baid. The valleys are cultivated with boro rice in the dry season by impounding the streams for irrigation.

The current project area has been marked on the Geological Map, Physiography map, General Soil Map in Figure 4.13, 4.14 & 4. 15. Most of the area of Bangladesh is a vast, low-lying alluvial plain, sloping gently to the south and southeast.

According to the Physiographic Map of Bangladesh the proposed project area falls within the Surma–Kushiyara Floodplain, which is a sub-region of the Sylhet Basin. This physiographic unit is characterized by low-lying alluvial plains, formed by sediment deposition from the Surma, Kushiyara, Khowai, and associated river systems. The area is typified by flat to gently undulating terrain, seasonal flooding during the monsoon, and the presence of numerous khals, beels, and floodplain depressions.

The Surma–Kushiyara Floodplain is hydrologically active and plays an important role in surface water drainage, groundwater recharge, and flood regulation, making careful management of land development, drainage, and wastewater discharge essential for industrial projects in this zone.

Geological Fault

The project site lies within the Sylhet Basin (Surma–Kushiyara floodplain) of northeastern Bangladesh, which is part of the tectonically active Bengal Basin influenced by regional plate interactions. The broader region is structurally influenced by significant tectonic elements associated with the Indian, Eurasian, and Burmese plates.

The project area does not lie on a mapped surface geological fault, although it is situated within the tectonically influenced Sylhet Basin where regional fault systems such as the Dauki Fault to the north and the NE–SW trending Sylhet Fault exert structural control. Therefore, seismic design considerations and appropriate geotechnical assessment should be incorporated into the facility design.

Any civil construction needs very careful attention and special foundation treatment as well as design is recommended. Provisions of BC Rules 1996 and BNBC 2020 have to be strictly followed.

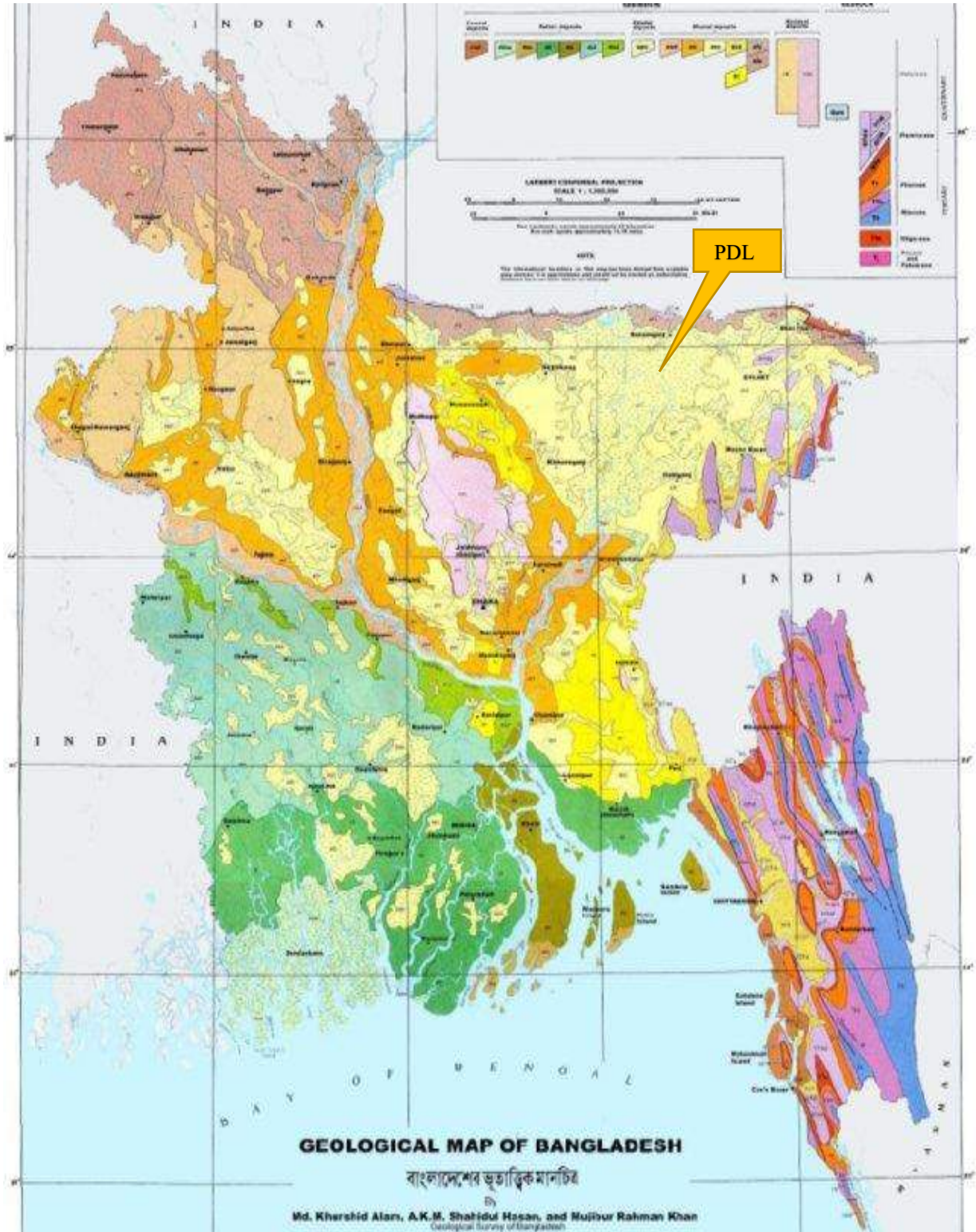
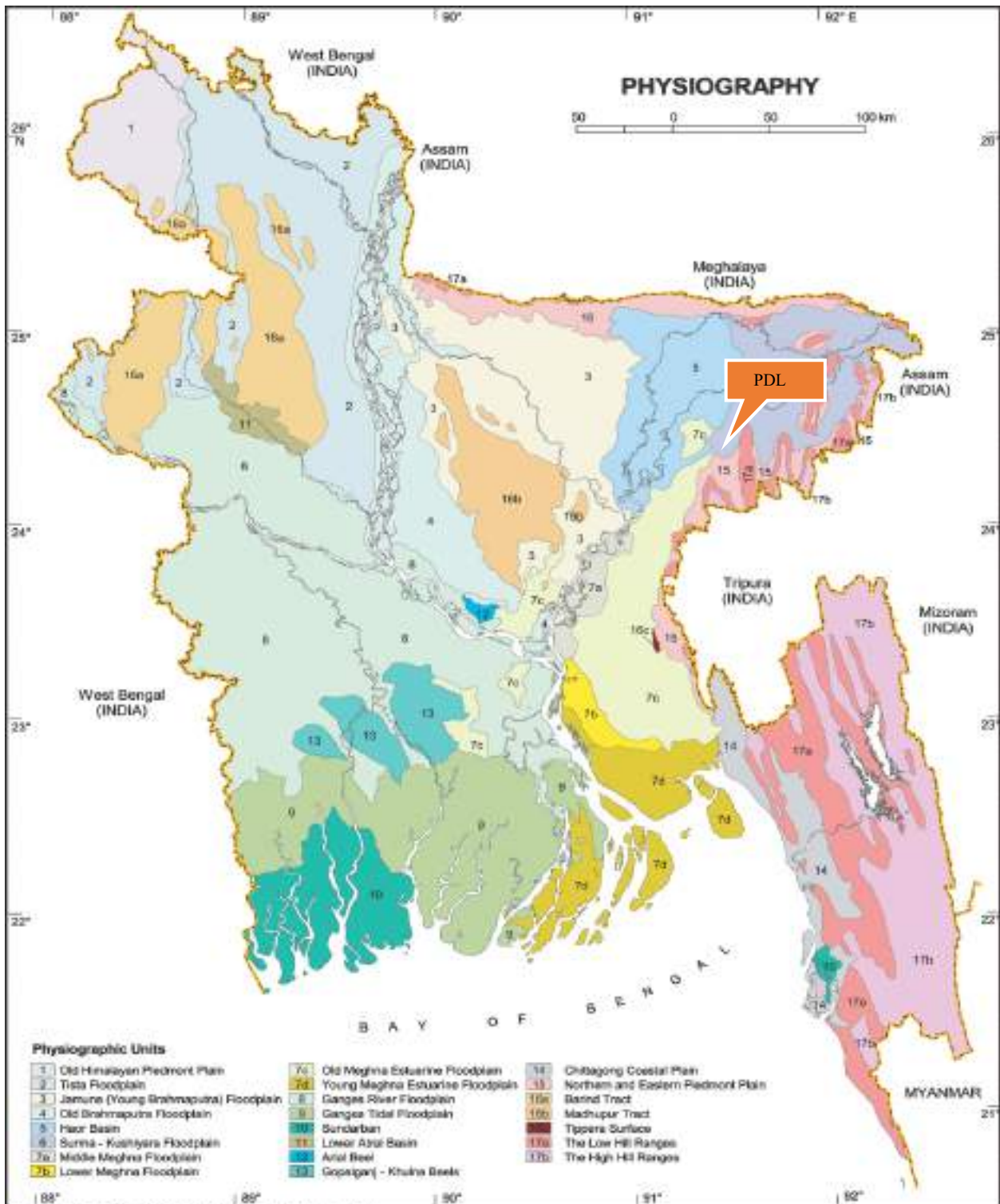


Figure 4.13: Geological Map of Bangladesh



Source: Modified From SARD, 1997; Rasheed, 1991; Rahman, 1982

Figure 4.14: Project Areas Marked on Physiographic Map of Bangladesh

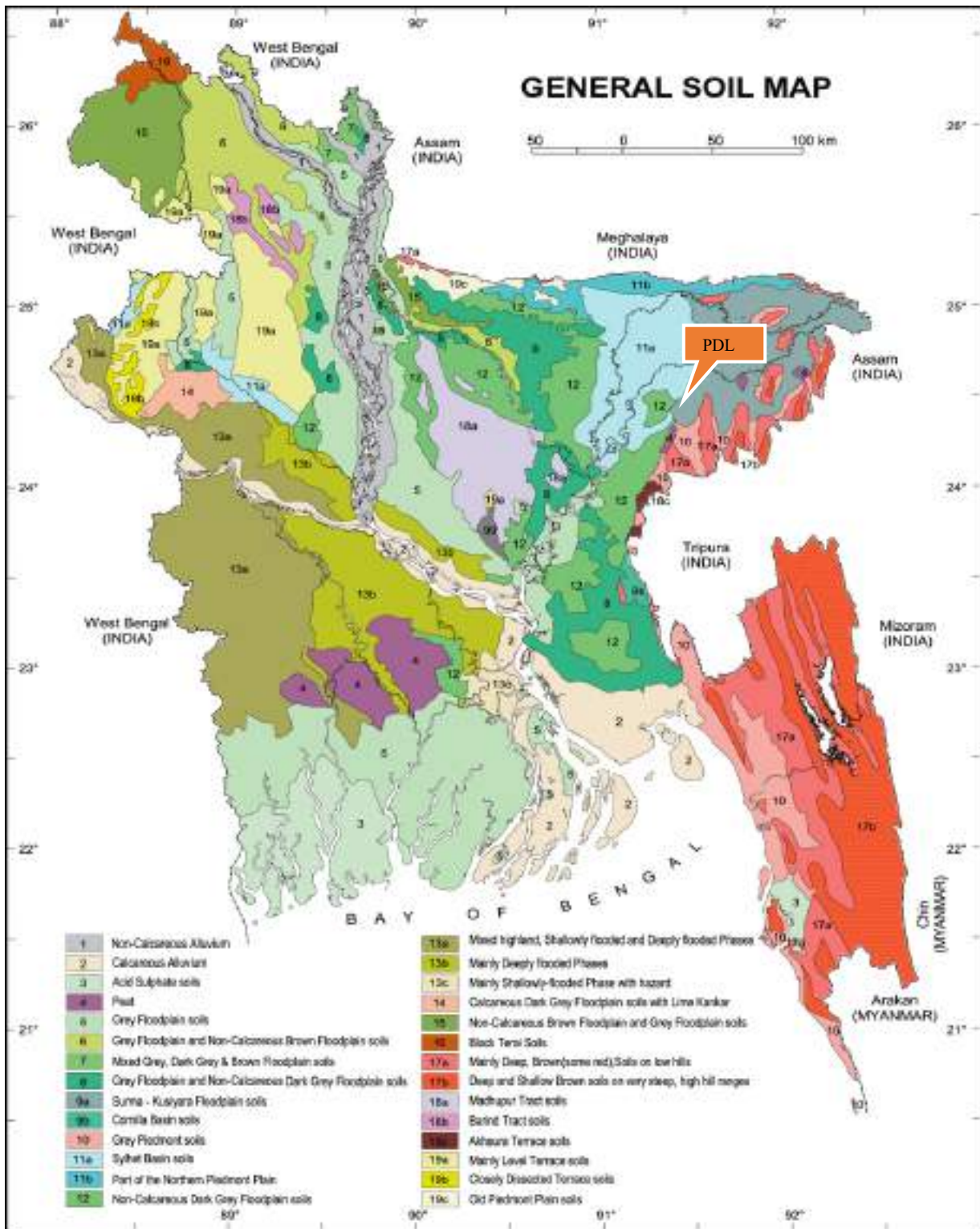


Figure 4.15: General Soil Map of Bangladesh

4.4 Hydrology

4.4.1 River System

The proposed project area within the Surma–Kushiyara river basin system of northeastern Bangladesh. This basin forms one of the major hydrological systems of the country and plays a vital role in regional drainage, flood regulation, and water resource availability.

Primary River

The Khowai River is the nearest major river to the project site, located approximately 2.5–3.5 km to the northwest. The river originates in the Tripura Hills of India, enters Bangladesh through Habiganj District, and flows through the floodplain before joining the Kushiyara River downstream. The Khowai River serves as the primary receiving water body for surface runoff and drainage from the surrounding area, including local khals connected to the project site.

Secondary and Downstream Rivers

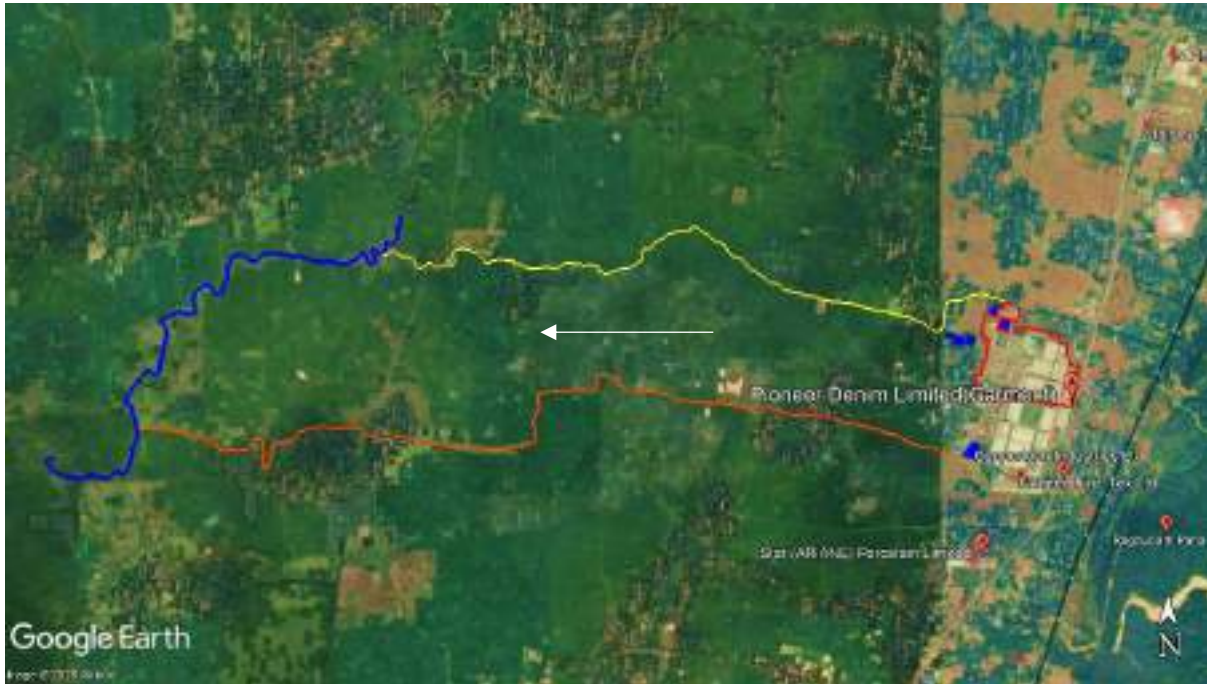
Downstream of the project area the Khowai River merges with the Kushiyara River, which is a major distributary of the Barak–Surma–Kushiyara river system. The Kushiyara River subsequently contributes to the Meghna River system, forming part of the larger Ganges–Brahmaputra–Meghna (GBM) delta network.

4.4.2 Drainage Systems

The drainage system of the project area is dominated by natural khals (canals), small streams, and adjacent floodplain depressions, which ultimately drain into nearby rivers such as the Khowai River and its tributaries. Surface runoff from the site generally follows a slow and meandering path due to the gentle slope and low elevation of the land.

During the monsoon season (June–September), heavy rainfall combined with upstream runoff often leads to temporary waterlogging in low-lying areas. In the dry season, most local khals carry little to no flow and function mainly as drainage conduits during rainfall events.

At present, site drainage is primarily through natural overland flow towards nearby lowlands and existing khals. For the proposed project, an internal drainage network comprising paved drains and controlled outfalls will be developed to ensure safe and efficient disposal of stormwater without causing adverse impacts such as flooding, erosion, or obstruction of natural drainage paths.



The figure shows the project site. The project boundary is marked in red. Local khals and low-lying drainage channels surrounding the site are indicated by green. Orange & Blue lines, showing natural flow directions toward the Kanai Khal, approximately 4.7–5 km northwest of the site. Arrows indicate the surface runoff direction, which guides stormwater through natural drainage pathways. The map also includes the north arrow for reference.

4.4.3 Annual Flooding

Baghashura Union is prone to annual monsoon flooding due to its low-lying topography and proximity to the Khowai River and local khals. Flooding typically occurs between June and September, lasting 7–15 days. Impacts include temporary inundation of agricultural land, minor damage to roads, and potential water contamination. While most impacts are reversible, localized erosion and persistent waterlogging may result in longer-term effects. Mitigation measures such as embankment strengthening, proper drainage, and community preparedness are recommended to reduce flood-related risks

4.5. Water Sources of Project Area

The project area depends primarily on groundwater from hand and deep tube wells for drinking water, while rivers, khals, and seasonal ponds serve agricultural and domestic needs. Shallow aquifers face seasonal yield fluctuation and localized iron contamination, whereas deep aquifers provide reliable arsenic-safe water. Surface water is abundant during monsoon but limited in dry months and may become temporarily contaminated during floods. Rainfall contributes significantly to groundwater recharge and surface water availability

.4.5.1 Surface Water

Surface water in the project area is dominated by the Khowai River, local khals, and seasonal ponds. These water bodies are primarily rain-fed and show strong seasonal variation, with high flows and occasional flooding during the monsoon, and reduced water levels during the dry season. Surface water is widely used for irrigation, fisheries, and domestic non-potable purposes. Water quality is generally suitable for these uses, although sedimentation and microbial contamination occur during floods. Proper management is necessary to ensure sustainable use and avoid flood or pollution-related impacts

Surface water quality

Surface water sampling and Physical & Microbiological Analysis of surface water at different location (Limited Parameter) was undertaken to understand the baseline water quality of the surface water in the study area. Surface water samples had been collected from Eight selected surface water sources representing different parts of the study area.

Eight (08) samples of surface water were collected from study area and then sample was sent to the ITS Labtest Bangladesh Ltd. (Govt. Approved Testing Laboratories) to assess the quality of the surface water. According to the test result,

The maximum DO (7.6 mg/l) was found 1 km Downstream of the project and the minimum (6.6 mg/l) at Reserve tank form ground water. pH of all sampling location was within the EQS (6.5-8.5) range for inland surface water.

The maximum TDS (310 mg/l) was found 1/2 km Downstream of the project and the minimum (90 mg/l) at Reserve tank form ground water. TDS of all sampling location was within the EQS (1000 mg/L) range for inland surface water.

The maximum DO (5.7 mg/l) was found 1/2 km Downstream of the project and the minimum (2.55 mg/l) at Downstream 0.5 km of south khal. Do of all sampling location was out of the EQS (≥ 6 mg/L) range for inland surface water.

The maximum Hardness (150 mg/l) was found 1 km Downstream of the project and the minimum (72 mg/l) at Reserve tank form ground water Hardness of all sampling location was within the the EQS (500 mg/L) range for inland surface water.

The maximum BOD (8 mg/l) was found South side canal Downstream (1km) of the project and the minimum (2.5 mg/l) at Reserve tank form ground water BOD of all sampling location was out of the EQS (≤ 12 mg/L) range for inland surface water.

The maximum COD (9.5 mg/l) was found South side canal Downstream (1km) of the project and the minimum (5.2 mg/l) at Reserve tank form ground water COD of all sampling location was within the EQS (10 mg/L) range for inland surface water.

EC of all sampling location was within the EQS (1000 ms/cm) range for inland surface water.

NO₃-N of all sampling location was within the EQS (7 mg/L) range for inland surface water.

The maximum NH₄-N (0.2 mg/l) was found Factory 1/2 km Downstream of the project and the minimum (0 mg/l) at Downstream 0.5 km of south khal. NH₄-N of all sampling location was within the EQS (0.1 mg/L) range for inland surface water Excluding Pond middle in the factory, 1/2 km Upstream. Factory 1/2 km Downstream (little bit).

The maximum PO₄-P (0.6 mg/l) was found South side canal Downstream (1km) of the project and the minimum (0 mg/l) at Downstream 0.5 km of south khal. PO₄-P of all sampling location was within the EQS (0.1 mg/L) range for inland surface water Excluding South side canal Downstream (1km), Pond middle in the factory & 1 km Downstream.

Total Cr. of all sampling location was within the EQS (0.02 mg/l) range for inland surface water excluding South side canal Downstream (1km) (0.03).

Pb of all sampling location was within the EQS (0.03 mg/l) range for inland surface water excluding Factory 1/2 km Downstream.

Hg of all sampling location was within the EQS (0.001) range for inland surface water excluding South side canal Downstream (1km). 1/2 km Upstream, Factory 1/2 km Downstream, 1 km Downstream.

Total Coliform of all sampling location was within the EQS (≤ 100 CFY/100mL) range for inland surface water. Water quality test result attached in **Annexure XII**

Table 4.1: Physical & Microbiological Analysis of surface water at different location

SL.	Test Parameter	Units	Results								Acceptable Limit
			Downstream 0.5 km of south khal	Upstream 0.5 km of south khal	South side canal Downstream (1km)	Pond middle in the factory	Reserve tank form ground water	1/2 km Upstream	Factory 1/2 km Downstream	1 km Downstream	
1	pH	-	7.32	7.28	7.5	7.1	6.6	7.2	6.9	7.6	6.5-8.5
2	TDS	mg/L	289	181	250	300	90	280	310	330	1000
3	DO	mg/L	2.55	3.8	5.5	4.3	3.9	2.8	5.7	5.2	≥6
4	Hardness	mg/L	135	111	110	132	72	93	120	150	500
5	BOD	mg/L	6	5.2	8	4.8	2.5	3.9	5	6	≤12
6	COD	mg/L	7.9	7.4	9.5	7	5.2	7.1	8	8.5	10
7	EC	ms/cm	597	380	520	623	185	585	630	675	1000
8	NO3-N	mg/L	4	5	4	3	2.7	3	2	3.2	7
9	NH4-N	mg/L	0	0.1	0.01	1	0.05	1	0.2	0	0.1
10	PO4-P	mg/L	0	0.2	0.6	0.2	0.09	0	0	0.2	0.1
11	Total Cr.	mg/L	0.1	0	0.03	0	0	0	0	0	0.02
12	Pb	mg/L	0	0.2	0	0.01	0	0.1	0.06	0	0.03
13	Hg	mg/L	0.01	0	0.002	0	0	0.02	0.03	0.04	0.001
14	Total Coliform	CFY/100mL	52	36	65	45	0	65	70	80	≤100

Date of starting 12/01/2026, Date of Completion 20/01/2026

Source: ITS Labtest Bangladesh Ltd. (Govt. Approved Testing Laboratories)

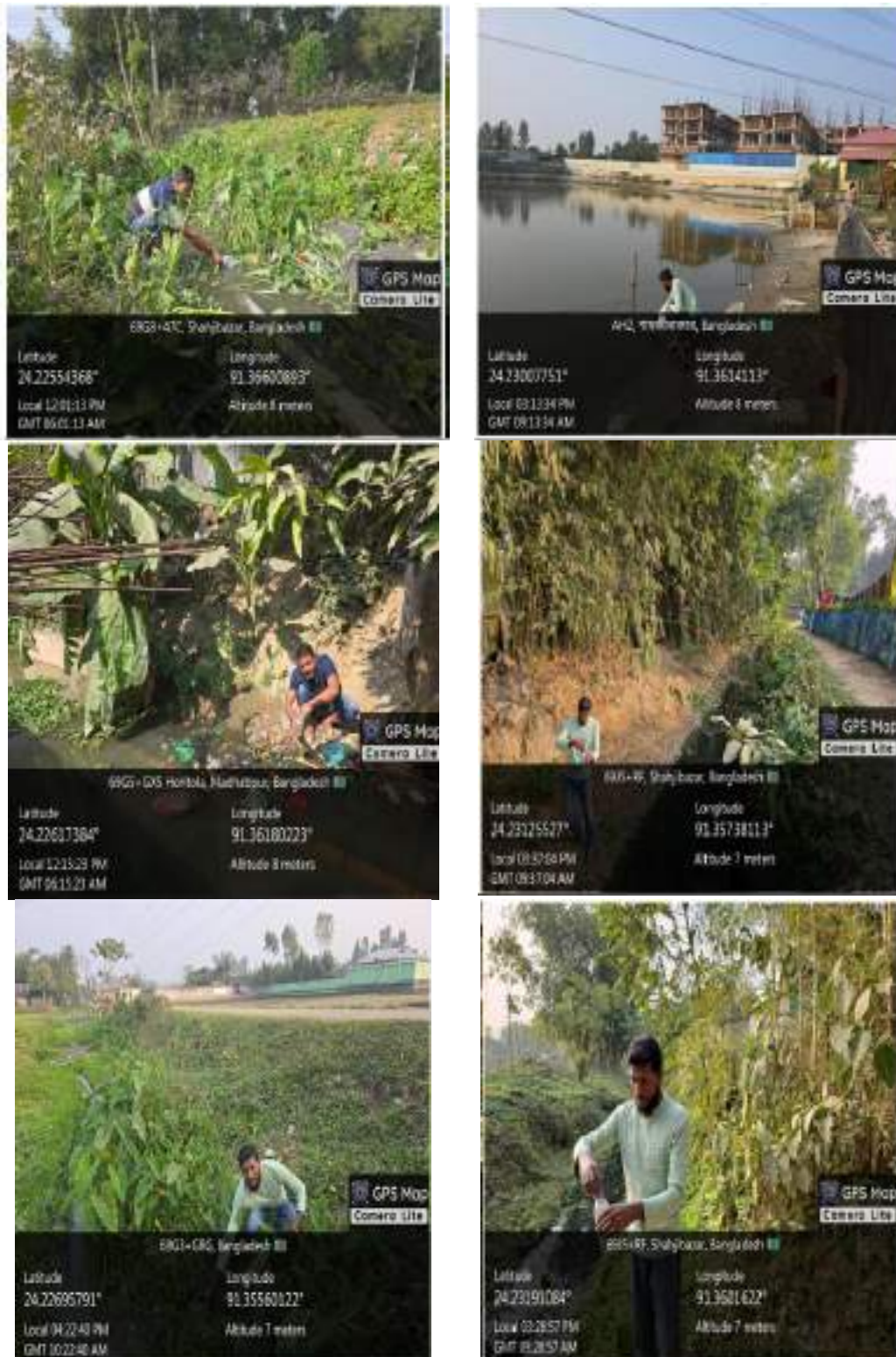


Figure 4.16: Surface Water Sampling Snapshot

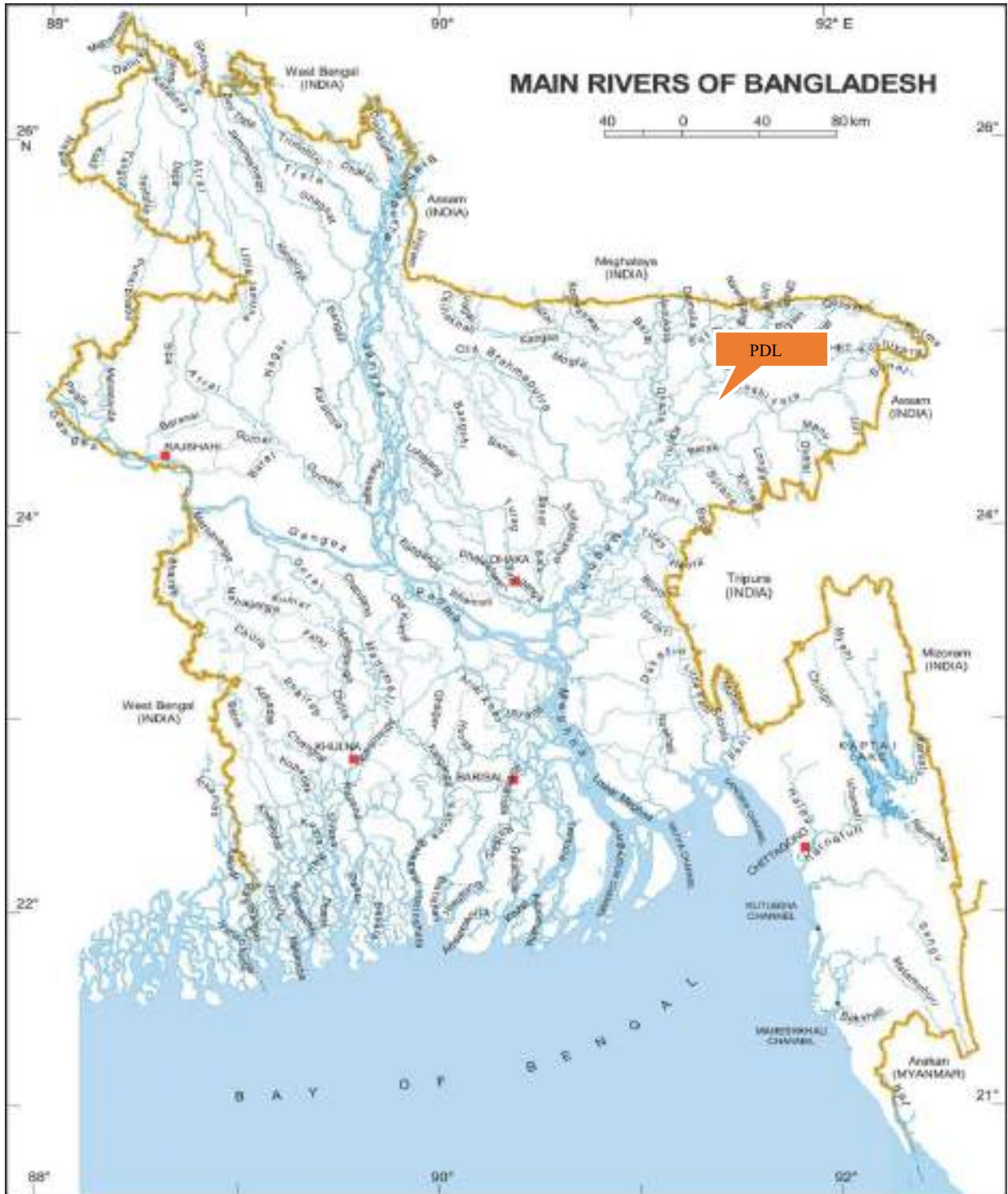


Figure 4.17: River Map of Bangladesh

4.5.2 Ground Water

Groundwater resources are flooding and stream flow in rivers penetrate earth surface and recharge groundwater reservoirs. Although Bangladesh has been considered rich in groundwater resources, the total groundwater storage data is absent. National Water Plan Phase-II estimated average groundwater as 21 cubic kilometers (cu km) in 1991. However,

with the increased trend of urbanization and irregular rainfall behavior, surface run-off has increased in recent times, which reduces groundwater recharge considerably. The groundwater level as reported by the figure (4.18) below is somewhere between 3m-6m below ground level (bgl).

The project site of Pioneer Denim (Garments Division) is located within the Sylhet Basin hydrogeological province. The region is characterized by extensive alluvial deposits consisting of alternating layers of clay, silt, and sand, forming a multi-layered aquifer system.

Groundwater occurs mainly within shallow to intermediate alluvial aquifers, which are hydraulically connected to surface water bodies and receive substantial recharge during the monsoon season.

The project area at Baghashura Union is underlain by shallow to deep alluvial aquifers with generally good groundwater potential. Drinking water supply is predominantly dependent on groundwater extracted through hand tube wells and deep tube wells. While hand tube wells provide widespread access, issues such as high iron concentration and seasonal yield reduction are observed. Deep tube wells tapping deeper aquifers provide arsenic-safe and reliable water throughout the year and are considered the most secure source. Overall, groundwater availability is adequate and no significant depletion has been reported in the area. Most people & industries within project impact area (1 km outside the project area) use ground water as source of Industrial and domestic purposes.

PDL is use water from its own Deep Tube Well & is striving to reduce the water consumption. Moreover, the surrounding condition favors the recharge of underground water aquifer as a result water table in this area would not lower significantly & there is no specific complaint in this area about non-availability of ground water.

The ground water quality data were collected from PDL which is using as drinking/process water after treatment for existing project. The ground water quality analysis report has been tabulated in Table 4,2

Table 4.2: Ground Water quality (limited parameters) of PDL

Sl. No.	Parameter	Result	(DOE) Bangladesh Standard for Ground Water
01	pH	6.7	6.0-9.0
02	Total Dissolved Solids	80 mg/l	1000 mg/l
03	Iron	8 mg/l	0.3-1.0 mg/l
05	Hardness (EDTA) as CaCo3	43.5 mg/l	(200-500) mg/l

Source: PDL

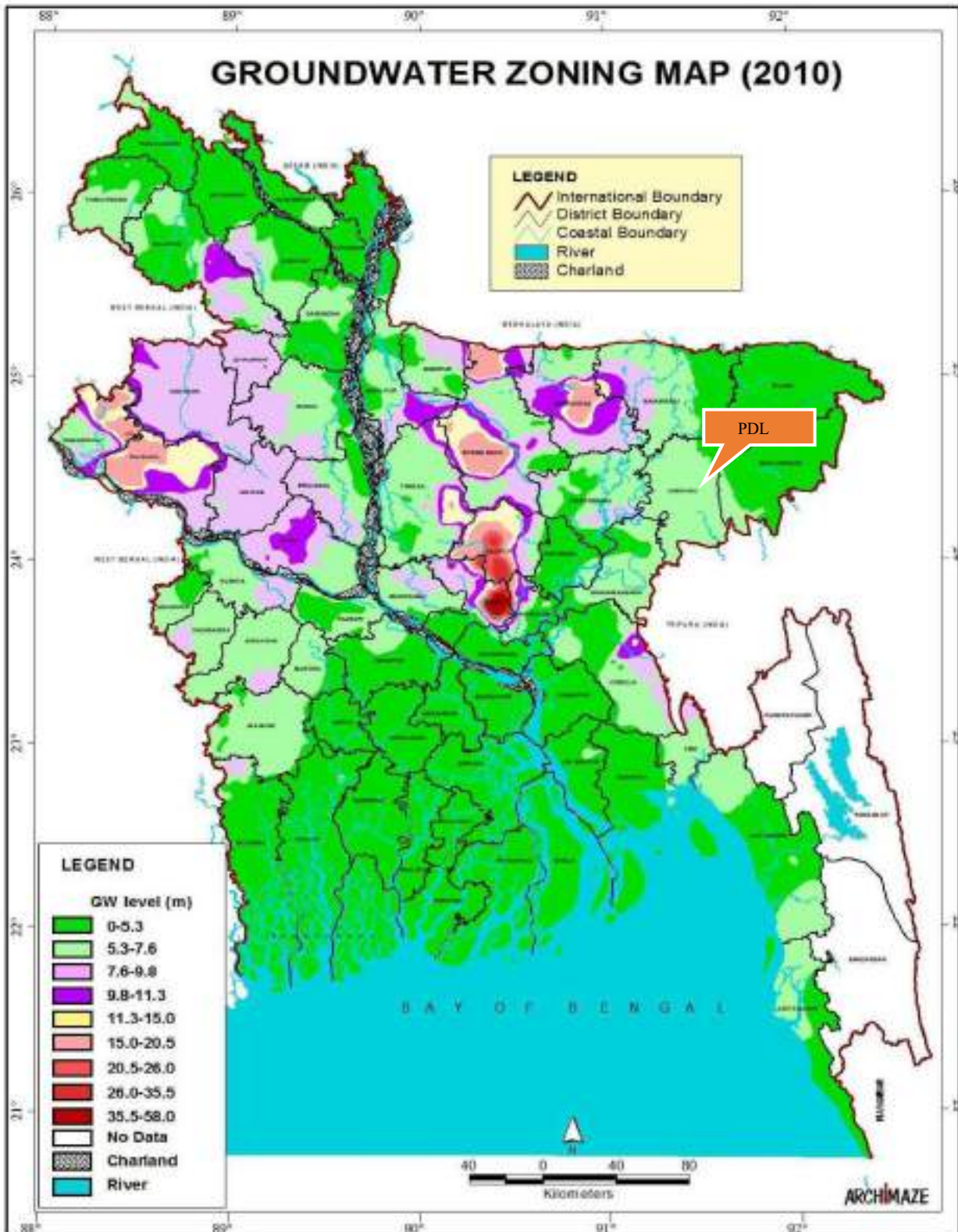


Figure 4.18: Ground Water Zoning Map of Bangladesh

4.6 Air Quality

Air quality depends on substances, which are present in atmosphere. Air is called polluted when these substances are present in such concentrations that they produce undesirable effects on human beings, animal and as well as plant life. These substances include gases (SO_x, NO_x, CO₂, etc.), Suspended Particulate Matter (smoke, dust, fumes, etc.), and many others. Concentration of different pollutants above allowable level can have adverse impacts on plant, animal and human life.

Air quality at the project site is typical of a mixed zone environment. Ambient pollutant concentrations are relatively low to practically non-existent. Suspended particulate matter (SPM) increases intermittently in areas where winds pick up dust over unpaved roads and exposed surfaces.

During site visit it is observed that the apparent ambient air quality of the area is fairly good. Air quality in the project complex is measured during Environmental study. The air quality data measured 23 & 24 January 2026 for 7 hours within complex & 0.5 km from factory and the data are given in Table 4.3. From the analysis it has been observed that in most of the sections the value of CO, CO₂, SO₂, NO_x, and SPM, PM₁₀, PM_{2.5} are below the maximum permissible limit of DOE guideline. Ambient air quality standards (**Annex-XIII**).

Table 4.3: Ambient Air Quality data of PDL

Test Result												
SL No	Location	Ambient Air Quality Result										
		SPM µg/m ³	PM _{2.5} µg/m ³	PM ₁₀ µg/m ³	NO _x µg/m ³	SO ₂ µg/m ³	CO ppm	CO ₂ ppm	VOC ppm	NO ₂ ppm	O ₃ ppm	CH ₂ O ppm
1	East side	105	34	64	0.0	0.0	0.4	405	0.0	0.0	0	0.05
2	West Side	101	37	66	0.0	0.0	0.3	411	0.0	0.0	0	0.03
3	North Side	109	36	67	0.0	0.0	0.3	409	0.0	0.0	0	0.02
4	South Side	110	39	66	0.0	0.0	0.2	413	0.0	0.0	0	0.02
5	In front of Dining Building	105	45	68	0.0	0.0	0.2	411	0.0	0.0	0	0.03
6	In front of R&D BUILDING	109	44	66	0.0	0.0	0.2	409	0.0	0.0	0	0.02
7	East Side 0.5 km from factory	111	41	63	0.0	0.0	0.3	402	0.0	0.0	0	0.03
8	West side 0.5 km from factory	102	43	64	0.0	0.0	0.3	408	0.0	0.0	0	0.02
Method of Analysis		Gravimetric	Gravimetric	Gravimetric	Jacob and Hochheiser	West-Gaeke	CO Meter	CO ₂ Meter	VOC Meter	Electrochemical	Electrochemical	CH ₂ O Meter

Source: EnviroCare International Limited lab report (25 January 2026)

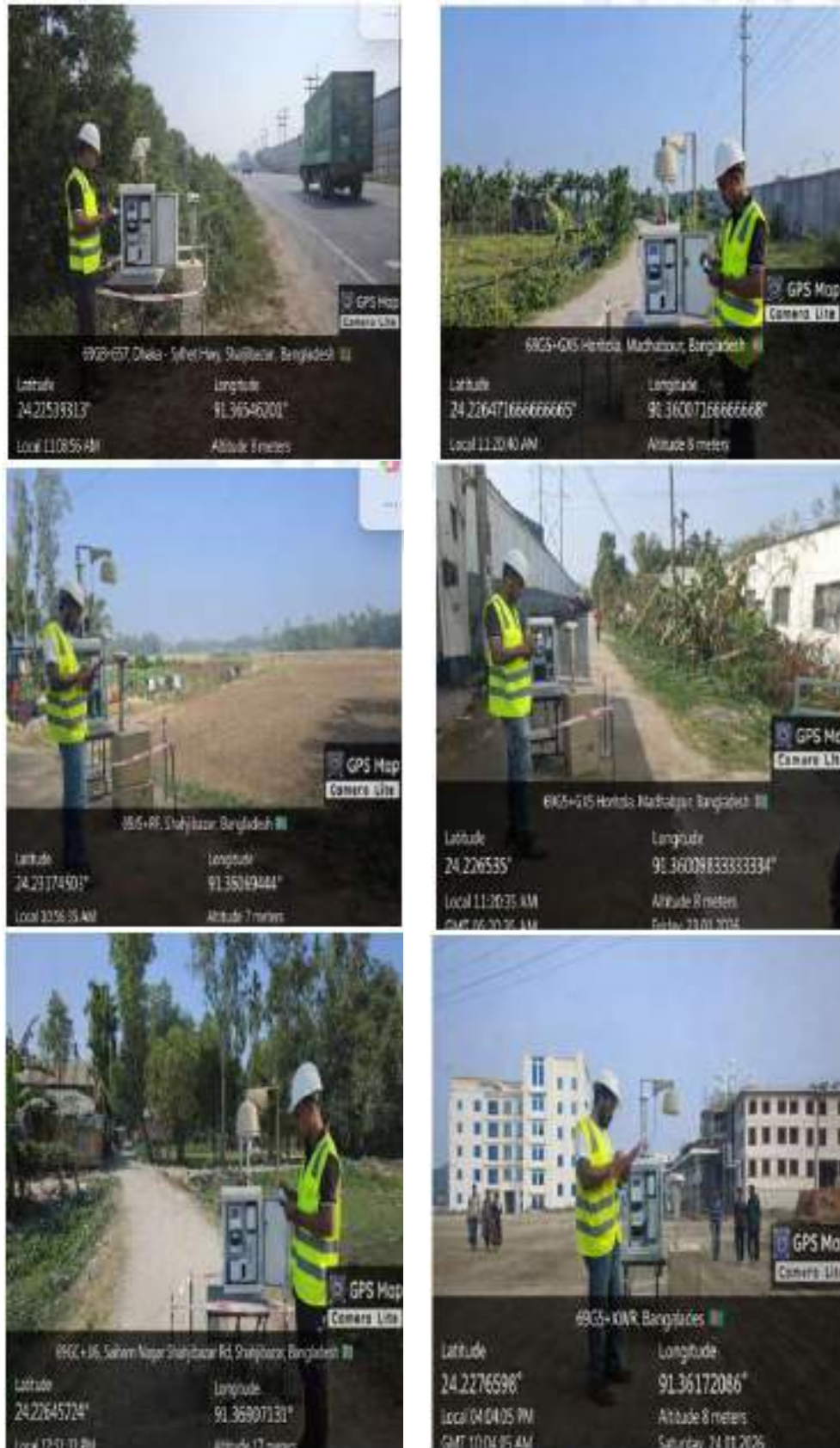


Figure 4.19: Air Quality Sampling Snapshot

4.7 Noise Level

As a part of the baseline study, noise level measurements were made at different locations in and around the project area. Noise measurements were performed during daytime 10.00 AM to 4.30 PM with a calibrated digital sound level meter (Model-SI-4033DS, made in Taiwan). Table 4.4 shows the summary of noise level measurements carried out in different locations in and around the study area. It appears that the project site is a very quiet area both during morning and evening time. The maximum recorded daytime noise level at the proposed site was 68.1 dBA. In the evening hours the noise level at the proposed site remains in the similar range as that of the daytime noise. However, the effect of traffic noise does not seem to have much influence on the noise level at the proposed site as it is located a bit away from the main road and is surrounded by boundary. The recorded noise levels at the project site are below the Industrial Zone allowable levels set in the ECR '2023, BNBC and the OSHA Guideline values. Details noise level analysis data are given below.

Table 4.4: Ambient Noise data of PDL

Ambient Noise Level Inspection					
SL No.	Location	Relevant Standard	Obtained value	Remarks	PPE Use
1	East Side	ECR – 60 dBA World Bank – 70 dBA OSHA – 90 dBA	63.2	Acceptable	No Need
2	West Side		68.1	Acceptable	No Need
3	North Side		61.3	Acceptable	No Need
4	South Side		64.6	Acceptable	No Need
5	In front of Dinning Building		65.5	Acceptable	No Need
6	In front of R&D BUILDING		66.2	Acceptable	No Need
7	East Side 0.5 km form factory		67.2	Acceptable	No Need
8	West side 0.5 km form factory		66.8	Acceptable	No Need

Source: EnviroCare International Limited lab report (25 January, 2026)

4.8 Meteorology (Climatic Condition)

The climate of Habiganj of which the project is a part, is average tropical monsoon with alternating dry/wet seasons. It has three main seasons:

- Summer/pre-monsoon - March and April
- Rainy season/monsoon - May to October
- Winter - November to February

Winter: November to February: The winter or dry season is the coolest and driest period. However, according to Bangladesh Meteorological Department (BMD) the highest temperature recorded during winter in Narayanganj is 32° C and a minimum of 12.7° C. Rainfall is very rare during this period. Winds are predominantly blowing from the Northwest but with a high frequency of calm wind situations.

Pre-Monsoon: March and April: In the summer pre-monsoon season and the early months of the wet seasons, the highest temperatures are reached. The monthly average temperature can rise up to 36° C. During this period, air becomes more humid, rainfall increases, and heavy rains with thunderstorm occur.

Monsoon: May to October: In the wet season more than 85% of the total annual rainfall occurs. Monthly average temperatures remain high with a maximum of 32.3° C. The period of periodic heavy thunderstorms lasts until June. June to mid-September to early November is the transitional period with decreasing rainfall, often thunder the project area has been marked in the climate map of Bangladesh. In Figure 4.25.

Information about rainfall data was collected from BBS, BMD, Bangladesh Agricultural Research Council's database and Annual rainfall of Narayanganj zila is 2376 mm. More than 90% of the total annual rainfall occurs in monsoon. The project area has been marked in the average rainfall map of Bangladesh in Figure 4.26 From the map it is evident that the mean rainfall varies from 2500 mm to 3000mm.

Table 4.5: Climate table // Weather by Month Madhabpur

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C (°F)	18.5 °C (65.3) °F	21.5 °C (70.8) °F	25.2 °C (77.4) °F	27 °C (80.7) °F	27.5 °C (81.5) °F	27.7 °C (81.8) °F	27.5 °C (81.4) °F	27.6 °C (81.7) °F	27.3 °C (81.1) °F	26 °C (78.8) °F	22.8 °C (73) °F	19.6 °C (67.2) °F
Min. Temperature °C (°F)	12.6 °C (54.7) °F	15.4 °C (59.7) °F	19.4 °C (67) °F	22.8 °C (73.1) °F	24.3 °C (75.7) °F	25.3 °C (77.6) °F	25.4 °C (77.6) °F	25.3 °C (77.5) °F	24.8 °C (76.6) °F	22.7 °C (72.9) °F	18 °C (64.5) °F	14.2 °C (57.6) °F
Max. Temperature °C (°F)	24.5 °C (76.1) °F	27.6 °C (81.7) °F	31.1 °C (87.9) °F	31.9 °C (89.4) °F	31.6 °C (88.8) °F	31 °C (87.8) °F	30.6 °C (87) °F	30.9 °C (87.7) °F	30.8 °C (87.4) °F	30 °C (85.9) °F	27.9 °C (82.2) °F	25.2 °C (77.3) °F
Precipitation / Rainfall mm (in)	7 (0)	27 (1)	116 (4)	258 (10)	403 (15)	368 (14)	320 (12)	269 (10)	285 (11)	172 (6)	29 (1)	12 (0)
Humidity (%)	69%	62%	61%	76%	82%	85%	85%	84%	85%	83%	75%	73%
Rainy days (d)	1	3	6	13	18	20	21	21	19	11	2	1

	January	February	March	April	May	June	July	August	September	October	November	December
avg. Sun hours (hours)	8.3	9.3	9.2	8.0	7.3	6.5	6.5	7.1	7.4	8.0	8.1	7.4

Data: 1991 - 2021 Min. Temperature °C (°F), Max. Temperature °C (°F), Precipitation / Rainfall mm (in), Humidity, Rainy days. Data: 1999 - 2019: avg. Sun hours

The difference in precipitation between the driest month and the wettest month is 396 mm | 16 inches. The average temperatures vary during the year by 9.2 °C | 16.5 °F.

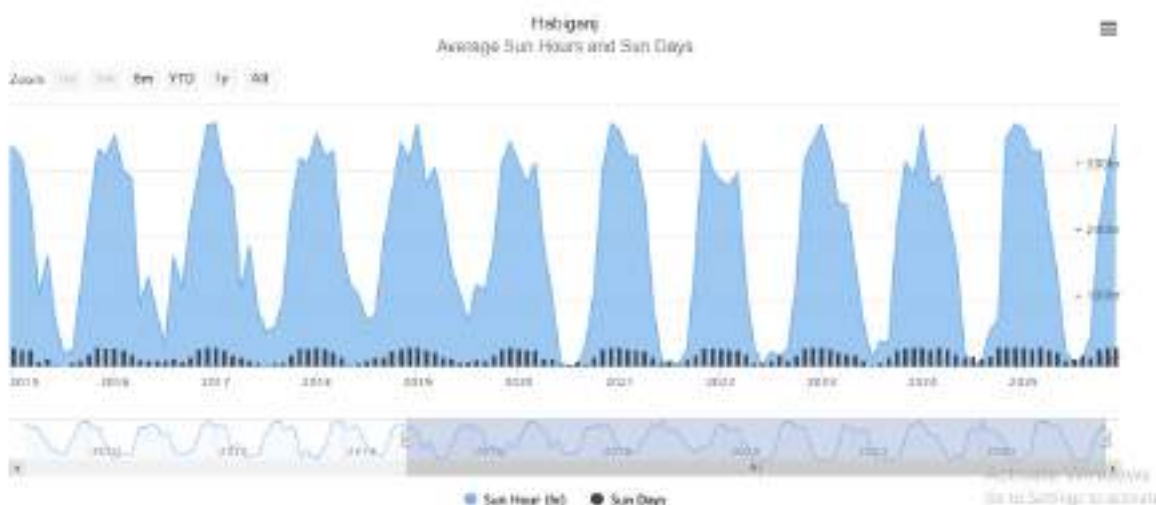
The month with the highest relative humidity is September (85.15). The month with the lowest relative humidity is March (61.31). The month with the highest number of rainy days is July (28.10 days). The month with the lowest number of rainy days is December (1.00 days).

Source: CLIMATE-DATA.ORG

4.8.1 Sunshine

The Pioneer Denim project site in Madhabpur, Habiganj experiences significant sunshine throughout most of the year, with average monthly sunshine totals ranging from approximately ~240 to ~330 hours/month (representing daily averages often above 8–10 hours in dry months). Sunshine days are high in the dry season (Nov–Apr) and substantially lower during the monsoon months (Jun–Sep) due to cloud cover and rainfall. This climatic pattern should be considered in planning outdoor operations, energy budgeting, and potential solar energy utilization.

The project receives an average solar radiation of approximately 4.6 kWh/m²/day, indicating favorable conditions for solar energy utilization. Integration of solar energy, even at a partial scale, can contribute to reduced greenhouse gas emissions and improved environmental performance of the project.



Source: BWA

Figure 4.20: Annual Sun Hours and Sun Days Averages

4.8.2 Rainfall

The project site experiences a humid, monsoon-influenced climate with significant seasonal variation in rainfall. Average monthly precipitation shows very low rainfall in the dry winter months ($\approx 5\text{--}20$ mm in Jan–Feb and Nov–Dec) and substantially higher rainfall during the pre-monsoon and monsoon periods ($\approx 230\text{--}580$ mm/month from Apr through Sep). The peak rainfall typically occurs in June–July, reflecting the influence of the southwest monsoon. These precipitation patterns should be considered in stormwater management, drainage design, and soil erosion control planning



Figure 4.21: Yearly Rainfall and Rain Days Averages

4.8.3 Annual Cloud and Humidity

The project site experiences significant seasonal variability in atmospheric moisture and cloudiness. Annual average relative humidity ranges from approximately 64% in March to around 86% during the monsoon months (June–August), with an overall humid tropical monsoon climate. Cloud cover follows a similar seasonal pattern, with the lowest values ($<15\%$) in the dry season (December–February) and higher cloudiness ($>50\%$) during the monsoon (June–September). These climatic conditions influence solar radiation, thermal comfort, and environmental management considerations for the project.

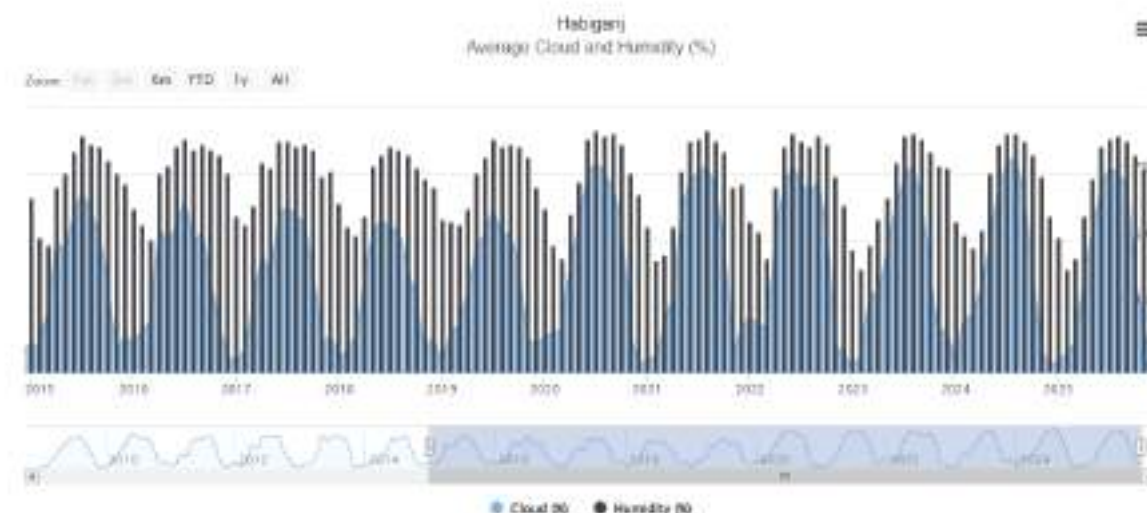


Figure:4.22: Annual Cloud and Humidity Averages

4.8.4 Wind Speed and Direction

The project site experiences predominantly low to moderate average wind speeds, ranging from about ~3 km/h in the dry winter months to ~6–8 km/h during the monsoon season. These wind speeds are typical for the region and reflect seasonal atmospheric circulation patterns. Wind effects on air quality and dispersion of pollutants are considered minor under normal conditions, but monsoon winds may influence dispersion during heavy rainfall events.

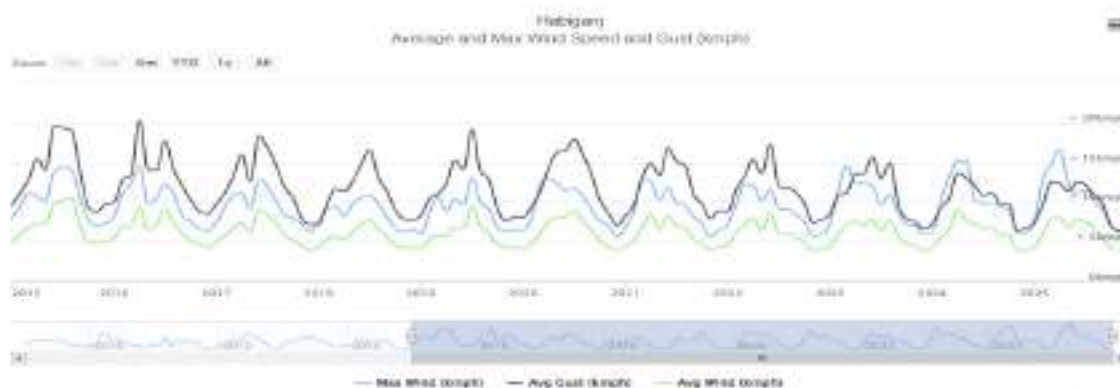


Figure:4.23: Wind Speed and Direction

4.9 Seismicity3

The project site located in an area classified as Seismic Zone-4 (Very Severe) according to the Bangladesh National Building Code (BNBC) seismic zoning provisions. Under the latest seismic zoning adopted in BNBC-2020, this zone has a seismic coefficient (Z) of 0.36 g for maximum considered ground motion on firm rock or stiff soil conditions. The classification reflects the relatively high seismic hazard in northeastern Bangladesh and the need for appropriate earthquake-resistant design of structures. All buildings and structural elements for the project shall be designed in accordance with BNBC seismic design requirements and relevant geotechnical conditions to

ensure life safety and structural integrity under seismic events. The project area has been marked in the seismic map of Bangladesh in Figure 4.28.

4.10 Fisheries

The project site is located near small rivers, khals, ponds, and low-lying floodplain wetlands that form part of the local inland fisheries resources. These water bodies support local fish species and are used for both subsistence and small-scale commercial fishing where seasonal rainfall and monsoon flooding maintain habitat connectivity for freshwater fish.

Capture Fisheries Predominantly in rivers, khals, and floodplains. Common freshwater species include: Rohu (*Labeo rohita*), Catla (*Catla catla*), Mrigal (*Cirrhinus mrigala*), Tilapia (*Oreochromis niloticus*) Minor carps, snakeheads, and catfish species. Small community ponds are used for semi-intensive aquaculture. Seasonal Wetlands / Beels

Serve as nursery and breeding habitats during monsoon flooding & Support migration of juvenile fish into rivers and khals.

During site visit & public consultation that is observed fish collection of the nearest khal decrease significantly

4.11 Biological Environment

Historically, the country has been endowed with a rich diversity of terrestrial and aquatic flora and fauna. The area is not heavily populated with the intensity of population, some of the highest on the earth. This has brought about vast pressures on the eco-system with the consequent loss of habitat for the biota and leading to species extinction or endangering their survival.

Since no long-term ecological survey was carried out at this stage of study, so no complete list of terrestrial fauna is available. But a number of avian species were observed during field visit in this area including crow, shalik, sparrow, etc. In addition to the avian species, the habitats are likely to contain verity of reptile, mammals and invertebrates. No wild animals inhabit and endangered species are present in this area.

The project is expected not to have any negative effect on the terrestrial flora, as the activities associated with the project are essentially same as what the area has experienced over the past few years.

4.12 Bio-ecological Zones

The bio-ecological component generally refers to flora and fauna, their present status, description and habitats based on the nature and type of the project activities. Temperature, rainfall, physiographic variations in soil and different hydrological conditions play vital roles

in forming diverse ecosystems in the different geographic areas in Bangladesh. The ecosystems of Bangladesh could be categorized into two major groups, i.e. (i) land based and (ii) aquatic. The land-based ecosystems include forest and hill ecosystems, agro-ecosystems and homestead. Ecosystem; while seasonal and perennial wetlands, rivers, lakes, coastal mangroves, coastal mudflats and chars, and marine ecosystems fall into the aquatic category. Each of the above ecosystems has many sub-units with distinct characteristics as well. IUCN Bangladesh in 2002 classified the country into twenty-five bio-ecological zones (Figure 4.26). The project area falls under Surma–Kushiyara Floodplain bio-ecological zone of Bangladesh, characterized by fertile floodplains, wetlands, and diverse aquatic ecosystems.

The status of the flora and fauna of the project area is determined by specific assessment of both the terrestrial and aquatic environments, review of literatures relevant to the location and identification of species through primary (transit walk, interviews) and secondary sources but there have been identified only terrestrial environment in the project influence area (PIA).

The land for the proposed project is not being used for any purpose last few years Although, the surrounding of this land provides good terrestrial habitat for the flora and faunal species. Diverse flora and faunal species were found during the visit surrounding the project area.

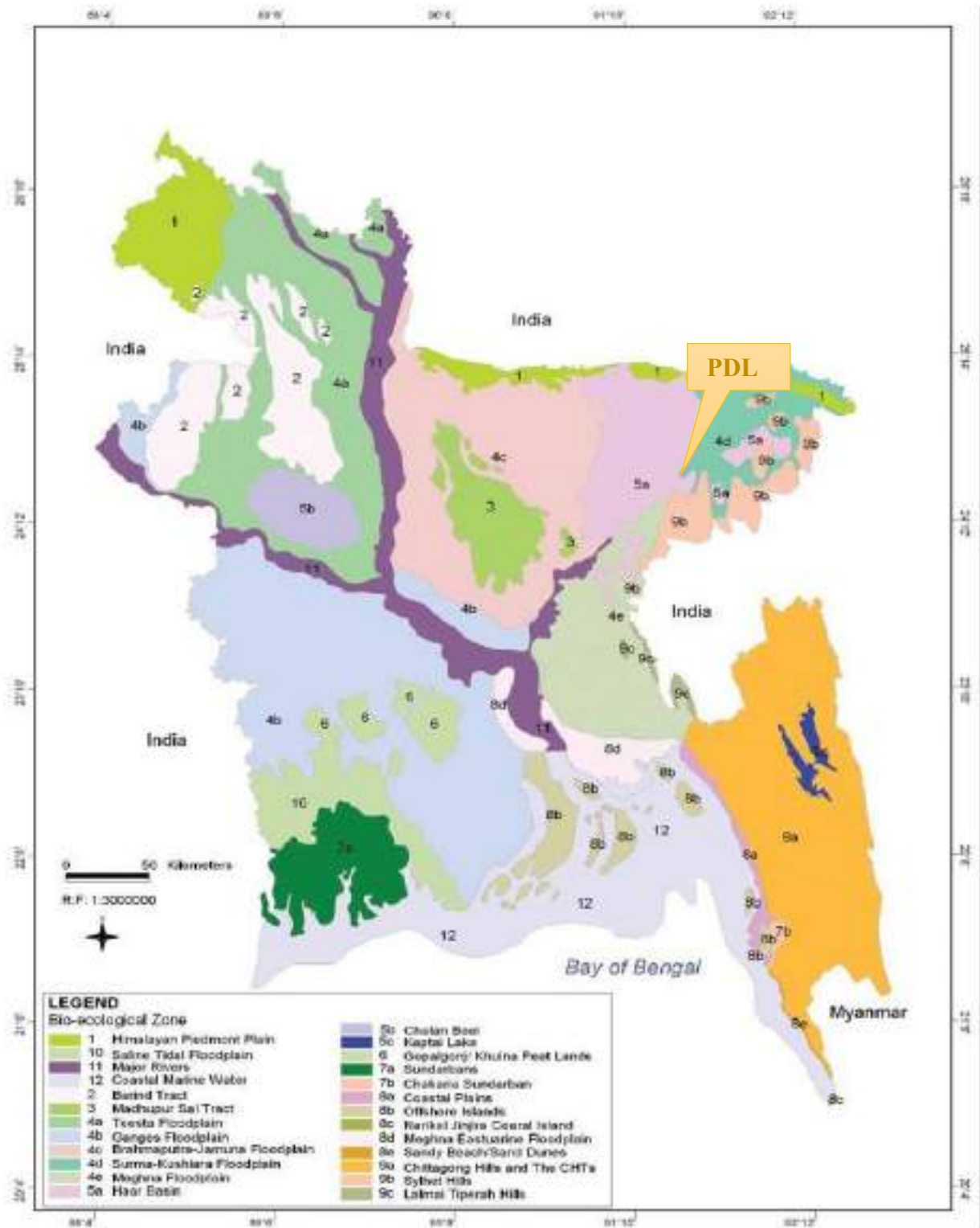


Figure 4.24: Bio-ecological zones of Bangladesh

Flora and Funa

The climate and the location of Habiganj district favour the growth and development of a diverse array of plant. For distinct vegetation and different echo system, the district remains in the evergreen and semi evergreen forest among ten divisions of its kind. The district is only a few feet above to the sea level. It is intersected by a few tortuous and sluggish rivers. Due to the existence of a bit different characteristics in nature, the trees and plants growing in the district are somewhat different from those growing in most of the other districts of the country. The main crops of Habiganj district are paddy, tea, potato, ground nut, battle leaf etc. The district is famous for growing a considerable quantity of tea. More than 20% of tea gardens of Bangladesh are located in this district. Tea grows in moist and hot climate. It generally grows on the slope of hills and hilly regions. It requires excessive rain but rain water must not stay at the root. The basic conditions required for growth of tea prevail in this district and as such plenty of tea grows here. Mango (*Mangifera indica*), black berries (*Syzygium cumini*), jack fruits (*Artocarpus heterophyilus*), banana (*Musa sapientum*), coconut (*Cocos nucifera*), orange (*Citrus reticulata*), papaya (*Carica papaya*), lichi (*Litchi chinensis*), dates (*Phoenix sylvestris*), water melons, guava (*Psidium guajava*), wood apples (*Aegle marmelos*) and palms (*Borassus flabellifer*) grow in the district. A good variety of flower plants like rose, palash (*Butea monosperna*), shimul (*Bombax ceiba*) and chameli (*Jasminum pubescus*) are found all over the district. There are several small hills covered with green grass and bamboo bushes. Sun grass and bara bamboo (*Dendrocalamus lirandissli*) trees are abundant all over the district.

The most valuable timber trees such as jarul or ajhar (*Lagerstroemia speciosa*), chaplasta, gundroi (*Cinnamonum glauduliformum*), kurta (*Sida acuta*), rata (*Dysoxyhum binee tariferum*) and poma (*Cerdrela toona*) are largely available in the district, and are used for construction of house and boats. Simul (*Bombax ceiba*), mango (*Mangifera indica*), kadam (*Anthocephalus cadmba*) and harish (*Albizzia stipalata*) are used for making tea boxes. The important trees like shundi (*Mechelin sh*), ping (*Cynometra pobjandra*), koroi (*Albizzia procera*), karal (*Dipterocarpus sh*), jam or black berry (*Syzygiun cumini*), gamar (*Gmelina arborea*), marai, kai-enge, banak, jackfruit (*Artocarpus heterophyilus*), hartakey (*Terminalia chebula*), bazang, barun, hizal (*Barringtonia acutangula*) and kuma are also found in abundance in the district. Some of these trees and plants normally do not grow in most of the other districts in Bangladesh.

Fauna: Despite importance of ecological integrity and bio-diversity, loss of species and their natural habitats are rapidly increasing in recent years. Bio-diversity is being affected by over exploitation, deforestation, inefficient forest management, agricultural and industrial pollution etc. a proper inventory of the rich biological resources of the country should be made and the economic, social, ecological and ethical values of bio-diversity are yet to be realised and disseminated by all concerned. However, in Habiganj district, there has been fairly good stocktaking of the vertebrate fauna. About 100 years ago elephants were found in the hilly area of the district. Gradually they turned rare and ultimately vanished. Tigers (*Panthera tigris*) are also rarely found in the northern hilly part of the district. Wild boars (*Sus scrofa*), sambar (*Cervus unicolor*), hog deer (*Axis porcinus*), swamp deer (*Cervus duvauceli*) are seen in the district. Various kinds of wild birds have increased its beauty. A good number of birds of different colour, size and habits are found here. Teasing birds like crow (*Corvus splendens*) and kite (*Milvus migrans*) are found in good number. Game birds namely dove, pigeon, snipe, heron (*Mycticarax mycticarax*) and pankawri (*Phalacrocoran niger*) are found all over the district. Song birds like cuckoo (*Cuculus microplerus*), shyama (*Copsychus malabaricus*), doel (*Copsychus saularis*), koyel (*Eudynamis scolopacea*), mayna (*Gracula religiosa autra*) and nightingale (*Picnonotus cafer*) are found in different seasons. The cuckoo (*Cuculus microplerus*), the most popular song birds comes to our country at the beginning of spring. Many migratory birds come from abroad during autumn and winter. Hen(*Gallus spp.*), duck (*Caiaina sentulala*), pigeon (*Columba spp.*), dove (*Bhalcophaps indica*) are the domestic birds found almost in every household of the district. Snipe, jungle fowl and marsh partridges are also found.

Fish is an essential staple and plays a very important role in the economy of the locality particularly of the haor area. A large variety of indigenous fishes including carps and many smaller species are available in the district. In the fresh water the popular species are ruhi or salmon (*Labeo rohita*), mrigel (*Cirrhinus mrigala*), kalbous (*Labeo calbasu*), katla or carp (*Catla catla*), etc. Shoal fish (*Channa striatus*), scorpion-fish or singi (*Heteropneustes fossilis*) are also found in large quantity in beels and khals. Many other spieces of river and fresh water fishes are also found in the district. Of these the principal varieties are boal (*Wallago attu*), dhain, chital (*Notopterus chitala*), ghona, airh (*Mystus aor*), bagair (*Bagarius bagarius*), pangas (*Pangasius pangasius*), rita (*Rita rita*), bain or eel (*Mastacembelus armatus*), chapila (*Gudusia chapra*), bhagna (*Labeo boga*), nandail (*Labeo nandina*), bacha (*Eutsopichthys vacha*), pon, gargle (*Arius gagora*), kaulia, kapali, khorsols

mehsir, gulsha (*Mystus bleekeri*), tengra (*Mystus vittatus*), chanda (*Mene muculata*), tekchanda (*Gerres argyreus*), kachki (*Corica soborna*), baila (*Glossogobius giuris*), batashi (*Pseudotropius atherinoides*), ghausa, kakila (*Strogylura strogylura*), phalli or flat fish (*Notopterus notopterus*), tatkeni (*Crosscheilus latius*), pabda (*Ompok pabda*), chela (*Chela cachius*), gangchela, gazar (*Channa marulius*), koi (*Anabas testudineus*), kholisha (*Colisa fasciatus*), puti (*Barbus punctius*), sharputi (*Puntius sarana*), taki (*Channa punctatus*), walking fish (*Ophicephalus striatus*), malandi, bashpata (*Danio devario*), kakra (*Scylla serrata*), bheda or meani (*Nandus nandus*), shrimps and prawn (*Farfantetenaeus aztecus*) are found in the district. However, some of these varieties, specially those which inhabit the marshes and tanks, are dwindling due to over catching and other reasons such as use of insecticides and pesticides for crop production, etc.

In addition, some exotic varieties of fish such as telapia (*Oreochromis mossambicus*), nilotica (*Oreochromis niloticus*), silver carp (*Hypophthalmichthys molitrix*), grasscarp (*Cteopharyngodon idella*) are also cultivated in the district and they are also becoming very popular.

The project is expected not to have any negative effect on the terrestrial flora & fauna, as the activities associated with the project are essentially same as what the area has experienced over the past few years.

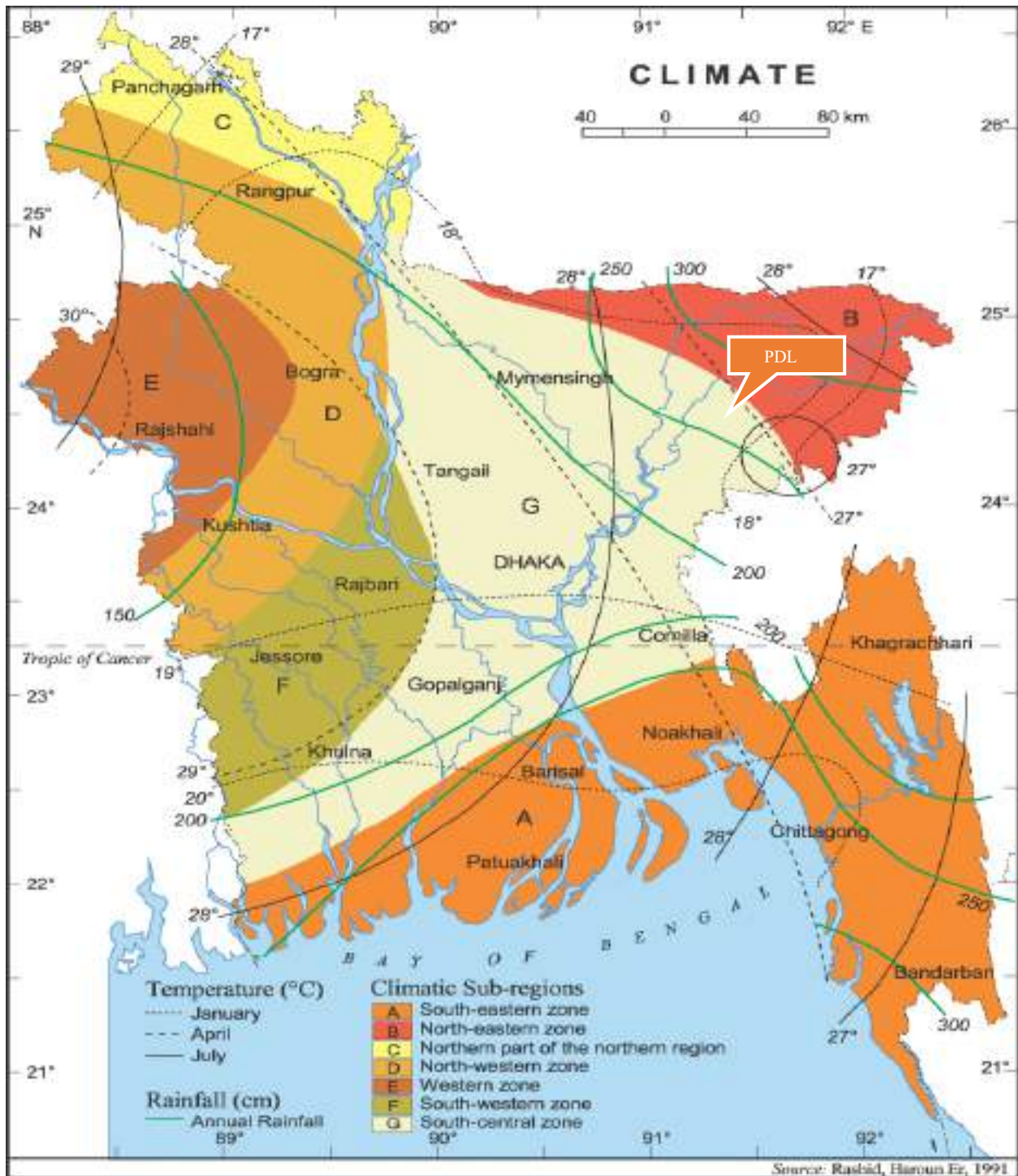


Figure:4.25: Climate Map of Bangladesh

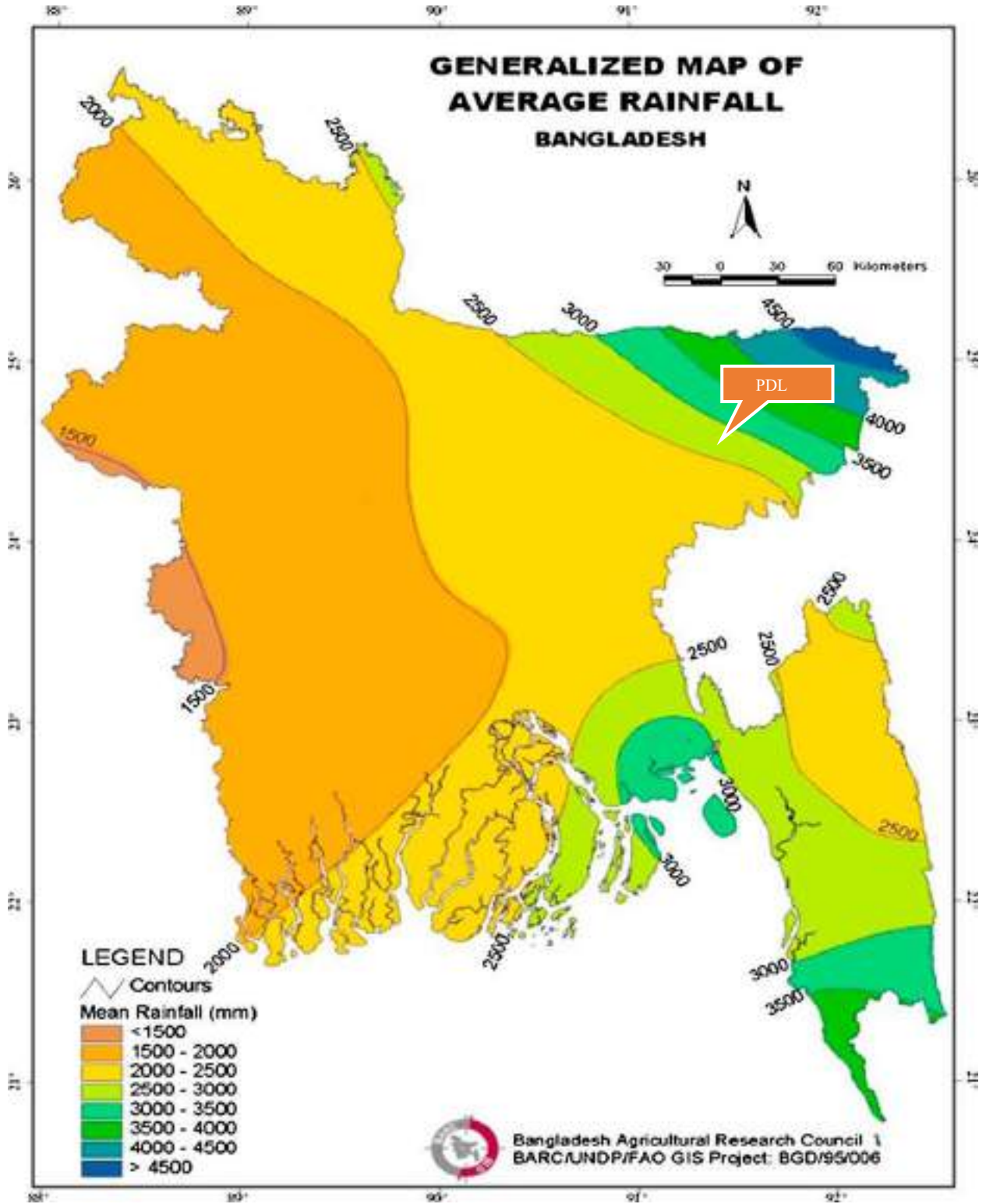


Figure:4.26: Average Rainfall Map of Bangladesh

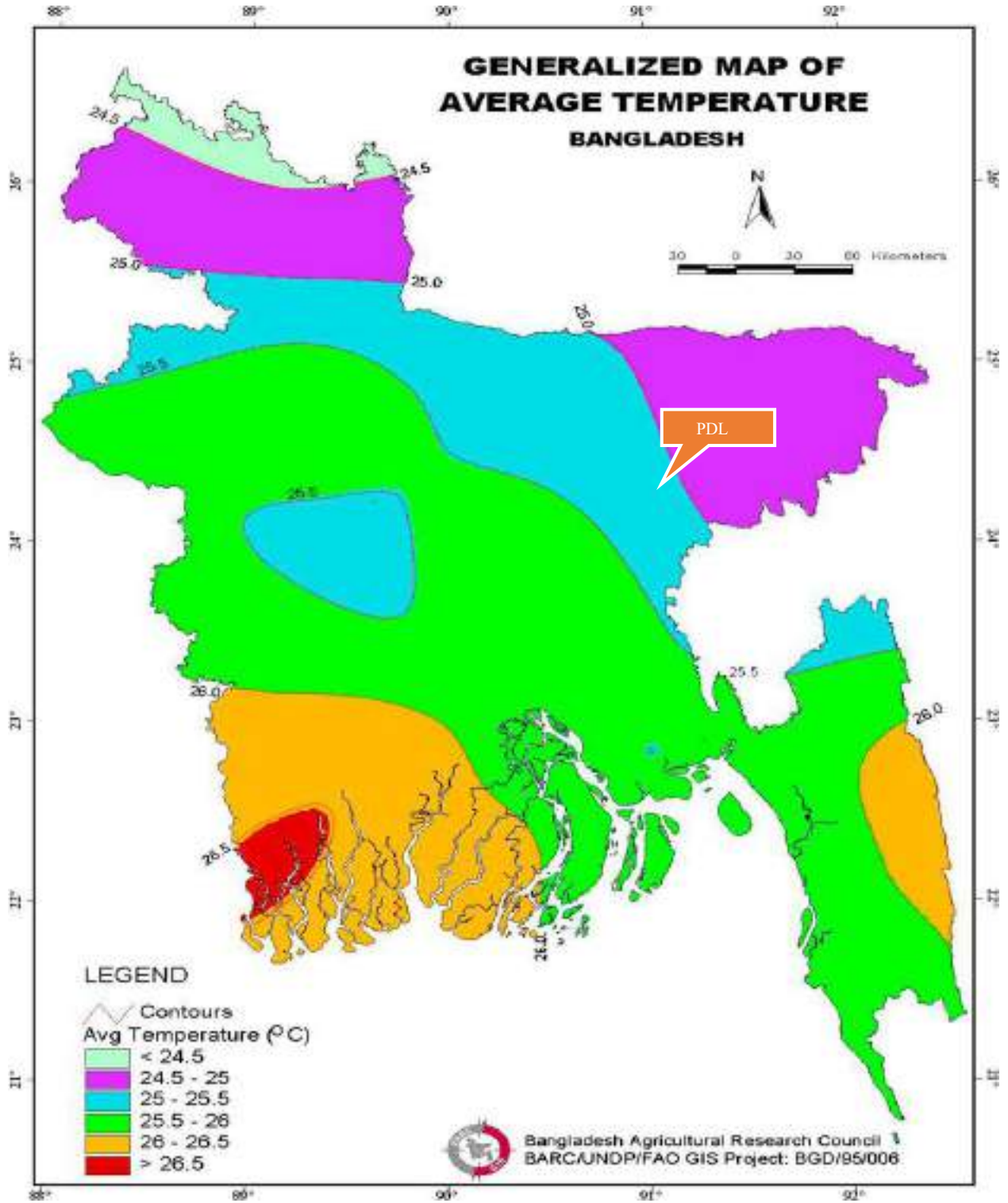


Figure:4.27: Average Temperature Map of Bangladesh

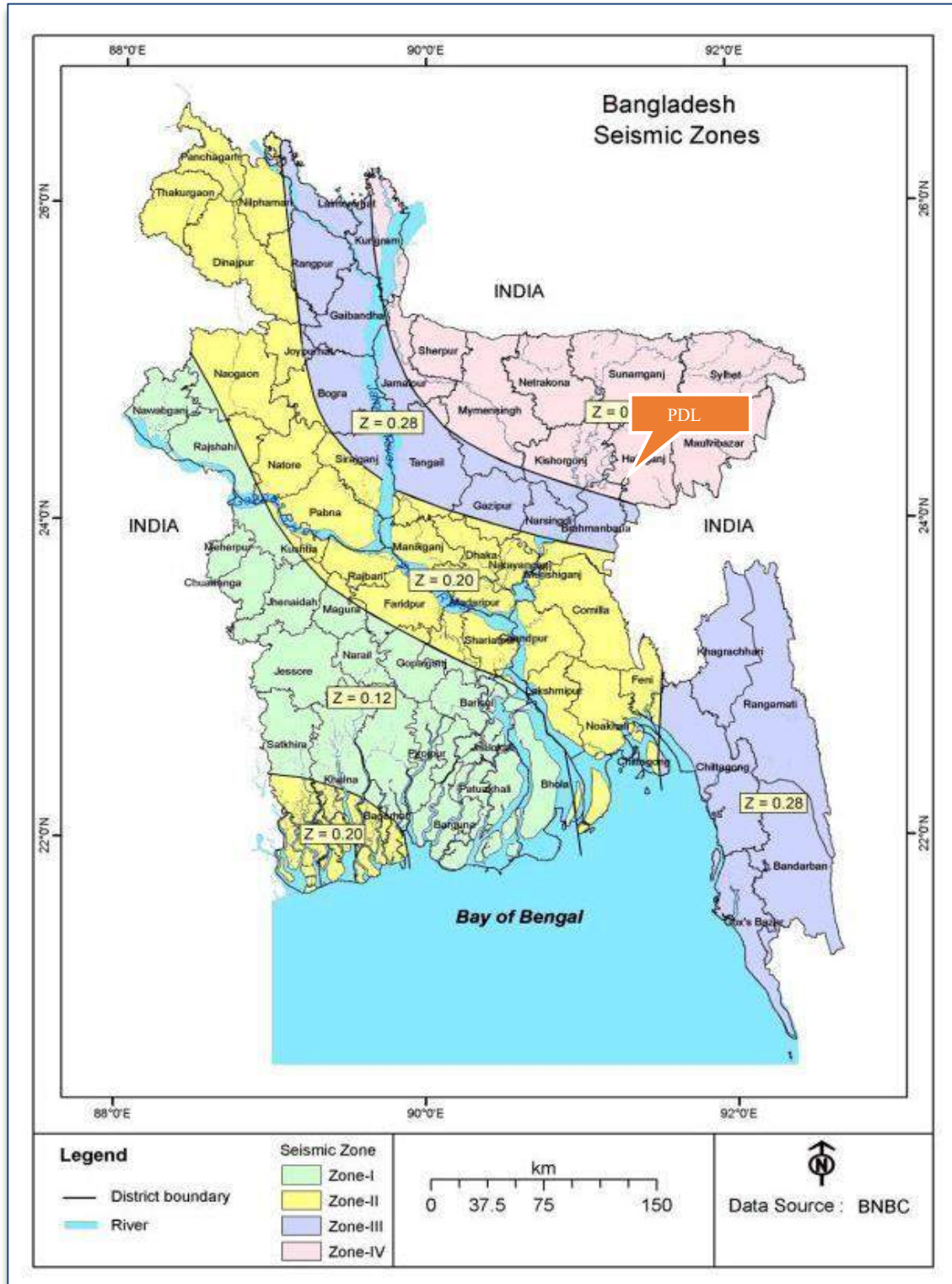


Figure:4.28: Seismic Zoning Map of Bangladesh

4.13 Lightening:

Due to its geographical position the project area is prone to Natural Hazard like Cyclone, storm surge, heavy rainfall, earthquake etc. Like Natural accidental hazard are uncertain and unexpected.

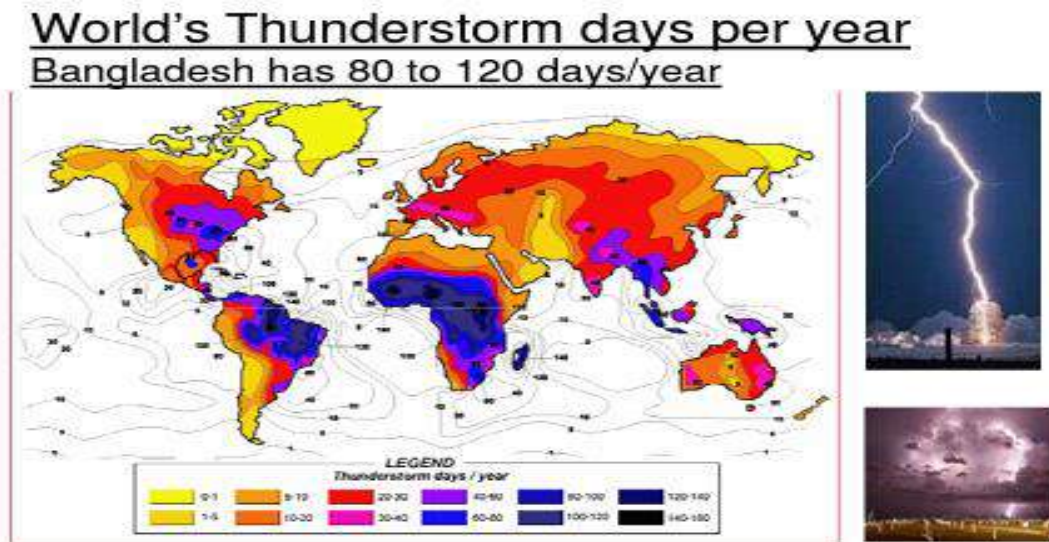


Figure 4.29: Thunderstorm Day per year

Lightning a Gigantic Electrical Spark Traveling between Cloud to Cloud or Cloud to Earth Containing an average charge of 30 to 50 lakhs Volts and a current of 30 Kilo amperes with a speed of 220 km per hour. Bangladesh has seen a near-record number of deaths this year from a phenomenon that appears to be worsening with climate change: lighting strikes. The problem has prompted Bangladesh government to add lightning strikes to the country’s list of official types of disasters, which includes floods, cyclones and storm surges, earthquakes, drought and riverbank erosion, among others.

Bangladesh has seen a near-record number of deaths this year from a phenomenon that appears to be worsening with climate change: lighting strikes.

The problem has prompted Bangladesh government to add lightning strikes to the country’s list of official types of disasters, which includes floods, cyclones and storm surges, earthquakes, drought and riverbank erosion, among others.

Bangladesh National Building Code (BNBC) first proposed in 1993 and legally binding in 2006 gives clear regulations for setting up “Lightning Arrestor” in buildings.

LPS design drawing attached in Annexure XIV

4.14 Flooding

Flood is a common phenomenon in Bangladesh. Every year certain area of Bangladesh is subjected to flooding. The major cause of flood is monsoon rainfall runoff from upstream catchments. More than 90 percent of runoff is from outside Bangladesh. Historical coverage for the flood occurred in 1998, flood type shows in Figure -4.25(a), 4.25(b). The project area is affected by internal and external flood. External floods are caused in the low area by over flow of sorrowing river and khal. While internal floods are caused by storm water due to rainfall and insufficient drainage facilities. The storm water discharges into river through natural drainage. The capacity of the natural drainage system of the project area is not enough and which is being obstructed due to land filling activities for housing and commercial development. Karnaphuli is the influential river of the project.

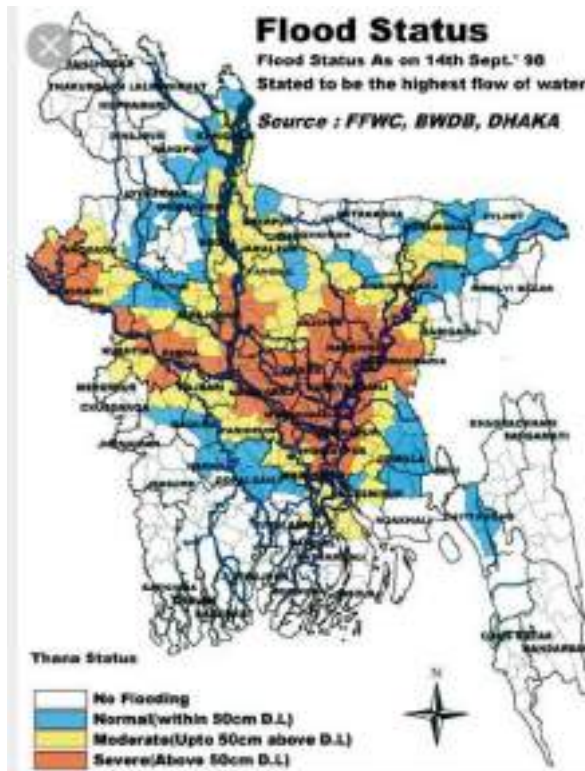


Figure 4.30 (a) Flood Status (1998) of Bangladesh

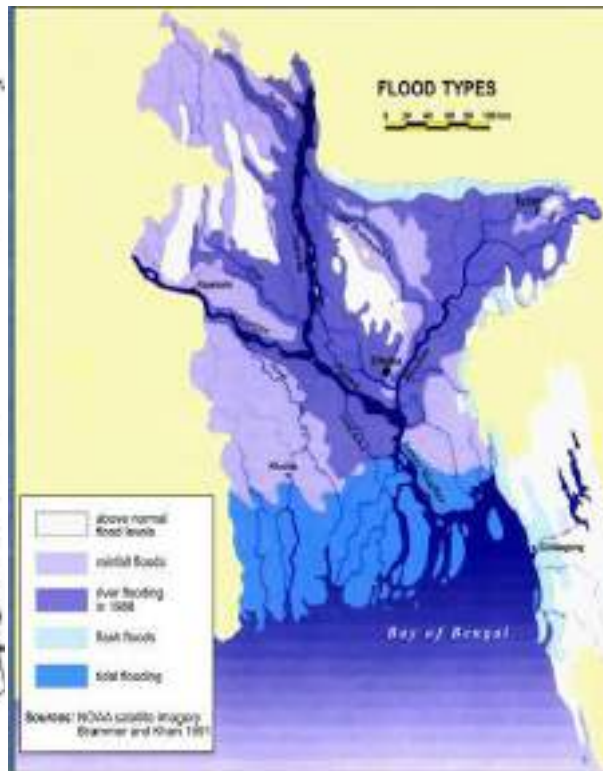


Figure 4.30(b) Flood type Map of Bangladesh

4.15 Cyclone and Tidal Surge

The project site at Madhabpur, Habiganj is located inland and does not face direct risk from tidal surges or coastal cyclones. However, historical data indicate that northeastern Bangladesh can experience indirect cyclone impacts, primarily in the form of high rainfall, riverine flooding, and strong wind gusts. Accordingly, site infrastructure and drainage systems have been designed to accommodate extreme rainfall events, while structural elements will be constructed to resist wind speeds typical of inland cyclonic systems (~80 km/h). The risk of tidal surge is considered negligible due to the site's distance from the Bay of Bengal

4.16 Protected Areas and Threatened species in the project area:

Based on Bangladesh Wildlife Preservation Order, 1973 Protected Areas (PAs) is classified into national parks, wildlife sanctuaries, game reserves and private game reserves. As of 2022, the World Database of Protected Areas lists 51 protected areas in Bangladesh. where 17 are national parks. Based on the map showing all of the protected areas, eco-parks and safari park The project area does not impinge upon any formally protected areas within its core influence zone, but is located in a district with significant ecological assets that host globally threatened primates and notable bird communities. Careful environmental management will ensure that regional biodiversity conservation objectives are upheld.

it can be concluded that nearest protected area is Satchari National Park 30 km south-east of the project site.

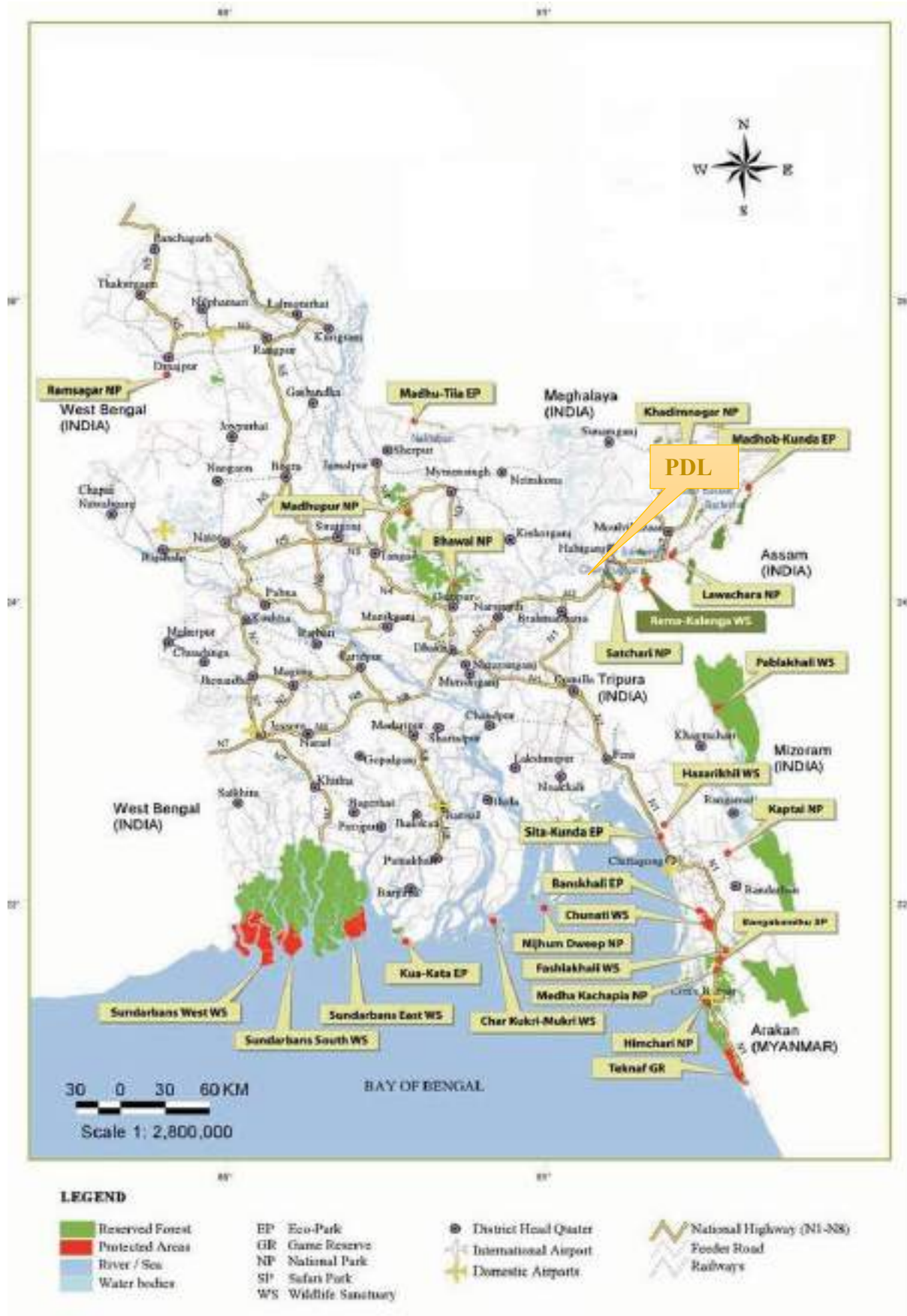


Figure 4.31: Protected Areas, Eco-parks and Safari Park of Bangladesh

4.17 Eco Sensitivity

The project site exhibits moderate to high ecological sensitivity. High sensitivity areas include riparian zones of khals and regional forested landscapes supporting threatened species. Medium sensitivity areas include ponds, wetlands, and vegetated buffers that provide breeding and feeding grounds for fish, amphibians, and birds. Low sensitivity areas include developed land and industrial plots. With implementation of proper mitigation measures, including wastewater treatment, habitat protection, and biodiversity monitoring, potential adverse impacts on local and regional ecology can be minimized. It is expected that the respective authority will allow PDL to set up a washing section with some guidelines & conditions for operating environmentally friendly way.

4.18 Baseline Socio-Economic Condition Around Project Area

Objectives of social baseline study were to gather information on the existing socio-economic aspects that exist within and outside of the proposed project site. The social assessment primarily focused on identifying the status of important economic and social conditions within the project areas. Potential impacts of the proposed project activities have been evaluated against these baseline socio-economic aspects, and later, mitigation measures have been suggested to reduce / eliminate the significant adverse impacts.

4.18.1 Approach and Methodology

An assessment has been carried out to evaluate the current baseline socio-economic aspects of the proposed project study areas. The social assessment covered an area of about 0.5 km radius surrounding the proposed project site. Efforts were made to identify the socio-economic aspects that may be impacted due to the proposed project activities.

To collect information on socio-economic aspects of the proposed project site and adjacent areas, the EIA team has conducted a rapid field assessment and arranged meetings (informal), Focus Group Discussion (FGD) and Key Informant Interview (KII) sessions. Both primary and secondary sources data are utilized for understanding socio economic condition at the project area.

4.18.2 Socio-Economic Environment

The socio-economic condition of Madhabpur Upazila & baseline survey was carried out within 500 meters of the project location which is fall in Bagasura Union considered as the impact zone for the project

Population

- Total Population (Madhabpur Upazila, Census 2022): ~250,000
- Population Density: ~900–1,000 persons/km²
- Gender Ratio: ~51% male, 49% female
- Urban-Rural Split: Predominantly rural (~80%), with small urban settlements.
- Population is largely engaged in agriculture, small-scale business, and government services.
- Literacy rate: ~55–60% (higher among youth).
- Ethnic composition: Mostly Bengali, with small percentages of indigenous or minority communities.

Table 4.6: Livelihoods and Economy

Sector	Description
Agriculture	Major crops: rice, sugarcane, vegetables, betel leaf, and seasonal fruits. Supports local economy and livelihoods.
Livestock & Poultry	Small-scale livestock and poultry farming common in rural households.
Fisheries	Small ponds, khals, and rivers support inland capture and aquaculture, providing protein and income.
Trade & Services	Local markets (haat/bazaar) and small shops dominate commerce; some employment in government services and education.
Industrial Employment	Limited; Pioneer Denim project will provide industrial employment opportunities in garments production.

Industrialization is still low, and the proposed project is expected to contribute to employment generation and skill development.

Table 4.7: Education & Health Facilities

Service	Status
Primary & Secondary Schools	Widely available; literacy improving gradually.
Colleges / Vocational Training	Limited, mainly in Habiganj Sadar; skills training for youth is emerging.
Health Facilities	Upazila health complex, community clinics, and private health centers; access in remote villages can be limited.

Infrastructure & Utilities

- Roads & Transportation: Mainly rural roads; regional connectivity good via Habiganj Sadar.
- Electricity: Grid-connected; power supply fairly reliable in central villages.
- Water Supply: Predominantly groundwater-based via tube wells and hand pumps; surface water use is limited.
- Sanitation: Rural sanitation coverage improving; some households still rely on pit latrines.

Social & Cultural Features

- Religion & Culture: Majority Muslim, with Hindu and other minority communities.
- Community Structure: Strong village-level community networks; local governance via Union Parishads.
- Traditional Livelihoods & Crafts: Some small-scale handicrafts, weaving, and cottage industries.
- Festivals & Events: Islamic and Bengali cultural festivals; community participation is high.

Vulnerable Groups

- Women: Engage in agriculture, household activities; limited access to formal employment.
- Children & Youth: School enrollment increasing, but dropout rates in rural areas remain.
- Low-Income Families: Depend on agriculture and fisheries; highly sensitive to environmental changes (floods, water pollution).

Population structure: Baghasura



Figure: Gender Status (Baghashura)



Figure: Age Group Status (Baghashura)

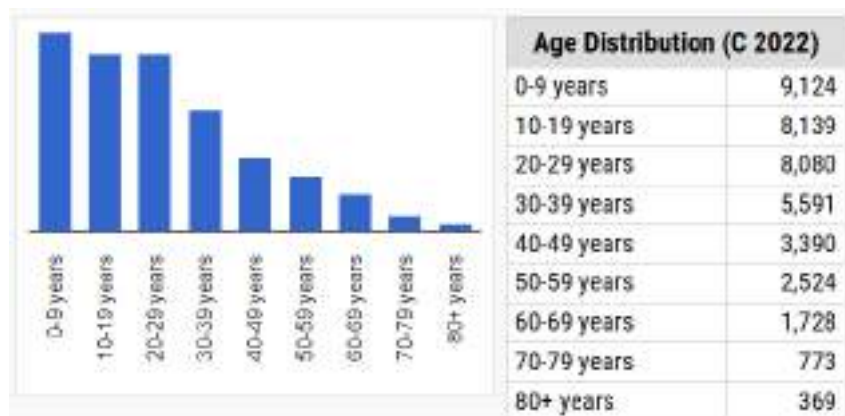


Figure: Age Distribution Status (Baghashura)



Figure: Urbanization Status (Baghashura)

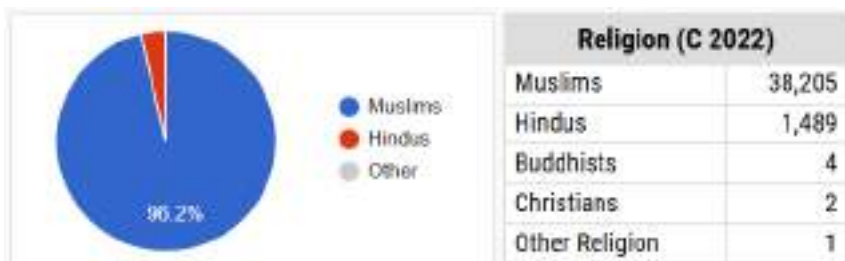


Figure: Religion Status (Baghashura)

The Pioneer Denim project will provide employment and skill development opportunities, contributing to socio-economic upliftment, provided that environmental and social

safeguards are implemented to minimize negative impacts such as pressure on water resources or local infrastructure.

4.18.3 Socio-economic perspective of the project study areas

Though there were no directly affected peoples (DAPs) for the project, existing industries, nearest households which were located within the radius of 500 meters was considered as study area the study has assessed the impacts of the project, the socio-economic conditions, and living standards of affected persons due to the project implementation.

The socio-economic perspective of the proposed project site and adjacent areas are described below in brief.

4.18.3.1 Employment and Income

The industrial and natural resource sectors provide formal and informal employment opportunities. Residents are engaged in factory work, rubber plantation management, gas and energy-related operations, as well as traditional agriculture. This diversified economic base contributes to a relatively higher degree of economic activity compared to unions with limited industrial presence. Average monthly income: BDT 8,000–12,000 (~USD 90–140).

The proposed project is located in a predominantly rural area where the local economy is mainly dependent on agriculture, fishing, and informal employment. Income levels are moderate, and seasonal underemployment is common. Implementation of the proposed garments manufacturing project will generate direct and indirect employment opportunities, enhance income levels, and contribute to local economic development. With appropriate labor management and community engagement, the project is not expected to cause significant adverse socioeconomic impacts.

4.18.3.2 Settlement and Housing Pattern

The project area of is situated within a rural settlement setting of Habiganj District, where habitation is characterized by scattered and linear village settlements. Residential clusters are generally located along local roads, embankments, and elevated natural levees, which provide relative protection from seasonal flooding.

Settlement Characteristics

- Settlements are composed of small to medium-sized homesteads, typically surrounded by agricultural land, ponds, and vegetation.
- Village clusters are interspersed with low-lying floodplain areas, beels, and seasonal water bodies.
- No major urban centers are located within the immediate project influence area.

Housing Pattern

- Housing structures are predominantly semi-pucca and kutcha, constructed using brick, tin, bamboo, and CI sheets.
- A limited number of pucca structures are present along main roads and commercial areas.
- Most houses are single-storied, with raised plinth levels to reduce flood damage during the monsoon season.

Infrastructure and Services

- Internal village roads are mainly earthen or partially paved, with access to local markets, schools, and health facilities.
- Drinking water is primarily sourced from hand tube wells and deep tube wells, while sanitation facilities are mostly pit latrines with varying degrees of improvement.
- Electricity coverage is widespread, though service reliability varies seasonally.

4.18.3.3 Economic Resources and Industry

Bagasura Union is a resource-rich area with diverse industrial and agricultural activities, contributing significantly to local employment and economic development.

Bagasura Union is notable for its wealth in natural and industrial resources. The area hosts the Habiganj Gas Field and the Shahjibazar Rubber Garden, which are key natural assets supporting both local and national energy and agricultural industries.

Bagasura Union is notable for its wealth in natural and industrial resources. The area hosts the Habiganj Gas Field and the Shahjibazar Rubber Garden, which are key natural assets supporting both local and national energy and agricultural industries. Additionally, Bagasura is home to four power plants at Shahjibazar, contributing to the national electricity supply and creating employment opportunities in energy management and related sectors.

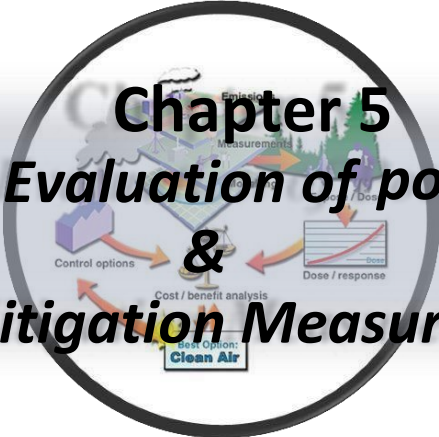
The union also has a significant industrial presence, including factories and production facilities. Prominent industries include RAK Print, Star Ceramic, Star Forsaline, Charu Ceramic, Sq

ware Textile & Denim, Pioneer Denim, and TK Group, showcasing the area's strength in manufacturing, ceramics, textiles, and printing.

These factories generate employment for the local population, foster skill development, and support regional economic growth.

4.19 Transportation:

Well-developed transportation infrastructure with major roads and highways facilitating easy movement of Thae project. The Dhaka-Sylhet highway (N2) & Railway are key routes in front of project & within 500 meters accordingly providing connectivity to other parts of Bangladesh. Additionally, the Habiganj Local Government Engineer's roads, Union roads also flow around enhancing the transportation network of the project.



Chapter 5
Identification, Evaluation of potential Impacts
&
Mitigation Measures

5.1 General Consideration

This chapter summarizes the impacts associated with the implementation of the project. The impacts would result from project related activities during the whole life-cycle of the project including the design, construction and operation phase. The potential impacts could cover a wide range of environmental, social, and ecological aspects. The objective of this chapter is to identify and evaluate the extent of probable impacts associated with the project, which would be useful in developing mitigation measures to avoid or minimize the adverse effects.

5.2 Scoping of Impacts

Identification of potential impacts due to the project location, construction and future operation has been done using Checklist. Checklists are comprehensive lists of environmental effects and impacts indicator designed to stimulate the analysis to think broadly about possible consequences of contemplated actions. In order to prepare the checklist and further to analyze associated Environmental impacts due to the project multi-disciplinary team from the consultant's side visited the existing project site, closely identified activities of the project and significant environmental components that may be affected by the project. The project officials were interviewed during each visit to assess their level of understanding of the interrelation of the project and significant environmental impacts. These were done mainly to identify the major environmental components of the project and at the same time stimulate thinking environmental conservation of all the groups associated with the project.

This process identifies water, air and sound quality of the project and its surroundings as the most significant environmental components. Overall project environment, erosion & landslide vulnerability of the Chittagong hilly area, sewage and storm water management, solid waste management, sound and air quality management, maintenance practices and overall environmental management systems are the major environmental issues identified from the consultant's side.

Tables represent the checklists developed for that Pioneer Denim (Garments Division) and similar facilities. In this checklist major activities which create the Significant Environmental Impacts (SEIs) are shown. The terms none, minor, moderate major, short termed and long termed are used in checklists to classify the magnitude and duration of probable SEI. These environmental impacts are assessed under the following headings:

Impacts from liquid discharge; Impacts from solid wastes; Air Quality Impacts; Occupational health impacts; Socio-Economic Impacts; Noise and Vibration Impacts; Land and Soils Impacts; Surface water Impacts; Groundwater Impacts; Flora and fauna Impacts.

Table 5.1 Checklist for identification of probable Environmental Impact of the project (Pre-construction phase)

Project Phase	Action Affecting Environmental Resources and Values	SEIs without Mitigation Measures				Impact Type				Duration		
		None	Low	Moderate	Major	Adverse	Beneficial	Reversible	Irreversible	Short Term	Long Term	
Pre-Construction phase	a	Site preparation										
		Removal of tree		✓			✓		✓			✓
		Increased infiltration or runoff		✓			✓		✓		✓	
		Disruption of Earth Surface			✓		✓			✓		✓
		Biodiversity		✓			✓			✓		✓
	b	Air pollution										
		SPM/Dust			✓		✓		✓		✓	
	c	Construction materials transport										
		Dusting and spillage		✓			✓		✓		✓	
		Traffic congestion			✓		✓		✓		✓	
	d	Demolition work										
		Noise					✓		✓		✓	
		Vibration		✓	✓		✓		✓		✓	
		Equipment repairing	✓									
	e	Construction Crew										
		Sewage generation		✓			✓		✓		✓	
		Solid waste generation		✓			✓		✓		✓	
		Emergency response		✓			✓		✓		✓	
	f	Socio-economic										
		Job creation						✓				✓

Table 5.2 Checklist for identification of probable Environmental Impact of the project (Construction phase)

Project Phase	Action Affecting Environmental Resources and Values	SEIs without Mitigation Measures				Impact Type				Short Term	Long Term	
		None	Low	Moderate	Major	Adverse	Beneficial	Reversible	Irreversible			
Construction phase	a	Construction work										
		Noise			✓		✓		✓		✓	
		Vehicle refueling		✓			✓		✓		✓	
		Equipment repairing on site		✓			✓		✓		✓	
		Land development			✓					✓		✓
	b	Air pollution										
		SPM/Dust		✓			✓		✓		✓	
		Exhaust from machinery			✓		✓		✓		✓	
	c	Construction materials transport										
		Dusting and spillage		✓			✓		✓		✓	
		Traffic congestion			✓		✓		✓		✓	
	d	Noise pollution										
		Vibration		✓			✓		✓		✓	
		Pilling			✓		✓		✓		✓	
		Inappropriate construction			✓		✓		✓		✓	
		Equipment repairing	✓									
	e	Construction Crew										
		Sewage generation		✓			✓		✓		✓	
		Solid waste generation		✓			✓		✓		✓	
		Emergency response		✓			✓		✓		✓	
	f	Socio-economic										
		Job creation				✓		✓				✓

Project Phase	Action Affecting Environmental Resources and Values	SEIs without Mitigation Measures				Impact Type				Short Term	Long Term	
		None	Low	Moderate	Major	Adverse	Beneficial	Reversible	Irreversible			
	Land Value				✓		✓				✓	
	Security				✓		✓				✓	
	Business opportunity				✓		✓				✓	
	g	Drainage										
		Storm water runoff			✓		✓		✓		✓	
	h	Land/Soil										
		Land slide	✓									
		Soil erosion	✓									
		Soil Pollution				✓	✓					✓
	i	OHS										
		Spreading diseases		✓								
		Accidents	Uncertain				✓					

Table 5.3 Checklist for identification of probable Environmental Impact of the project (Operation phase)

Project Phase	Action Affecting Environmental Resources and Values		SEIs without Mitigation Measures				Impact Type				Duration	
			None	Minor	Moderate	Major	Adverse	Beneficial	Reversible	Irreversible	Short Term	Long Term
Operation phase	a	Drainage										
		Increased storm flow and		✓			✓		✓			✓
		Domestic sewage waste				✓	✓		✓			✓
	b	Land, Permanent structures and roads				✓				✓		✓
	c	Air pollution										
			Generator		✓			✓		✓		✓
			Vehicular Movement			✓		✓		✓		✓
	d	Noise pollution										
			Electro mechanical machinery		✓			✓		✓		✓
			Traffic congestion			✓		✓		✓		✓
	e	Water Pollution										
			Process / Domestic wastewater				✓	✓		✓		✓
	f	Waste										
			Solid waste generation				✓	✓		✓		✓
	g	Accidental, Fire and Natural Hazard										
		Fire and Natural Hazard		Uncertain			✓					✓

The Impacts, which are likely to be occurred in the different phases of the project, are identified in the checklist. Evaluation of these impacts will be done in the following sections mentioning their origin and characteristics, actual site condition, implemented mitigation measures along with the possible enhancement of mitigation/enhancing measures.

5.3 Evaluation of Anticipated Adverse Impacts and Mitigation

Environmental impacts can be broadly categorized into 3 groups – Pre-construction, construction phase and operation phase. Major physicochemical parameters considered for assessment of environmental impacts of project activities during construction phase include water pollution, drainage congestion, noise pollution, air pollution, and generation and disposal of solid wastes.

5.3.1 Impacts during Pre-Construction Phase

Before the actual construction can progress, Vegetation clearing, site preparation & temporary fencing also need. The construction materials such as broken concretes, brick before starting the construction. These processes could lead to the pollution of soils, air, and groundwater.

5.3.1.1 Regulatory Constrains

There are few things to consider before starting the development work mainly SPL must get approval from DOE to start the project which could be done by:

- ✚ Getting NOC from local authority
- ✚ Environmental Site Clearance Certificate from DOE in favor of the project
- ✚ Detailed Environmental Management Plan
- ✚ Implementation of All Environmental Management Options
- ✚ Environmental Clearance Certificate
- ✚ Regular monitoring and Renewal of ECC

Mitigation Measures

The project has already got TOR approval from DoE, NOC from local authority & others necessary permission/NOC. Now they are preparing an Environmental Impact Assessment as per condition of ECC (DoE).

5.3.1.2 Overland Drainage and Impact on surface water

The potential impacts on local hydrology are principally those of altered patterns as a result of onside construction and earthwork activities. The proposed project will affect natural drainage, surface and ground water quality if not managed the construction works properly.

Mitigation

- Surface drainage is controlled to divert surface runoff away from the construction area;
- Completed areas are restored/re-vegetated;

- Containment of sanitary waste are adequately disposed of to avoid surface and ground water contamination.
- Adequate provision has to be retained for the treatment and disposal of cuttings, drilling fluids and lube oil wastes generated during drilling, testing and commissioning stage.

5.3.1.3 Land Selection

Impact Origin

As noted earlier, the proposed project site will be constructed under Badsha group. most of the land remains as fallow land and no cultivation is being done at present, selected land of the project will not affect the existing environment.

Mitigation Measures

Site for the proposed development work would be done carefully that surrounded by low hill area. There must also be a full-time supervision by professional engineers during implementation of site development to ensure proper and responsible implementation of strengthening work.

5.3.1.4 Loss of and Displacement from Agricultural land and House

Impact Origin

The proposed project will set up in existing industrial boundary named Pioneer Denim Limited a sister concern of Badsha Group, which will result in no loss of agricultural land as well as agricultural product of the country also any house.

Mitigation Measures

For economic development, Bangladesh has no option other than going for commercialization. To do so, some portion of land would have to be converted to commercial/industrial land. But attention should be given so that conversion of such land use should take place in comparatively less fertile area. The present land for proposed plant is no so fertile and hence ultimate loss in economic value due to loss in agricultural

products will be overcome by industrial production in near future. Moreover, the land was purchased long before by compensating actual land value, so it is expected that by this time, the displaced land owner must find himself adopted in new income generation activities. land use Permission for industrial purpose attached in **Annexure VI**.

5.3.1.5 Site preparation and Clearing and Earthworks

Impact Origin

Each development project more or less requires site preparation. The preparation works generally done during construction stages includes

- Biomass Removal
- Biomass Disposal
- Constriction of access road
- Cut and fill operation
- Soil Export and Import
- Drainage works etc.

The impacts generally arise from the above activities are as follows:

- Noise
- Fugitive dust
- Runoff and flooding
- Soil erosion
- Water Pollution through runoff and sedimentation
- Safety Concerns

Mitigation Measures

- Cutting and filling operation should be kept minimum.
- The proponent should ensure construction of proper drainage facility.
- Regular water sprinkle should be used to minimize fugitive dust emission.
- Safe working procedures should be ensured by the contractor
- Controlled site grading preservation of natural drainage alignments; minimal cut-and-fill approach.
- Limit development within approved boundary retains buffer zones and green belts.
- Restrict heavy equipment movement; designate fixed access routes.

5.3.1.6 Change in Landscape

Impact Origin

A landscape is a subjective concept that cannot be precisely quantified. However, in general, any project when not designed considering the local landscape, then it creates visual intrusion to the people. The proposed project may change the local landscape to some extent.

Mitigation Measure

Any built up part of the project should be designed considering key criteria of landscape like coherence, readability, hierarchy and stability. It is understood that the proposed

project and other infrastructure will have a modern architectural view with wall facilities available, which does not provide any significant visual intrusion.

5.3.1.7 Inadequacy of Buffer Zone

Impact Origin

Buffer Zones are spaces, which provide natural environmental protection from damage by external events. These spaces, in between any development projects, are usually remaining vegetated which can provide windbreaks, erosion control, sediment traps, sound insulation and visual screening. Such vegetation land is available surrounding the project plant but within the project area is not so available. This is obviously not possible from Bangladesh point of view (as a densely populated country) that industries will keep a certain space from another installation as a buffer zone. However, industries should try to keep a certain open space within the factory premises which can be developed as a buffer strip.

Mitigating Measure

A green belt has been developed by planting trees of various species in all possible open spaces within project premises. Trees take carbon-di-oxide and discharge oxygen for their photosynthesis, which helps to clean the air. Some trees also absorb the toxic gases and particulate. In addition, the wood, fruit and fuel values are considerable. It also maintains the ecological balance and improves scenic beauty.

5.3.2 Construction Stage

5.3.2.1 Impacts on Earth Work

Impact Origin

Impacts from Excavation

The main impact during the construction phase is related with the requirement of cutting earth-works. The proposed Project involves construction of buildings, shed, STP, ETP and with facilities. During this process, there exists a concern of soil collapse as well as the safety of the workers. This process will require constant pumping of water out of the excavation trench for supporting the truck traffic. Moreover, the excavation will generate a large volume of earth material, which need to be properly disposed of.

This piling activity may cause collapse of the soil or may affect the surrounding structures. Extra precautions should be taken care of during this activity.

Mitigation Measure

The proposed site is relatively flat. It may not require too much earthwork to make the site flat. Although minimum but the landscape due to earthwork in the site area may slightly be changed but will create no change in the existing drainage system. Authority of housing project will try to minimize the volume of earthwork by keeping various land levels. There should be a good drainage system and cover so that no water logging could happen during rains within the area.

Earth filling will be needed during construction of the access road. Natural water body as well as existing drainage system will not to be interrupted.

5.3.2.2 Impacts on Air Environment

Impact Origin

The air quality in the project area may slightly deteriorate for the time being during construction. Sometimes sandy soil can pollute the air during heavy wind. It is anticipated that the air would be polluted with dust sand particles for the movement of light and heavy transport vehicles and during piling work. This air pollution may create some breathing problems to the workers. The major construction activities from which air emission mostly dust emission may occur are;

- Poorly paved service lane;
- Ground excavation;
- Delivery of building materials to site;
- Handling and mixing of cement; etc.

Proposed Mitigation Measures

Following mitigation measures are proposed to minimize the air pollution during the construction stage: -

- ✓ The Project Proponent should ensure complete the paving of the service road
- ✓ Regular sprinkling of water to be done on open surface and dust grounds until paving is done;
- ✓ The sand and other such dispersible material should be stored at site for minimum working period.
- ✓ Any open area should be planted with appropriate vegetation (trees, flowers and grasses) ;
- ✓ Project management and contractor to enforce strict use of personal protective clothing;
- ✓ When too dry there should be regular removal of dust settled on vegetation if any
- ✓ Complains of dust related ailments among employees and neighbors to be given access to medical attention.
- ✓ The equipment design should be chosen for least suspension of dust/sand into atmosphere.
- ✓ The construction activity should be carried out during day time only.

5.3.2.3 Impacts on Acoustic Environment

Noise is likely to be generated from the following activities/areas:

- ❖ During ground preparation;
- ❖ During assembly of building materials on site;
- ❖ During construction of the various components of the proposed project.

Ground preparation

Ground preparation is another activity that will potentially result in noise nuisance.

Activities of ground preparation that are likely to result in noise nuisance include: -

- ✓ Use of heavy machinery such as excavators, caterpillars in ground excavation will be a source of noise nuisance; and
- ✓ Transportation of excavated earth material from site by use of dump trucks will result in noise nuisance. The noise will be mainly from the trucks.

Assembly of building materials

Building materials to be used in construct site will first be gathered and assembled on site. These include building blocks, timber, steel bars, sand, gravel cement. Possible courses of noise nuisance when assembling construction material on site include: -

- Offloading of building materials on site especially steel bars, gravel and building blocks can result in noise;
- Trucks ferrying in building materials can be a source of noise;
- Employees involved in offloading of building material can be a source of noise.

Construction of the various components of the proposed development work

Construction of the civil work structures for the proposed development will be labor intensive. This will involve engaging a large workforce, also during construction some machines and equipment will be in use. Possible sources of noise during construction work may include the following: -

- Loud talking, shouting and conversation among employees;
- Noise from equipment such as cement mixers;
- Noise from machines such as welding machines and wood working machines;
- Increased machine and equipment activity on site.

Proposed Mitigation Measures for Noise: Nuisance Management

Generation of noise pollution and vibration are an integral component of any construction work that cannot be avoided completely. However, it is possible to take certain measures to reduce these levels to an acceptable level. Appropriate precautions and skilled operation of machines and equipment would contribute to reduce the nuisance. Precaution like selection of proper working period considering the comfortable time of the people working and living around should be followed for construction work. The construction work normally starts at about 8.00 am and continues until 6.00 pm at the plant site. Working beyond this period may create sound hazards to the local people and hence the above work period shall be enforced.

- ✓ Noisy construction works to be limited to daytime hours
- ✓ Immediate neighbors to be notified in writing on the date of commencement of construction work at least one month in advance;
- ✓ All employees likely to be exposed to ear noise to be provide with ear protectors;
- ✓ The project Proponent and contractors to ensure strict enforcement on user of ear protectors;
- ✓ Where applicable and possible exceptionally noisy machines to be fitted with noise reduction devices;
- ✓ Any employee who may complain about ear related pain and or complication while at work to access medical attention at the expense of the contractor or project proponent;
- ✓ Fitting noise machines with noise reduction devices;
- ✓ Providing suitable hearing protection to all workers exposed to noise levels above 85dB(A);

5.3.2.4 Sanitation Hazard & drinking water

Impact Origin

The health of the project personnel, construction workers and laborers living at the base camp could be impacted if arrangement of sanitation and drinking water is not ensured adequately and properly. During construction stage, lot of local labors will work and hence they would generate considerable amount of human waste. These are the potential source for spread of diseases, as various insects will play dominating role in the spread of diseases. There are chances for the spread of waterborne diseases also.

Mitigation Measures

Proper sanitation system should be provided and at the same time, regular, proper and safe disposal of human waste should be ensured. Adequate number of toilets and bathrooms should be available for the workers, and proper disposal system of sewage waste should be implemented for sanitation purpose and the workers should be made aware to practice those facilities.

The project activities shall make higher demand on the local utilities and service facilities particularly potable water, health and sanitary facilities. There should be sufficient supply of potable drinking water.

5.3.2.5 Overland Drainage and Impact on water

The potential impacts on local hydrology are principally those of altered patterns as a result of on-site construction and earthwork activities. The proposed project will affect natural drainage, surface and ground water quality if not managed the construction works properly.

Excess withdrawal of ground water may lead to depletion of aquifers. Thus, measures should be taken to minimize the water extraction by reducing water consumption and wastage. Mitigation measures are given below

Mitigation Measures

- Water for curing can be saved by carrying out curing in early morning or late evening and covering structures with gunny bag so as the moisture can be restored for longer time.
- Regular inspections at site to monitor leakages in water storage tanks
- Temporary storm water drains should be constructed so as to store rain water for construction activities.
- Creating awareness among construction workers about the importance of water conservation
- Storing the curing run-off and waste from other construction activity and using the same for sprinkling.
- Tapping should be made at a different aquifer from the aquifer from where the local people have tapped for water for drinking and domestic purposes

Impact on Surface Water and Groundwater Quality

The major source of wastewater generation during construction phase is from the labor camp, which will be established for project construction activity. There is a potential for contamination of surface and groundwater resources resulting from improper management of sewage. The quality of water bodies could also be affected due to surface runoff from contaminated soil (soil contamination due to oil/ fuel spillage and leakages), particularly during monsoon season. The surface runoff carrying the loose top soil will lead to increased sedimentation in the receiving water bodies. Contamination to water bodies may also result due to oil spilling during construction activities and/or surface runoff from the construction site to the adjacent water body. Thus, measures are required to be taken to minimize the surface water pollution

Mitigation Measures

- To avoid excavation activities during rains
- To prevent piling up of excavated soil, raw material and construction debris at site by proper management and disposal
- Minimize run-off by using sprays for curing
- Maintaining appropriate flow of water sprinklers at site
- Construction of storm water drains along with sedimentation tanks with sand bags as partition as barrier for direct flow of run off to river.
- Construction of adequate nos. of toilets and proper sanitation system for workers to prevent open defecation along the river banks/water supply lines
camp sewage and connect to nearby municipal sewers.
- Proper collection, management and disposal of construction and municipal waste from site to prevent mixing of the waste in run-off and entering the water bodies
- No debris/construction material should enter the waterbody in the area

5.3.2.6 Accidents or Occupational Health Hazard

Impact Origin

accident is unexpected and it may occur any time during construction work and cause loss of lives and properties.

Under controlled situation, accident is not expected. However, occasionally it occurs during construction works. Accident may occur during earth cutting, casting, construction works and installation of heavy machinery. The protection of head, eye, ear, and hand, foot of the workers, laborers and project personnel could be affected if proper and adequate arrangement is not ensured.

Mitigation Measures

Adequate precautionary measures will be undertaken at the project site to avoid any accident. However, it would reduce the occurrence of accidents remarkably. Adequate first aid facilities and emergency contacts to the adjacent health complexes and other emergency services will help to save the lives from accidents.

The workers should wear PPE (Personal Protective Equipment) and other necessities.

5.3.2.7 Spreading diseases

Source of Impacts

It is not unlikely that diseases may be spread among the construction workers as most of them are illiterate and their level of knowledge on health and hygiene is very low. They are not aware of water pollution, healthy accommodation and food poisoning. Moreover, due to high concentration of labor force during construction, unhygienic condition may be created in the vicinity and thereby the same may lead to transmission of various diseases. Thus, the worker may suffer from various diseases such as COVID – 19, diarrhea, dysentery and skin infections. These diseases can spread from one worker to another and to the people living in the area.

Mitigation Measures

During construction phase, all of the impacts are reversible including spreading of diseases among the workers and the people working and living nearby. Moreover, the impacts are of short duration. In order to reduce or avoid the spreading of diseases, it is suggested that arrangement for good quality drinking water, hygienic sanitation and accommodation facilities for the staff and the workers shall be made. Frequent medical check-up would also be helpful in controlling the spreading of diseases. Emergency medical services and adequate first aid facilities should always be available at the site during construction period. Specially COVID – 19 diseases will take place highest priority.

To prevent the spread of COVID-19:

- Clean hands often. Use soap and water, or an alcohol-based hand rub.
- Maintain a safe distance from anyone who is coughing or sneezing.
- Wear a mask when physical distancing is not possible.
- Don't touch your eyes, nose or mouth.
- Cover nose and mouth with bent elbow or a tissue when cough or sneeze.
- Stay home if any worker feels unwell.
- If any worker feels fever, cough and difficulty breathing, give medical attention.

Calling in advance allows local healthcare provider to quickly direct you to the right health facility. This protects worker, and prevents the spread of viruses and other infections.

5.3.2.8 Increase in vehicular traffic in the area

Increase in vehicular traffic in the area is likely to be experience during construction phase. Increase in vehicular traffic in the area is likely to be because of-

- ✚ Trucks ferrying construction material to site;
- ✚ Trucks ferrying waste material from site; and

- ✚ Ferrying in of construction tools and equipment.

Proposed mitigation measures

The following measures can be put in place to mitigate possible negative impacts likely to result from increase in vehicular traffic in the area:

- ✓ Management to provide for adequate internal parking, for all vehicles coming to the plant premises;
- ✓ Management to pave the dilapidated service road with tarmac or more durable material;
- ✓ Marking of the roads to be clearly done.

5.3.2.9 Impacts on wildlife (i.e. loss of habitat, hindrance to wildlife movement)

Source of Impacts

Heavy construction work may disturb the wildlife.

Mitigation/Management Measures

- Boundary fencing of the Project Site area are ensuring wildlife choose alternative routes.
- Provision of landscaped areas, where possible, around and within the Project Site using indigenous species to supply habitat for terrestrial and riparian species and improve aesthetics.
- Construction workers will be prohibited from felling trees, hunting wildlife and fishing in the vicinity of the project site.
- Monitoring population of terrestrial and aquatic organisms of the area in every six months during the construction phase.

5.3.2.10 Hazardous Materials

- ✓ Refueling, washing and maintenance of plant and vehicles will be prohibited in the vicinity of water bodies. Spill kits will be available to contain any accidental release of hazardous materials (including within vehicles when transporting hazardous materials).
- ✓ All hazardous materials will be provided with secondary containment. Any hazardous materials to be transported to or from the Project Site will include suitable protection (In the form of manufacturer / supplier recommended

packaging or as stated in the relevant Material Safety Data Sheet (MSDS) to mitigate against any accidental release.

5.3.2.11 Environmental contamination due to spillage or accidental release of hazardous materials (i.e. fuels, lubricants, solvents) onsite

Measures should include:

- Prohibition of dumping any contaminating material on the Project Site or elsewhere;
- Storage and routine handling of fuels, lubricants, oils, solvents and other potentially contaminating Substances in a weather-protected area equipped with a secondary containment system for spills;
- Requisite steps should be taken toward spill prevention and, to this end, spill contingency plan should be undertaken. Necessary equipment and materials should be made available onsite to execute cleanup operations; and
- All materials recovered during clean-up operations should be stored in labeled and secured containers for

5.3.2.12 Influx of Temporary Laborers

- The project will monitor social impacts on the local area due to increased demand for goods, services and public health facilities arising out of an influx of workers in the project area.
- The on-site labor camp should meet the relevant standards. The Grievance Redress mechanism is to address any complaints from local people.
- The project entrepreneur will monitor the social impacts on the local areas during the construction of the Plant and will work with local Community leaders to mitigate any adverse impact.

5.3.2.14 Economic benefits to the people of Project area

Review the suitability and capacity of local workers. The project will be encouraged to recruit local labor, goods and services, wherever these are available provided acceptable quality and price. The project will be required to follow a local procurement policy. The project will develop a Recruitment Policy for approval by PDL. The Recruitment Policy will include:

- i. ensure equal opportunities, fair treatment recruitment, compensation, remuneration, working conditions and terms of employment;
- ii. a means of expressing grievances; and
- iii. engaging subcontractors and suppliers who do not employ child labor or forced labor, and operate appropriate management systems consistent with requirements (i) and (ii).

5.4 Impact at Due to Operation of The Project

Unjustified and unplanned Operation of any project can potentially affect quality of life, air, noise, water, land, flora, fauna and human by increase in water, noise and air pollution, increase in hazardous waste generation, pollution from spillage/surface runoff, disturbance to flora and fauna, by loss of trees resulting from increased access, increase in land values, threatening agriculture, etc. Environmental issues during the operational phase of the Pioneer Denim (Garments Division) project have been Predicted for each of its components: Issues that need to be evaluated are:

- Water use and waste water discharge (Significant)
- Noise generation (Moderate)
- Solid waste generation (Moderate)
- Natural and Accidental Hazard (Uncertain); etc.
- Air pollution (Significant)

5.4.1 Impact on Water Environment

Impacts and Origin

It is envisaged to install abstraction wells within the subject site to meet the water demand. The Installation of washing unit shall lead to the generation of process and domestic effluent. washing units which are an integral part of garments units are the main source of process waste water. The waste water generally has high TDS, high BOD, COD and the color quotient of the water is also moderate. The direct discharge of the untreated process and domestic effluent waste will lead to impacts in the surface water quality. Also, it is anticipated that surface runoff may significantly increase post development of PDL which may impact surface water quality.

Based on topographic gradients and the natural drainage network around the Pioneer Denim (Garments Division) site, the Khowai River is the nearest major surface water body that would

receive any untreated or inadequately treated effluent. Local khals and drainage channels on the project site generally drain toward the Khowai River before joining the larger Kushiya River system downstream. The area is characterized by low-lying floodplain terrain, and surface runoff pathways contribute to flow toward these rivers, particularly during the monsoon season.

Therefore, wastewater management must ensure compliance with effluent standards and avoid direct discharge into local khals to prevent adverse impacts to the downstream water resources. Currently, the Pioneer Denim (Garments Division) consumes 1,250 cubic meters of water per day in various processes which will increase to 18,000 cubic meters by 2027. A portion is used for operation; another portion is used for utility section and rest of the amount is used for domestic purpose in the plant. Total amount of liquid effluent is around 18,300 m³/day. Industrial effluent is 18000 m³/day & domestic 300m³/day. The BOD and COD value of the effluent is also expected to be quite high.

Mitigation Measures

To mitigate wastewater problem from washing processes, Pioneer Denim (Garments Division) set up a biological ETP with a capacity of 21600 cubic meters, which is divided into four sections. The daily capacity of each section is 5,400 cubic meters. One section is currently operational and the remaining three section are under construction which will be operational in phases by 2027. The part that is currently operational is treating 1,200 cubic meters of wastewater per day.

DESCRIPTION of ETP

The ETP includes the following processes and equipment:

Capacity: 300000 Pcs/ day (by 2027)
Specific Water Consumption = 60 L /Pcs
= 300000 Pcs/ day x 60 L/Pcs ÷ 1000 L /1 m³
= 18000 m³/day
= 750 m³/hour
ETP design 18000 m³/day + 20%
= 21600 m³/day
= 900 m³/hour

FACTORY MASTER LAYOUT
PIONEER DENIM LIMITED (GARMENT DIVISION)
Horitola, Shahpur Bazar, Madhabpur,
Habiganj, Bangladesh

FACTORY AREA DETAILS			
Sl. No.	Name of Building	Area (sq. ft.)	Volume (cu. ft.)
1	Raw Material Store	1000	1000
2	Washing Machine	2000	2000
3	Washing Machine	2000	2000
4	Washing Machine	2000	2000
5	Washing Machine	2000	2000
6	Washing Machine	2000	2000
7	Washing Machine	2000	2000
8	Washing Machine	2000	2000
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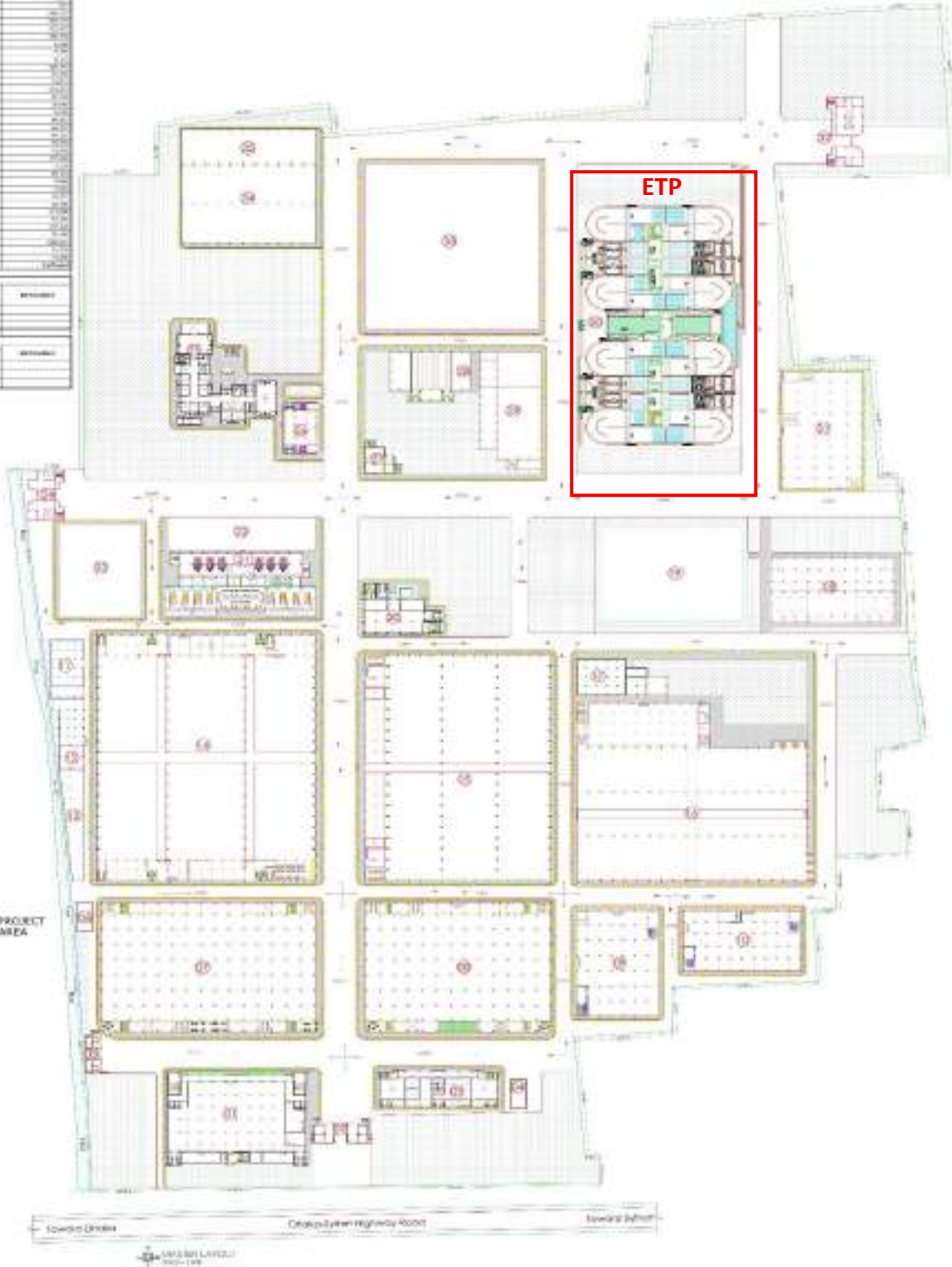
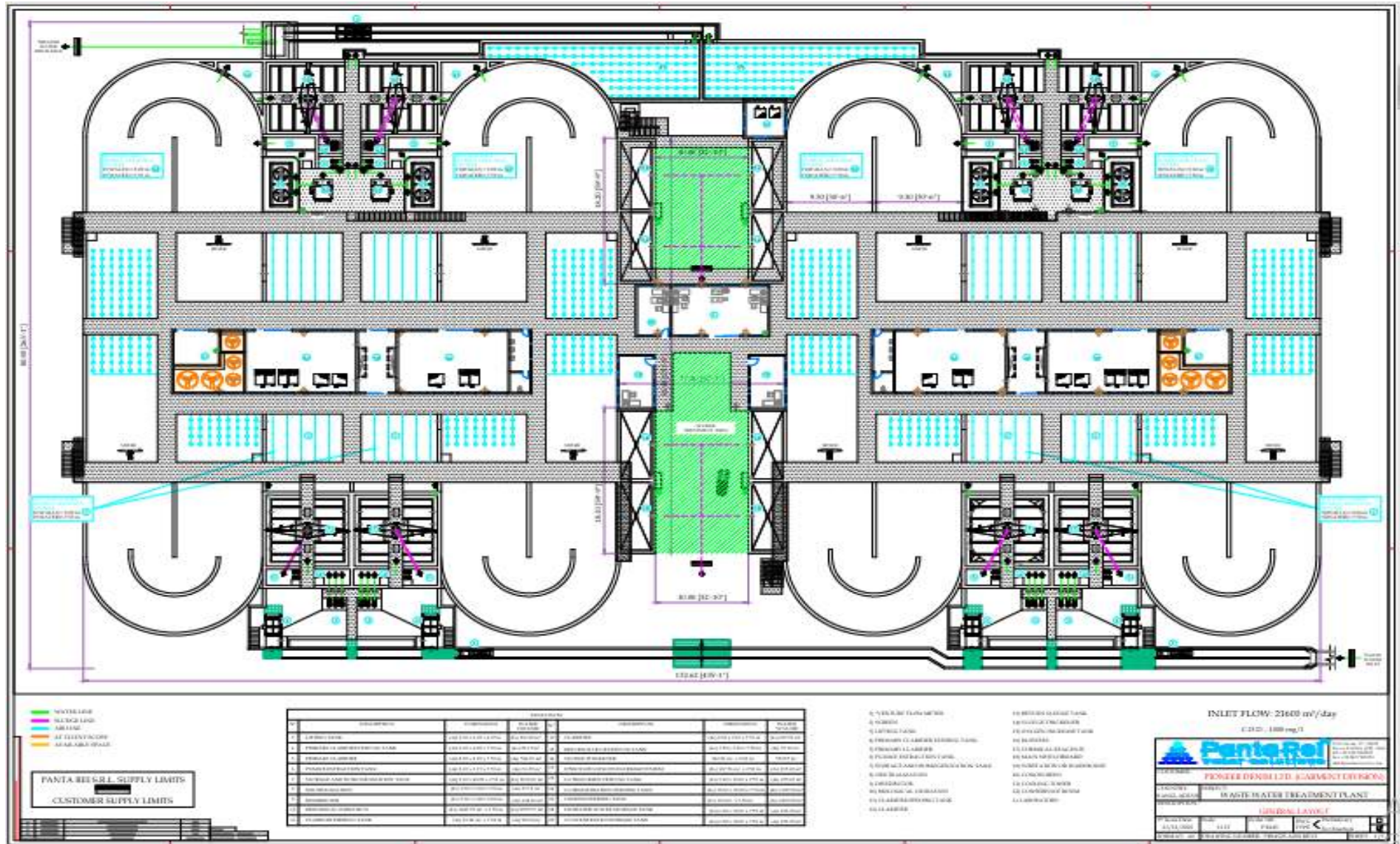


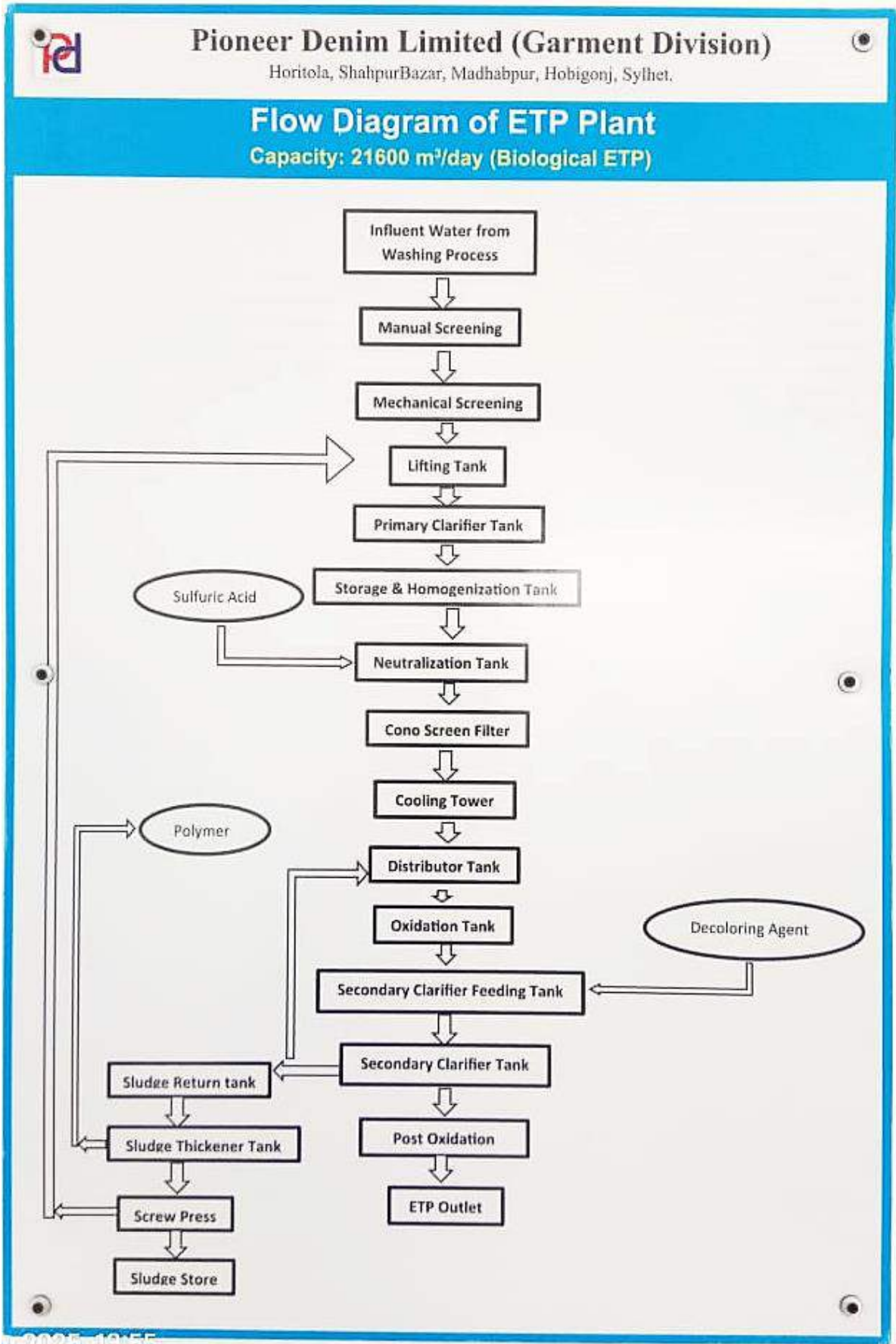
Figure 5.5: ETP area Marked on Project layout Plan



- 11) clarifier feeding tank
- 12) clarifier
- 13) return sludge tank
- 14) sludge thickener
- 15) oxygen increase tank
- 16) blowers
- 17) chemical reagents
- 18) main switchboard
- 19) substation or warehouse
- 20) Cono screen
- 21) cooling tower
- 22) conference room
- 23) laboratory

Tank Details

TANKS DATA							
Nº	DESCRIPTION	DIMENSIONS	WATER VOLUME	Nº	DESCRIPTION	DIMENSIONS	WATER VOLUME
3	LIFTING TANK	(4x) 9.00 x 6.00 x 4.00 m	(4x) 216.00 m ³	12	CLARIFIER	(4x) 9.00 x 9.00 x 7.50 m	(4x) 607.50 m ³
4	PRIMARY CLARIFIER FEEDING TANK	(4x) 2.00 x 4.85 x 7.50 m	(4x) 72.75 m ³	13	RETURN SLUDGE FEEDING TANK	(4x) 1.50 x 3.30 x 7.50 m	(4x) 37.12 m ³
5	PRIMARY CLARIFIER	(4x) 8.90 x 8.90 x 7.50 m	(4x) 594.07 m ³	14	SLUDGE THICKENER	110.91 m ² x 5.00 m	554.55 m ³
6	PUMICE EXTRACTION TANK	(4x) 2.00 x 3.75 x 7.50 m	(4x) 56.25 m ³	15	DISSOLVED OXYGEN INCREASE SYSTEM	(2x) 107.56 m ² x 2.50 m	(2x) 215.12 m ³
7	STORAGE AND HOMOGENIZATION TANK	(4x) 9.00 x 40.00 x 7.50 m	(4x) 2700.00 m ³	22	ULTRASCREEN FEEDING TANK	(4x) 3.00 x 10.00 x 7.50 m	(4x) 225.00 m ³
8	NEUTRALIZATION	(4x) 1.50 x 3.30 x 7.50 m	(4x) 37.12 m ³	24	ULTRAFILTRATION FEEDING TANK	(4x) 15.00 x 10.00 x 7.50 m	(4x) 1125.00 m ³
9	DISTRIBUTOR	(4x) 5.30 x 3.40 x 8.00 m	(4x) 144.16 m ³	26	OSMOSIS FEEDING TANK	(1x) 199 m ² x 7.50 m	(1x) 1493.00 m ³
10	BIOLOGICAL OXIDATION	(4x) 1247.73 m ² x 7.50 m	(4x) 9357.97 m ³	28	FILTRATED WATER STORAGE TANK	(4x) 6.00 x 10.00 x 7.50 m	(4x) 450.00 m ³
11	CLARIFIER FEEDING TANK	(4x) 13.28 m ² x 7.50 m	(4x) 99.60 m ³	29	CONCENTRATED STORAGE TANK	(4x) 6.00 x 10.00 x 7.50 m	(4x) 450.00 m ³



ETP Design Calculation

Daily flow:	21600	m ³ /day
Inlet COD:	1000	mg/l
Inlet BOD ₅ :	400	mg/l
Inlet Suspended Solids:	800	mg/l
Daily COD load:	21600	kg/day
Daily BOD ₅ load:	8640	kg/day
Outlet COD concentration:	< 150	mg/l
COD global reduction:	85% <	
Outlet BOD ₅ concentration:	< 30	mg/l
BOD ₅ global reduction:	92.5%	
Final D.O. concentration:	> 4.5	mg/l

The tank volumes and process parameters shown below guarantee the COD and BOD reduction shown above.

Equalization tank volume: N°4 tanks of 2700 m³ each, therefore total equalization volume 10800 m³ (12 h hydraulic retention time)

Equalization tank aeration: N°4 lines of 1043 m³/h air each, one for each equalization tank.
 Number of coarse bubble diffusers: 210 per line, total 840.

The equalization retention time and aeration guarantee a perfect mixing of the pollutants before the biological oxidation as well as the prevention of bad smell.

Mixed Liquor Volatile Suspended Solids (MLVSS) in biological oxidation tank:

3000 mg/l

Inlet BOD₅ to the oxidation tank: 0.4 kg/m³ x 21600 m³/day = 8640 kg/day

F/M ratio in biological oxidation:

8640 kg BOD₅/day / (3 kg/m³ x 37428 m³) = 0.077 kgBOD₅/kg biomass/day

This value is correct for an extended biological aeration process, as it should be around 0.04 to 1 kgBOD₅/kg biomass/day.

Volumetric load:

8640 kg BOD₅/37428 m³ = 0.23 kgBOD₅/m³/day, which is as per the recommended values of 0.1 0.4 kgBOD₅/m³/day.

Estimated daily biological sludge production: 6900 kg/day at 25% dry matter (after dewatering).

Oxygen demand: 397 kg/h

Average air requirement: 10660 m³/h

Average air flow supplied in oxidation stage: Air is supplied N^o4 operating blowers. All operating blowers have VFD and have a flow range from 1945 to 3159 m³/h of air each, meaning that the system can supply from a minimum of 7780 m³/h to a maximum of 12636 m³/h of air.

Diffusers calculation: 10660 m³/h average air flow/ 3.5 m³/h per diffuser: 3045 diffusers.

The air is supplied through 3080 fine bubble diffusers of 9" with special EPDM coating.

The retention time, aeration and the use of high efficiency air diffusers allow the bacteria to successfully degrade the pollutants and therefore remove the BOD and COD from the wastewater.

The system features special flow-makers in the racetrack oxidation tank in order to optimize oxygen transfer and energy consumption.

Sludge recirculation rate normally calculated as:

$$\text{Recirculation flow / Inlet flow} = (1350 \text{ m}^3/\text{h}) / (900 \text{ m}^3/\text{h}) \times 100 = 150\%$$

Sludge age: MLVSS in aeration tank/TSS entering the system (inlet TSS 800 mg/l, but as the system has a primary clarifier and special disc microfiltration, TSS will enter the biological process at a maximum concentration of 0.15 kg/m³).

$$\text{Sludge age} = (3 \text{ kg/m}^3 \times 37428 \text{ m}^3) / (0.15 \text{ kg/m}^3 \times 21600 \text{ m}^3/\text{day}) = 34.6 \text{ days.}$$

Required sedimentation surface, with sedimentation speed of 0.30 m/h (Surface Loading Rate)

$$900 \text{ m}^3/\text{h} / 0.30 \text{ m/h} = 3000 \text{ m}^2$$

Clarifier technology: Lamella packs (for space saving)

Lamella inclination: 60°

Total theoretical sedimentation surface: 3000 m² (required sedimentation surface)

Actual clarifier developed surface:

831 m² per clarifier; N^o4 secondary clarifiers installed so total developed sedimentation surface = 3324 m².

Which shows that the actual sedimentation surface complies with the requirement and leaves a good safety margin.

Weir overflow rate:

N°4 secondary clarifiers, each one 9 meters side so: 9 m clarifier side x 2 + 8 m side x 2 (to take into account the 1 m division in the square clarifier) = 34 m x 4

clarifiers = 136 m Daily

flow: 21600 m³/day

WOR = 21600 / 136 = 158.8 m³/m/day

Sludge Loading Rate = 3 kg / m³ x 21600 m³/day / 3324 m² = 19.49 kg/m²/day.

Retention time in secondary clarifier:

N°4 clarifiers x 607 m³ each = 2428 m³/900 m³/h = 2.7 hours.

Details technical data, Hydraulic profile, General Layout, P&ID attached in **Annexure XV**

The project proponent has decided to construction of a STP with capacity of 1200 m³/day after starting full production of the factory for domestic wastewater treatment.

Wastewater treatment plant parameters – STP

STP Design Calculation

Daily flow: 1200 m³/day

Inlet COD: 600 mg/l

Inlet BOD₅: 300 mg/l

Inlet Suspended Solids: 300 mg/l

Daily COD load: 720 kg/day

Daily BOD₅ load: 360 kg/day

Outlet COD concentration: < 150 mg/l

COD global reduction: 75%

Outlet BOD₅ concentration: < 30 mg/l

BOD₅ global reduction: 90%

Final D.O. concentration: > 6 mg/l

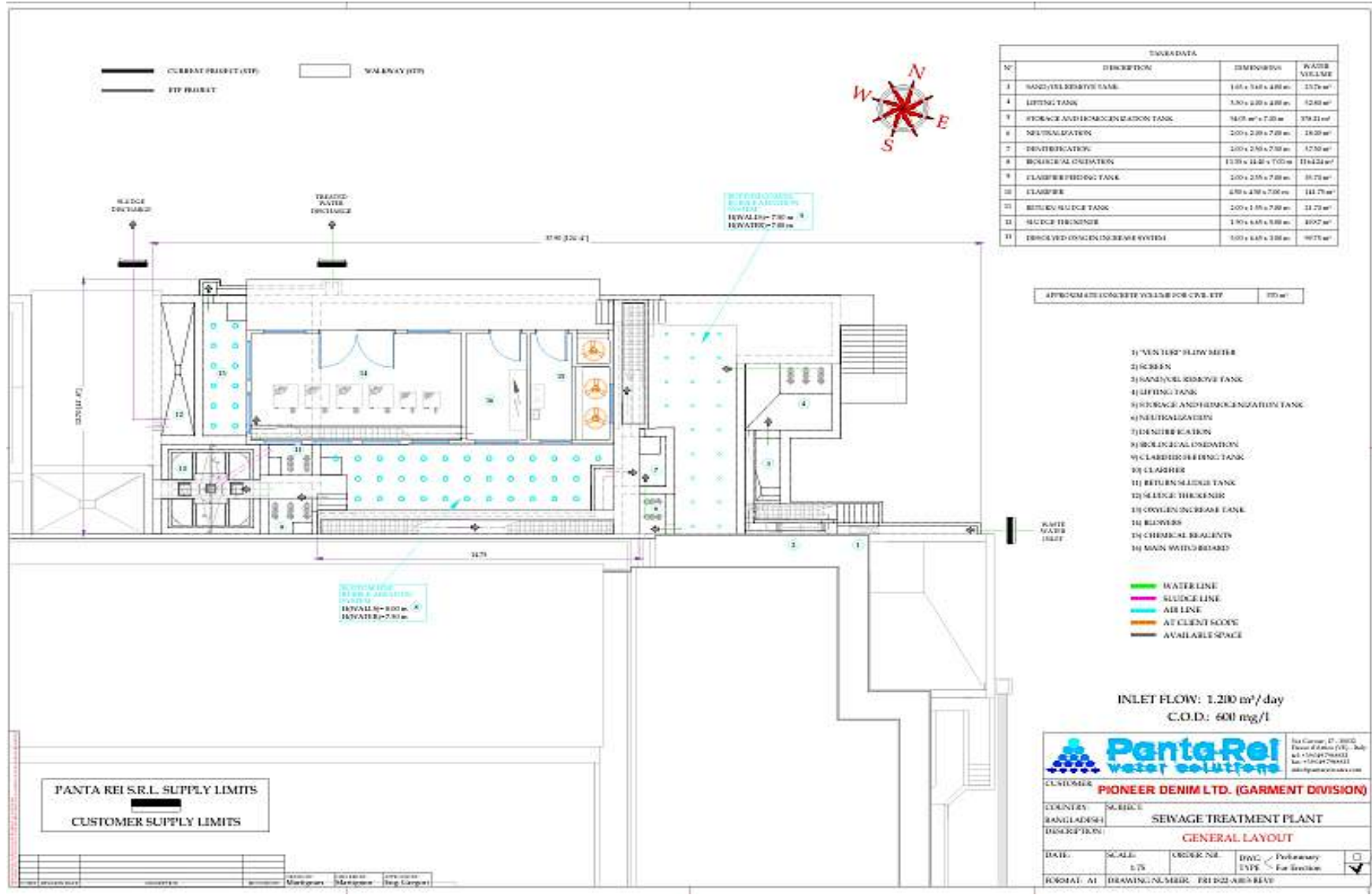


Figure 5.4: General layout of STP

The tank volumes and process parameters shown below guarantee the COD and BOD reduction shown above.

Equalization tank volume: 378 m³ (7.5 h retention time)

Equalization tank aeration: 259 m³/h

The equalization retention time and aeration guarantee a perfect mixing of the pollutants before the biological oxidation as well as the prevention of bad smell.

Biological oxidation tank: 1164 m³ (23 h retention time in total)

Mixed Liquor Volatile Suspended Solids (MLVSS) in biological oxidation tank: 4000 g/m³

Inlet BOD₅ would be 300 mg/l = 0.3 kg/m³ x 1200 m³/day = 360 kg/day.

F/M ratio in biological oxidation:

$360 \text{ kg BOD}_5/\text{day} / (4 \text{ kg/m}^3 \times 1164 \text{ m}^3) = 0.077 \text{ kgBOD}_5/\text{kg biomass/day}$

This value is correct for an extended biological aeration process, as it should be around 0.04 to 1 kgBOD₅/kg biomass/day.

Volumetric load:

$360 \text{ kg BOD}_5/1164 \text{ m}^3 = 0.3 \text{ kgBOD}_5/\text{m}^3/\text{day}$, which is as per the recommended values of 0.1-0.4 kgBOD₅/m³/day.

Oxygen demand: 30 kgO₂/h

Average air flow supplied in oxidation stage: 498 m³/h

The retention time, aeration and the use of high efficiency air diffusers allow the bacteria to successfully degrade the pollutants and therefore remove the BOD and COD from the wastewater.

Sludge recirculation rate normally calculated as:

$\text{Recirculation flow} / \text{Inlet flow} = (70 \text{ m}^3/\text{h}) / (50 \text{ m}^3/\text{h}) \times 100 = 140\%$

Sludge age: MLSS in aeration tank/TSS entering the system. The TSS considered entering the oxidation tank would be maximum 500 mg/l = 0.5 kg/m³.

$\text{Sludge age} = (4 \text{ kg/m}^3 \times 1164 \text{ m}^3) / (0.3 \text{ kg/m}^3 \times 1200 \text{ m}^3/\text{day}) = 12.9 \text{ days}$. This is also called SRT, sludge retention time.

Sludge generation: a total sludge generation for this project running in steady state is based on the cellular growth of the biomass depending on the amount of BOD being degraded (and used as carbon source for their growth and reproduction).

Total concentration of BOD used as design: 300 mg/l

Total BOD per day: $0.3 \text{ kg/m}^3 \times 1200 \text{ m}^3/\text{day} = 360 \text{ kg/day}$

Amount of sludge generated: 200 g of sludge per kg of degraded BOD.

Total amount of sludge generated per day: $360 \text{ kg BOD/day} \times 0.2 \text{ kg sludge/kg of BOD}$:

72 kg/day of sludge 100% dry concentration.

It is considered that the filter press yields a dry matter concentration of 25%. Therefore, the solid sludge being generated would be:

$72 \text{ kg/day} / 0.25 = 288 \text{ kg/day}$ of 25% dry sludge, around $0.3 \text{ m}^3/\text{day}$.

Required sedimentation surface, with sedimentation speed of 0.33 m/h (Surface Loading Rate, SLR):

$50 \text{ m}^3/\text{h} / 0.33 \text{ m/h} = 151 \text{ m}^2$

Clarifier technology: Lamella packs (for space saving)

Actual clarifier developed surface: 165 m^2

Degree of inclination of lamella packs: 60°

Which shows that the actual sedimentation surface complies with the requirement plus a safety margin.

Retention time in final clarifier: 2.8 h approximately.

Clarifier will be adjusted to have a wall length of 8.5 m per side.

Weir overflow rate:

$4.5 \text{ m clarifier side} \times 2 + 3.5 \text{ m side} \times 2$ (to take into account the 1 m division in the square clarifier) = 16 m

Daily flow: $1200 \text{ m}^3/\text{day}$

$\text{WOR} = 1200 / 16 = 75 \text{ m}^3/\text{m/day}$

Sludge Loading Rate = $4 \text{ kg} / \text{m}^3 \times 1200 \text{ m}^3/\text{day} / 165 \text{ m}^2 = 29 \text{ kg/m}^2/\text{day}$.

Number of lamella packs sections in the clarifier: 2

Number of lamella packs per section 8 (so 16 modules total).

Size of each lamella pack (LxWxH): $1000 \times 1060 \times 1000 \text{ mm}$.

Final STP discharge will also undergo a chlorination treatment with sodium hypochlorite for disinfection.

Tank Details of STP

TANKS DATA			
N ^o	DESCRIPTION	DIMENSIONS	WATER VOLUME
3	SAND/OIL REMOVE TANK	1.65 x 3.60 x 4.00 m	23.76 m ³
4	LIFTING TANK	3.30 x 4.00 x 4.00 m	52.80 m ³
5	STORAGE AND HOMOGENIZATION TANK	54.03 m ² x 7.00 m	378.21 m ³
6	NEUTRALIZATION	2.00 x 2.00 x 7.00 m	28.00 m ³
7	DENITRIFICATION	2.00 x 2.50 x 7.50 m	37.50 m ³
8	BIOLOGICAL OXIDATION	11.55 x 14.40 x 7.00 m	1164.24 m ³
9	CLARIFIER FEEDING TANK	2.00 x 2.55 x 7.00 m	35.70 m ³
10	CLARIFIER	4.50 x 4.50 x 7.00 m	141.75 m ³
11	RETURN SLUDGE TANK	2.00 x 1.55 x 7.00 m	21.70 m ³
12	SLUDGE THICKENER	1.50 x 6.65 x 5.00 m	49.87 m ³
13	DISSOLVED OXYGEN INCREASE SYSTEM	5.00 x 6.65 x 3.00 m	99.75 m ³

STP General Layout, Process calculation attached in **Annexure XVI**

5.4.2 Impact on Overland Drainage

The project area is located within a naturally low-relief floodplain terrain where surface runoff is conveyed through local overland drainage paths and small natural khals, particularly during the monsoon season. Overland flow from the project site follows the existing ground slope and ultimately drains into the adjacent local khal, which acts as the primary receiving water body. No natural drainage channels will be obstructed or diverted as part of the project development.

The receiving khal has adequate hydraulic capacity to convey the treated effluent without causing stagnation or backflow. Due to dilution with seasonal runoff and existing flow in the khal, no measurable adverse change in pH, BOD, COD, or suspended solids is anticipated. Thermal and chemical impacts are also expected to remain within acceptable limits.

The project does not involve land filling that would block natural flow paths. During monsoon periods, the khal functions as a conveyance channel for both surface runoff and treated effluent, and the additional discharge volume represents a small fraction of the khal's carrying capacity. Therefore, no waterlogging or erosion impacts are expected.

Mitigation and Management Measures

- Treated effluent discharge will strictly comply with **DoE/ECR standards**.
- Discharge will be through a **lined drain with energy dissipation** at the outfall to prevent erosion.

- Regular monitoring of effluent quality and khal condition will be conducted.
- Emergency shutdown procedures will be in place in case of treatment failure.
- No direct discharge onto open land without channelization will be allowed



The figure shows the project site located at 24°13'36.13" N, 91°21'55.27" E in Habiganj. The project boundary is marked in red. Local khals and low-lying drainage channels surrounding the site are indicated by green & Blue lines, showing natural flow directions toward the Kanai Khal, approximately 4.7–5 km northwest of the site. Arrows indicate the surface runoff direction, which guides stormwater and treated effluent from the site through natural drainage pathways. The map also includes the north arrow, scale bar, and legend for reference.

Based on the existing overland drainage condition, hydraulic capacity of the receiving khal, and compliance of treated effluent with regulatory standards, the discharge of **treated wastewater** is not expected to cause any significant adverse impact on surface water quality, overland drainage, or flood regime of the surrounding area.

5.4.3 Cumulative Impact on Surface Water Resources

Surface water drainage from the site is conveyed through local khals toward the river, and subsequently to the Kushiyara River system downstream. The local khal (Sara) already receives runoff and discharges from multiple existing sources, including domestic wastewater from nearby settlements, agricultural runoff containing fertilizers and pesticides, and effluent from other small- to medium-scale industrial and commercial activities within study area.

In this context, any additional discharge from the project if inadequately treated may incrementally increase the cumulative pollutant load (BOD, COD, TSS, nutrients, and color) in the receiving water body, particularly during the dry season when river flow and dilution capacity are low. During the monsoon season, although dilution capacity is higher, cumulative impacts may arise due to synchronized runoff from multiple upstream and adjacent sources entering the river system simultaneously, potentially affecting water quality, aquatic habitats, and downstream water uses.

However, with the implementation of a properly designed and operated Effluent Treatment Plant (ETP) complying with DoE discharge standards, and with strict control on discharge pathways through lined channels and monitoring systems, the project's incremental contribution to cumulative impacts is expected to be low and localized. Effective wastewater management, combined with preservation of natural khals and avoidance of illegal discharges, will ensure that the project does not significantly exacerbate existing pressures on the Kushiara river system.

Overall, considering existing land use, current discharge pressures, and proposed mitigation measures, the cumulative impact on surface water quality is assessed as manageable and not significant, provided continuous compliance with regulatory requirements and implementation of the Environmental Management Plan (EMP).

5.4.4 Impact on Groundwater

Groundwater is a vital source of water for domestic, agricultural, and industrial use in the project area. Project activities such as groundwater abstraction, excavation, construction works, wastewater discharge, and handling of chemicals or fuels may affect groundwater quantity and quality. The potential impacts on groundwater during construction and operation phases, including changes in water table levels and risks of contamination, are proposed mitigation measures to ensure sustainable groundwater use and protection.

The proposed project shall comply with the provisions of the Bangladesh Water Act 2013, particularly Section 7 which mandates integrated, equitable, and sustainable management of national water resources under the guidance of the competent water authority. In accordance with the Bangladesh Water Rules, 2018, all activities related to abstraction, use, diversion, or discharge of water will be subject to prior approval from the relevant authority, following prescribed procedures, documentation, and conditions.

Project proponent has taken No objection certificate to abstraction of groundwater through deep tube wells 2000 m³/day. NOC attached in **Annexure VI**.

Mitigation and Management Measures

To protect groundwater resources, the following measures shall be implemented:

- install a monitoring well to measure the groundwater level at the project site
- Construction of impervious RCC-lined ETP units
- No direct discharge or infiltration of untreated effluent into soil
- Secondary containment for chemical and fuel storage areas
- Regular inspection of underground pipelines and tanks
- Groundwater quality monitoring (pre-monsoon and post-monsoon)
- Abstraction within safe yield ($\leq 70\%$ recharge)
- Distributed well-field & rotational pumping
- Dry-season abstraction reduction (15–20%)
- Use of deep confined aquifer only
- Trigger-based monitoring (≥ 1.5 m/year decline)
- Protection of community wells
- Mandatory WARPO reporting & compliance.

5.4.5 Impact Acoustic Environment (Green Belt & Eco System Development)

Impacts and Origin

The term ‘noise’ may be defined as an unwanted sound at a wrong time and a wrong place. Noise is considered to be one of the dimensions of pollution, which leads to degradation of the environment and also creates psychological and physical effects on human health. The discomfort caused by noise is difficult to assess; it includes auditory fatigue and temporary lessening of hearing ability. Perception of noise is often relative to the background sound level, so that new roads in quiet areas or noisy trucks at night are often perceived as worse than higher levels of noise in a busy area during working day. Noise levels depend on the two parameters—sound pressures and sound intensity. They are measured in different units giving varying degree scale of magnitude. The common scientific unit is the ‘decibel’ (dB). Measurement of noise level in dB is carried out with an instrument called sound level meter. During operation of the **Pioneer Denim Limited (Garments Division)** noise is likely to be generated from the following activities:

- Vehicular movement outside the project
- Routine operation of project machineries

- Generators
- Others factory surrounding of the project

Potential environmental impacts of noise

- ✓ Noise pollution can potentially affect immediate Employees and work environment. The impacts are Continuous exposure of neighbors to noise nuisance may result in noise induced hearing lose;
- ✓ High noise level will force employees to shout loud when communicating to one another;
- ✓ Exposure of employees to high noise level (above 85dB) continuous for 8hours per day may result in noise induced haring lose;
- ✓ Exposure of ear to peak sound level instantaneously may result to deafness.

In order to assess the present sound quality sound quality monitoring was conducted at **Pioneer Denim Limited (Garments Division)** which shows at project sound level does not exceeds the allowable level for Industrial area.

Mitigation Measures

Green buffer should be developed all along the project boundary. Green buffer should compose of the 2-3 rows of plants of variable height and thick canopy so as to form continuous barrier. This will help in reducing the noise level significantly.

Install the new machinery of modern make which complies with the noise standards prescribed by DoE.

Job rotations should be practiced for workers in working at noise intensive locations to prevent prolonged exposure to high noise level as it may lead to deafness, fatigue, head ache, nausea and drowsiness. Propose PPEs must be made compulsory for workers working at locations where the intensity of noise is high.

Acoustic design with sound proof glass paneling will be provided for critical operator cabins / control rooms of individual modules as well as central control facilities.

Proper greasing, periodic checkups for frictionless movements. Honking should be prohibited within the site

In order to resist the noise generated due to plant activity and to uptake the waste water generated to some extent, it is recommended to develop green belt around the periphery of the plant road side area. There won't be any relocation of existing trees in the near vicinity of the project site. The total green belt area identified for the project is 30% of the total project area.






Adequate funds will be allotted for greenbelt development activities to be undertaken in project and surrounding area. The details regarding fund allocation for next five years for the greenbelt development of the area is as given in chapter 6.

Pioneer Denim Limited (Garments Division) will have responsible for Eco friendly eco system development around the project area by community cooperation.

5.4.6 Impact due to Solid & Hazardous Waste

Impacts and Origin







Varieties of solid waste are generated from daily operation of the **Pioneer Denim Limited (Garments Division)**, Which mainly include the following:

-  Papers, Poly/ Plastic, Empty Carton etc. from the daily activities (Minor)
-  Jhut waste, Fabric cut piece etc
-  Electrical and mechanical wastes (Minor)
-  Oil containers and Chemical containers/bags (Moderate)
-  Sludge from ETP Operation

If this solid waste is not managed properly, it can impose great danger to the community, which are:

- ✓ Poorly disposed waste paper especially plastic waste can block drainage;
- ✓ Odor emanating from degradable waste especially kitchen waste can pollute local ambient air;
- ✓ Poorly managed and disposed kitchen waste can attract diseases vectors;
- ✓ Decomposing kitchen waste can pollute local ambient condition;
- ✓ Poorly managed electrical, mechanical and chemical wastes can pollute soil, water and air.
- ✓ Improve sludge management system.
- ✓ Solid sludge from ETP create soil pollution, odor & health risk.

Mitigation measures

-  Sufficient numbers of cleaners who regularly cleans and collects solid wastes generated in the projects.
-  Sufficient numbers of dustbins and sign board put in place to aware people in case of electro mechanical waste the amount is very negligible and collected and stored in store room. These items have secondary demand and it is generally sold out.
-  Installed sludge dewatering system (filter press)
-  Ensure proper sludge handling.
-  Proper solid-waste management shall be established
-  Solid waste should collect in environmentally friendly ways and disposal through regular disposal system

5.4.7 Impact on Health and Safety

Impact Origin

The health of the plant workers varies from one section to another as outlined below;

- (i) Health risks are found in the management of the waste holding areas, the transfer routes and preparation procedures. The risks including exposing the workers to a wide-open burning of fuel and raw material in case of fire breakout. The neighborhood could also be affected through wind or surface runoff transferring contaminants and other emissions
- (ii) Combustion areas are the most critical section in respect of health and safety due to amount of heat required in the process.
- (iii) Heat is also a serious impact to the employees operating the plant since they are likely to be open. The general ambient heat around the entire premises is also likely to be relatively high extending the risk to more workers,
- (iv) Personal accidents and risks of getting injured by falling objects to the workers and visitors while moving around the premises cannot be ignored.
- (v) There are risks of inhale gas/vapor outbreaks from chemical storage area, oil storage areas posing potential danger to not only the site, but also the neighboring land users,

Mitigating Measures

Safe and good occupational health status of the employees and workers is important for not only the persons working, but also for the operation and maintenance of the whole project. Regular medical check-up is to be done to ensure the soundness of health of the employees and workers. Pollution control measures are to be duly adopted as necessary, including noise and dust control, so that there would not be any negative occupational health impact. Insurance for all employees should be taken out. A senior medical officer with sufficient background and experience in occupational health problems should coordinate this issue and would be responsible for drawing up and implementing a detailed and regular program for ensuring health safety for all the workers.

The supervisors and operators should be regularly given training regarding safe operation and maintenance works. Workers should be provided with appropriate personnel safety equipment such as safety boots, helmets, gloves, protective clothes, dust mask, goggles, and ear protection at no cost to the workers. The use of PPEs will be strict for the workers working in dangerous zones and First Aid boxes and firefighting equipment should be available at each section of the

project. Periodic checkups should be conducted for the workers working in the textile, Chemical storage, and ETP to reduce exposure levels, rotate the shifts of the workers.

5.4.8 Natural, Accidental Hazard and Fire

Impacts and Origin

Due to its geographical position the project area is prone to Natural Hazard like heavy rainfall, earthquake etc. Like Natural accidental hazard are uncertain and unexpected. The impacts could be from small injury to devastating and deadly.

Lightning a Gigantic Electrical Spark Traveling between Cloud to Cloud or Cloud to Earth Containing an average charge of 30 to 50 lakhs Volts and a current of 30 Kilo amperes with a speed of 220 km per hour.

Bangladesh has seen a near-record number of deaths this year from a phenomenon that appears to be worsening with climate change: lightning strikes.

The problem has prompted Bangladesh government to add lightning strikes to the country's list of official types of disasters, which includes floods, cyclones and storm surges, earthquakes, drought and riverbank erosion, among others.

Bangladesh National Building Code (BNBC) first proposed in 1993 and legally binding in 2006 gives clear regulations for setting up "Lightning Arrestor" in buildings.

Table 5.1 Risk Index as per BNBC 2006 art 2.9.1.

SI No:	Building/Shed	Point	Comment
1	Washing Shed (Wet Process)	49	LPS Required
2	Washing Shed (Dry Process)	49	LPS Required
3	R&D Building	50	LPS Required
4	Generator Building & Shed	51	LPS Required
5	WTP 1	48	LPS Required
6	Fire Pump Room	46	LPS Required
7			
Marginal Risk Index = 40			












The accidental hazard associated with the project is:

- Accident due to operate machinery
- Accident from generator /Boiler/ETP
- Fire from factory

Fire is another most important issue for this project. Proper firefighting design should be taken to consider operating this project.

Mitigation measures

The Project has installed Lightning Protection System (LPS) to mitigate natural hazard as per BNBC code. To reduce impacts of Natural Hazards and accidental hazard Pioneer Denim Limited (Garments Division) should be taken the following actions

-  All the infrastructures have been designed and installed to withstand natural hazard
-  The operators at generator/Boiler are properly trained
-  Sufficient fire extinguisher available in the project
-  First Aid points are available with trained paramedics
-  Fire alarm & fire training
-  Information center is available at major locations
-  Entering in the danger zone is strictly prohibited
-  Safety instructions and rules are displayed at all machinery
-  Trained supervisors and operators ensure proper implementations of safety rules.
-  Ensure that PPE is available at all times at site
-  In event of accidents, the authority will be responsible for immediate evacuation of injured person to the nearest medical center. The proponent should bear medical and other expenses of the injured person.

5.4.9 Impact on Air Quality

Post development of the factory & setting up of washing section, there could be some impacts on the air quality of the area. Industrial development will involve generation of emissions, and increased vehicular movements. These altogether may have overall negative impact on the air quality of the site and the nearby areas. The industry proposed to set up washing section. It is envisaged that, the small amount of particulate matter, Sulphur dioxide, metals and other pollutants



like, oxides of nitrogen and carbon monoxide will be generated during industrial operations. Air emissions from industry contains some volatile organic compounds but do not contain any hazardous compounds. But air emissions from effluent treatment plant of the industry is a major concern. Particulate Matter, SO₂ and NO₂ from utilities like generator; and SO₂, NO_x, HC and CO from vehicular traffic coming in and going out from the site.

Monitoring units for air quality must be installed and periodically checked at upstream and downstream wind flow directions and the analysis results should be within the limits as provided by the DoE.

At the operational phase of such project air pollution may occur mainly from production area, Boiler, generators, increased vehicular movement and indiscriminate disposal of degradable solid waste. All of these actions are done in very small scale. So particular management is suggested to collect dust from production unit and regular monitoring and proper management of solid waste and effective control of vehicular traffic during peak hours. No harmful emissions (dioxins and furans) produced.

Mitigation measure

- ✍ Effective control of vehicular traffic
- ✍ Provision should be made for peripheral green belt all along the boundary. Green belt should have minimum of three rows of local variety of tree.
- ✍ Tree species should be selected such that first inside row is of smaller height, middle row of tree is of medium height and last row of tree is of higher height so that green belt formed appears like a canopy.
- ✍ Air pollution monitoring should be carried out quarterly to check the air pollution level.
- ✍ Burning good quality fuel
- ✍ Energy conservation should be adopted by opting the alternate energy options like solar power
- ✍ Environmental Soundly disposal of generator exhaust.
- ✍ Odor should be managed at the site using odor suppressant and planting fragrant flowering trees

-  Install dust collector in production area
-  Effective dust control production procedure.

5.4.10 Increase in vehicular traffic in the area

Impact Origin

Increase in vehicular traffic in the area is likely to be experienced during operational hours of the project. Increased vehicular traffic in the area is likely to result from: -





- Personal vehicles belonging to employees;
- Service provision vehicles such as garbage collection trucks;
- Emergency service vehicles such as fire engines;
- Goods carrying vehicle.

Potential negative impacts from increased vehicular traffic



- There will be more noise from increased vehicular traffic
- There will be an increase of exhaust emission from vehicles which will pollute local atmospheric air.

Mitigation measures

Pioneer Denim Limited (Garments Division) have readily available the parking facilities within the project. In-house traffic system is built up to avoid the traffic jam surrounding the project. In addition, the following measures can be put in place to mitigate possible negative impacts likely to result from increase in vehicular traffic in the area:

-  Management to pave the dilapidated service road with tarmac or more durable material;
-  All users of said roads to always observe traffic rules this will give pedestrians and cyclist their space and safety while using the road;
-  Marking of the roads to be clearly done;
-  Horns and sirens near main gate should be strictly prohibited;

5.4.11 Potential impacts on wildlife (i.e. loss of habitat, hindrance to wildlife movement)

-  Boundary fencing of the Project Site will ensure wildlife choose alternative routes. Planting of indigenous trees, where possible, around the boundary of the Project Site
-  . Provision of landscaped areas, where possible, around and within the Project Site using indigenous species to supply habitat for terrestrial and riparian species and improve aesthetics.

- ✚ The planted trees will be inspected to ensure they become established. Any planted trees which do not successfully establish will be replaced.

5.4.12 Hazardous Materials Management

- ☼ Refueling, washing and maintenance of plant and vehicles is prohibited in the vicinity of water bodies. Periodic checks of all necessary tanks and pipelines.
- ☼ Periodic checks by EHS Manager to ensure mitigation measures are implemented and enforced.
- ☼ Hazardous materials (i.e. chemicals, oils, fuels) will be stored in containers comprising appropriate secondary containment.
- ☼ Spill kits will be available to contain any accidental release of hazardous materials. A 'Spill Prevention, Control and Contingency Plan' will be developed, outlining the plant design features and spill prevention and control measures.
- ☼ No underground storage tanks (USTs), containing oils fuels or chemicals will be located on-site without ensure proper safety measures & concern authority permission.

4.4.13 Release of chemicals, sludge, waste oil, hydraulic fluids, paints, solvents and similar materials to the environment

- ✚ Imposing strict prohibition of dumping or burial of any potentially contaminating waste.
- ✚ All the other potentially contaminating wastes (used oil, drained hydraulic fluid, spent solvents, etc.,) will be recovered in separate, properly
- ✚ Labeled containers and disposed to far off-site recycling facilities. Where viable options of incineration are available (e.g., refining of lubricating oil, solvent recovery, etc.), these is pursued upon

5.4.14: Chemical storage

Impact origin

The potential adverse impacts of chemical storage or warehousing facilities are associated not only with the storage, mixing, and transfer of industrial chemicals on site (which may take the form of bulk dry powder/granules/pellets, liquids or gases), but may also include a range of other on-site activities such as mechanical workshops, conveyor systems, wash-bays, and parts cleaning facilities.

Potential negative impacts from Chemical storage

Air and noise issues associated with chemical storage or warehousing facilities are likely to include:

- ✚ Dust from storage or mixing of bulk dry powder/granules/pellets, movement and loading/unloading of vehicles
- ✚ Odor and mist from decanting liquids, leakage from gas cylinders and volatile materials, chemicals used in mechanical workshops and wash-bays

- ☒ Noise from the movement of trucks, front-end loaders and forklifts (including reversing alarms), particularly early in the morning or late at night. Other noise sources include air conditioning, pumps, conveyor systems, hoppers and compressors.
- ☒ Chemical burns are possible if spills of hazardous materials occur.
- ☒ Hazardous and toxic substances
- ☒ Lack of awareness of the properties of the dangerous substances;
- ☒ Operator error, due to lack of training and other human factors;
- ☒ Inappropriate storage conditions with respect to the hazards of the substances;
- ☒ Inadequate design, installation or maintenance of buildings and equipment;
- ☒ Exposure to heat from a nearby fire or other heat source;
- ☒ Poor control of ignition sources, including smoking and smoking materials, hot work, electrical equipment etc.

Mitigation measures

PDL should build a well design & organized Chemical warehouse including for maintaining standard chemical storage temperature. In addition, the following measures take place to mitigate possible negative impacts likely to result from Chemical warehouse area: EHS Manager Leads EHS team to conduct review of the latest chemical regulations on annual basis, with reference to Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), Classification, Labelling and Packaging (CLP) and various tools for screening followed in facility. Continual update of Restricted Substance Lists (RSLs) based on the latest legal and brands requirements.

Storage and handling hazardous and toxic substances:

- ☒ the hazard of the substance has been classified
- ☒ the substance is suitably labelled with specific risk and safety phrases, and packaged accordingly;
- ☒ Information, in the form of a material safety data sheet, is available.
- ☒ Maintain a Material Safety Data Sheet (MSDS) for each chemical to which workers are exposed in the facility;
- ☒ Follow instructions on the MSDS/SDS for handling chemical products

- ✍ Train employees on the risks of each chemical being stored;
- ✍ Provide spill cleanup kits in any area where chemicals are stored
- ✍ Have a written work sheet.
- ✍ Train employees to clean up spills, protect themselves and properly dispose of used materials;
- ✍ Provide proper personal protective equipment (PPE) and enforce its use;
- ✍ Store all chemicals safely and securely;
- ✍ Store chemicals away from forklift traffic areas

Chemical Inventory

A list of all the chemicals in the facility used to make products, including the supplier's name, the quantity and frequency of consumption. It could include information on:

- Chemical ingredient information (chemical name, trade name, and Chemical Abstracts Service (CAS) number of chemical ingredients in an article or chemical mixture, including known impurities)
- Function of a chemical ingredient in an article or chemical mixture (e.g. colorant/dye, ink, special chemical attribution, catalyst, plasticizer, monomer, finishes, processing/ancillary chemical, etc.).
- Process chemical information (chemical name, trade name, and CAS number of chemicals used to make a product).
- Chemical hazard data, human health and eco-toxicological characteristics of chemical ingredients and chemicals used in making that ingredient, as well as their physical safety properties such as flammability.
- Potential for human or environmental exposure to chemical ingredients in an article or chemical mixture;
- RSL compliance (based on safety data sheet (SDS) / declaration);
- Status of RSL compliance based on the application.

5.5 Anticipated positive impacts of the Project

The plant has an overall positive implication to the country and especially urban, agricultural and industrial sectors.

Positive impacts likely to result from project will include.

Potential Positive impacts

- Generation of foreign currency earnings through export of denim products
- Enhancement of national export competitiveness
- Creation of direct and indirect employment opportunities
- Support to local businesses, suppliers, and service providers
- Development of local infrastructure and utilities
- Increased revenue generation for the local municipal council
- Promotion of local economic growth and livelihood opportunities
- Efficient and planned utilization of natural resources
- Improvement of local aesthetics through site development and landscaping
- Contribution to overall eco-social development of the area
- Enhancement of national denim production capacity
- Support for sustainable and environmentally compliant industrial growth in the Habiganj region

5.6 Conclusion

The potential impacts related to wastewater discharge, solid waste generation, air emissions, and noise from the proposed project are largely reversible in nature, provided that appropriate mitigation measures such as effluent treatment, waste management, emission control, ensure Occupational health safety and noise abatement are implemented. Land and soil impacts are considered partly reversible, as soil quality can be restored through remediation measures; however, long-term contamination by persistent pollutants may cause localized irreversible effects. Overall, with proper environmental management, the project impacts are expected to be reversible and manageable.

Chapter - 6

Environmental Management Plan



6.0 ENVIRONMENTAL MANAGEMENT PLAN

6.1 General Consideration

To control a project, Environmental Management Plan (EMP) is concerned with the implementation of the measures necessary to minimize or offset adverse impacts and to enhance beneficial impacts. Unless the mitigation and benefit enhancement measures, identified in EIA cannot be achieved. All the measures are said to be successful when they comply with the Environmental Quality Standard (EQS) of Bangladesh. Thus, the objectives of EMP for the present project would be:

- Mitigation measures to reduce or eliminate negative impacts;
- Enhancement measures to maximize positive impacts;
- Monitoring requirement and indicators.

6.2 Environmental Management System

Identification and summary of all potentially significant adverse environmental impacts from the company's manufacturing activities; List of specific measures to be undertaken to mitigate environmental impacts; Description and technical details for each mitigation measure, including the type of impact to which it relates and the conditions under which the measure is required, as well as equipment descriptions and operating procedures; Institutional arrangements, including assignment of responsibilities for implementing mitigation measures (i.e. supervision, enforcement, monitoring of implementation, remedial action, reporting, and staff training).

6.3 Mitigation/Beneficial Enhancement Measures

For effective and environment friendly operation of an industry, a set of guideline tools and suggestions are necessary which need to be flowed at various stages of plant installation, operation and maintenance. This plan generally has various components of management depending on the type of industry or plant activity and types of discharge and their pollution potential. The EMP once prepared forms the basis of environmental management actions from the part of the plant authority and often may need modification or up-gradation because of changes in the plant operation or factual pollution load/environmental problems detected afterwards. The plant authority may also need fleshing out the suggested outline of the EMP laid down in the report.

All beneficial and adverse impacts which may likely to occur at different project phases are identified and evaluated at section 5.0 of this report. Some aspects of mitigation and benefit

enhancement measures have also been discharged concurrently with impact evaluation. In view of the earlier discussion summary of all possible mitigation and benefit enhancement measures due to plant location and plant operation are presented in Table-7.1.

Table-6.1: Possible Mitigation/Enhancement Measures

Project Phase	Potential Impacts	Mitigation/Benefit Enhancement Measures
Plant Location	Disruption of earth surface	<ul style="list-style-type: none"> • Cutting and filling of earth should be prohibited. • Adequate drainage system should be constructed for the ease of natural drainage system of the area.
	Inadequacy of buffer zone	<ul style="list-style-type: none"> • Plantation of trees should be done at all possible open space of the factory premises.
Construction Phase	Run of erosion	<ul style="list-style-type: none"> • Proper compaction should be done after each layer of earth filling. • Avoid earth filling in rainy season
	Worker accident	<ul style="list-style-type: none"> • Set up warning signs, signals and provide helmets for workers in accordance with relevant accident prevention and work safety procedure. • Restrict access to work site.
	Sanitation diseases hazard	<ul style="list-style-type: none"> • Supply good quality drinking water to the workers. • Provide well planned sanitary facilities. • Provide regular health inspection among workers. • Promote health education campaign among workers.
	Noise/vibration hazard	<ul style="list-style-type: none"> • Make working program according to the local situation.
	Traffic congestion	<ul style="list-style-type: none"> • Avoid carrying of construction materials in peak hour of road traffic.
	Employment	<ul style="list-style-type: none"> • Employ local land less labors.
Liquid Discharge	Liquid Discharge	<ul style="list-style-type: none"> • Take care of STP/ETP and Plumbing system of the project. • Washing water should be discharge after proper treatment. Take care of ETP
	Solid Waste	<ul style="list-style-type: none"> • Organize proper collection and transportation of all solid wastes. • Install proper solid waste disposal system.
	Air quality	<ul style="list-style-type: none"> • Provide proper stack height.

Operation Phase	Occupational health	<ul style="list-style-type: none"> • Make the works aware of hazardous materials and proper handling methods • provide musk, aprons, ear plug and hand gloves to the workers. • Provide regular health inspection among workers. • promote health education campaign among workers.
	Employment	<ul style="list-style-type: none"> • Employ local jobless people wherever possible.

6.4 Monitoring Requirement & Monitoring Indicators

Monitoring of the performance of a plant is very important and sometimes vital. An industrial unit in Bangladesh generally monitors the quality of its raw materials and product, but not the related environmental parameters, thereby neglecting the environment. For surveillance of the performance of the equipment and the quality of the environment, monitoring of the environment of the work-zone and the general environment should be performed on a regular basis.

It should be mentioned here that the monitoring program should be such so that it can ensure compliance with national environmental standards. The importance of this monitoring program is also for ensuring that the plant does not create adverse environmental changes in the area and providing a database of operations and maintenance, which can be utilize if unwanted complaints are made.

Environmental monitoring requires set of indicators that could be conveniently measured, assessed and evaluated periodically to observe the trends of change in baseline environmental quality. Stack Emission data of generator, drinking water, ETP, parameter is the main monitoring parameter in this project. A list of possible parameters to be tested sample number and sampling frequency are given in Table-7.2.

Table-6.2: Effluent Parameters (Third party /DOE)

Environmental Component	Parameters	Locations	No. of Sampling per year
Wastewater	pH, Color, Temperature, DO, SS, TDS, BOD, COD.	Inlet & Outlet of the treatment plant	2

Table 6.3: Monitoring Plan for the Effluent Treatment Plant operation.

Item No.	Type of sample and collection point	Frequency of sampling	Parameters of the tested	Purpose
1.	Treated wastewater Discharge point to the drain	Once every two weeks	PH, TSS, BOD5, COD, TSS, DO Temperature	To verify compliance with the provisions of ECR-2023
2.	Raw wastewater: Effluent from Equalization	Daily	PH, Temperature	To monitor any change in the composition of raw wastewater
3.	At the flash Equalization tank.	Daily	PH, Temperature	To monitor performance of biological tank.
4.	Effluent from the Aeration Tank, before its entry into the	Daily	pH, DO, MLSS	to monitor performance of aeration tank
5	At the pH correction channel.	Daily	pH	Control

6.5 Other Monitoring Programs

- Amount of solid waste (e.g, waste, wastage fabrics, packaging materials, etc.) generated and the method of their disposal (e.g., local vendor) should be properly recorded.
- Emergency response facilities, e.g., fire extinguishers, should be regularly checked and them contents refilled at regular interval. Records of such checking and re-filling should be properly maintained.
- There should be regular drills for factory workers to familiarize them with emergency evacuation procedures.
- There should be regular training programs for factory employees in order to make them aware about the “safety policy” and “health and environmental hygiene policy” of the factory.
- There should be regular training for firefighting workers to familiarize them with firefighting equipment’s

Table-6.4: Others Monitoring Parameters

Project activities	Monitoring place	Monitoring parameters	Monitoring frequency	Responsible person/unit for monitoring
Operation period:				
Solid waste generation	<ul style="list-style-type: none"> ○ Production/packaging/conservation area ○ Solid waste conservation area 	Weight of packaging/scrap materials	Daily	Compliance & Env. Officer
Polluted air emission	<ul style="list-style-type: none"> ○ Boiler, Generator 	SPM/PM, NO _x , SO _x	Quarterly	
Hazardous waste generation	<ul style="list-style-type: none"> ○ Generation area ○ Hazardous waste conservation area 	Quantity conservation & leveling	Daily	
Workplace environment	<ul style="list-style-type: none"> ○ Production area 	Light, air, noise, humidity, temperature	Quarterly	
Emergency response Equipment	Full facility	<ul style="list-style-type: none"> <input type="checkbox"/> Extinguishers in position <input type="checkbox"/> Water Hydrants <input type="checkbox"/> Fireman switch testing <input type="checkbox"/> Servicing fire Extinguishers <input type="checkbox"/> Review Records of Accidents which is recorded on & around the entire facility <input type="checkbox"/> OHS training 	Weekly	HR & Compliance
Ground Water extraction	Monitoring Well	information on groundwater level	Daily	HR & Compliance
	Full facility	Water Use volume	Daily	HR & Compliance

6.6. Occupational Safety

PDL has adopted a detailed “safety policy” for ensuring occupational safety for all working within the industry premises. The safety policy covers precautionary measures related to working anywhere within the factory, use of any machinery, working with or near machinery in motion, stacking packing and storing materials, and carrying of excessive weight by

individual factory employee. Smoking within the factory is strictly prohibited. Carrying of cigarettes and matches within the working area is also prohibited.

The industry building and associated civil structures will be constructed as per approved design following national building codes. Provisions for approach roads, staircase, and emergency exits will be kept as per „Government guidelines. Electrical wiring, switchboards, and circuit breakers will be designed and installed by qualified engineering firms.

6.6.1 Emergency Responses

Provisions for emergency responses have been elaborate in the” Emergency Preparedness policy” adopted by the industry. All areas within the factory will be equipped with portable fire extinguishers. These fire extinguishers will be placed in easily accessible areas and will be especially marked for easy identification. All types of fire extinguishers will be labeled with user instruction and effective use period, as per recommendations of the local fire service civil defense authority. Fire alarms with lights will also be placed at appropriate locations. Fire & emergency exit plans will be fixed at easily visible place on every production floor.

The entry and exit routes to the factory will be well marked and have to fitted with emergency lights. There is provision for emergency staircase for emergency evacuation, besides the regular staircase. One vehicle will be engaged full time for any emergency to carry the patient or victims to the hospital.

Two qualified registered doctor and two nurses work full time in the factory. Besides a five-member certified team who can provide first aid treatment is always available in the factory during working hours.

6.6.2 Health and Environmental Hygiene

PDL will be adopted a “health and environment policy” for ensuring sanitary condition within the factory premises and for providing healthcare support to the factory workers. The policy deals with cleanliness within the factory premises, disposal of solid wastes, maintenance of latrines, urinals, and drains, and lighting of factory promises. Potable water in sufficient volumes will made available to all employees working on every floor. A necessity of the project is a team of an MBBS doctor and paramedics work full-time in the factory to help factory employee with their medical needs.

Health and Environment Policy-

- Factory Cleanliness

The interior of factory should be kept clean. To maintain cleanliness all interior walls should be painted with paint. And floor will cc/tiles finished. Apart from that industrial vacuum-cleaning machine will being used on a regular basis for dirt free interior.

- Disposal of Waste & Effluents

There is an insignificant quantity of raw material waste and packaging material will be disposed of through local vendor. Usually they (vendor) use packaging materials is being recycled for different uses. The re-cycled (semi full) product is environment friendly. The factory floor should be kept free of any kind of liquid, and the human waste should be disposed of in toilet, which will be drained to STP.

- Maintenance of Drains

Washroom wastewater drains should be constructed properly maintaining required slope, so that nothing can be accumulated in system.

- *Lighting of Interior of Factory*

The factory floor will be lightened with LED light sets. Factory floor, all exit & stairs have to equipped with proper emergency light units. Production floor be equipped with sufficient nos. of ceiling fans and industrial exhaust fans for sufficient ventilation and cooling.

PDL should also designed energy efficient building to use daylight for good control to both reduce energy demands and make people happier and more productive.

- Drinking Water Provision

There is sufficient volume of fresh natural drinking water kept at convenient locations of shed. It is PDL business goal to keep sound health to enhance the productivity.

- Toilets & Urinal

There will be constructed a total of separate toilets for male and female workers, which meets the local authority requirements. All the toilets will be connected with water line for flashing system to wash down the pan & Commode. Toilet floors and partial walls are tiled for hygienic region. Four times a day, cleaners clean the whole area with different liquid cleaner. Exhaust fan has ensured fresh airflow inside the toilets and sufficient lighting will be installed. Human waste and wastewater will eventually drain to STP.

Safety Policy-

- Safety Precaution

All machineries & Equipment are designed considering the safety well as per local laws well as international factory safety guidelines.

- Building and Structure

Building machines and equipment should well protected to ensure workers safety. Proper safety notice & Instruction in Bi-lingual (Bangle & English) will set to required equipment. Under no circumstances no one will be allowed to use any pains in the factory. There should not have any machinery or equipment that is un-protected in the factory which may endanger the workers.

- Staking. Packing And Storing Material

Factory warehouse will be equipped with required pallet to systematic arrangements for staking. There will keep minimum one-meter gap between stacks.

- Fire Fighting Equipment

As per floor area sufficient number of different types & size portable fire extinguishers will be placed and defined by special mark and easily located while kin emergency. Periodically local fire-service & civil defense dept. will inspect the production floor to give the certificate.

All fire extinguishers will be colored as per type, details of usability as mentioned in EU standard notice which has been placed in production floor.

All fire extinguishers will be labeled with effective use period and replace of dry powder, foam at regular interval and label as per recommendation of local civil defense fire service.

Fire alarm with light will be placed in easily visible range and alarm switch will be marked with proper graphic & Symbol notation with wordings.

The Project have to be experienced firefighting team for emergency response and worker training.

- Means of Escapes in Case of Fire & Emergency

There should be a fire/emergency evacuation plan with symbols fixed in easily visible on the place of floor.

- Prohibition of Smoking

Smoking is strictly prohibited at any time on any day in the factory. At each time of entry of a worker, the security people will be being engaged at the entry gate are to collect matches & cigarette from workers and deposit in the office.

6.7 Materials, Supplies and Equipment (In house monitoring Capability)/ Monitoring

To be an environmentally acceptable unit, PDL have it's own environment monitoring unit/cell with trained manpower with necessary equipment and other logistics along with required budget. Hence, PDL EMC will undertake the activity of monitoring the water quality, ambient air quality, noise level etc. either departmentally or by appointing external agencies wherever necessary. Regular monitoring of environmental parameters will be carried - out to find out any deterioration in environmental quality and also to take corrective steps, if required, through respective internal departments or third party. The Cell will also collect data about health of workers, green belt development etc.

The materials, supplies, equipment and personnel requirements are largely guided by technical aspects of monitoring and such requirements thus, largely control the budget of the monitoring program. PDL should arrange all kinds of equipment, laboratory instruments, chemicals and engage technically efficient personals and set up own laboratory. Otherwise PDL may engage any government approved private organization or apply to DOE to conduct monitoring.

However, for conducting the monitoring program by third party a proposed budget based on current market price has been tabulated in the bellow tables

Table 6.5 shows the preliminary cost estimates for monitoring activities during construction. assuming the duration of construction to be 12-month. The responsibility of monitoring is by the PDL and the PDL has to bear the cost.

Table 6.5: Preliminary cost estimates for monitoring and other mitigation activities during construction phase

Parameter/Activity	Frequency of activity	Cost in BDT (per month)	Cost in BDT (18 months)
Particulate Matter (PM10, PM2.5)	Quarterly	10,000/- per each set of PM ₁₀ and PM _{2.5} measurement	40,000/-
Noise Level	Quarterly	5,000/- (Per set of measurement)	20,000/-

Parameter/Activity	Frequency of activity	Cost in BDT (per month)	Cost in BDT (18 months)
Drinking water quality testing: pH, color, turbidity, total hardness, chloride, Total and Fecal coliform, Total Dissolved Solids, Arsenic, Iron, Manganese, Electrical Conductivity (salinity), Free Chlorine	Biannual	Tk. 10,000/- per set of measurement	Existing practice of the project
Site Cleaning and preparation including dismantling of structures, removal and safe disposal of debris, providing necessary protective fencing and safety measures with sign boards.	Periodic	Lump sum	Within project construction cost.
Providing safety gear package like hand gloves, eye protection glasses, helmets, rubber shoes, light PDL reacting dress etc. for 15 sets @ Tk. 3,000 for each set	-	Lump sum	45,000/-
Drinking water container for workers including necessary ceramic filters for providing drinkable water	-	Lump sum	50,000/-
Temporary Sanitary Latrine/ Septic Tank/ Portable Toilet: 2 nos. (1 no of Toilet for female and 1 no of Toilet for male) @Tk. 20,000	-	Lump sum	Within project construction cost.
Health and safety warning sign	-	Lump sum	Within project construction cost.
Appointment of an Environmental Health and Safety officer for Environmental and Social Management and Monitoring during construction (Salaried position)	-	30,000/-	PDL Env officer.
Total			1,55,000/-

Notes: (1) The estimated costs for particular matter (PM) and noise level measurements as well as laboratory analysis for water samples are based on current rates charged by **third party** and the rates may vary. (2) During the construction phase, some monitoring may be carried out by the factory through its own staff and equipment, if available, or can be

out-sourced to a competent Contractor. Equipment for monitoring such as digital camera, sound level meter, GPS etc. may be purchased by PDL.

Table 6.6 shows the preliminary cost estimates for monitoring activities during operation phase of the project. This shows the cost estimate per month which will continue throughout the life-cycle of the project. The responsibility of this monitoring lies on PDL and this cost should be budgeted in the annual maintenance budget of PDL.

Table 6.6: Preliminary cost estimates for monitoring and other mitigation activities during operational phase

Parameter/Activity	Frequency of activity	Cost estimate (per month)
CO, SO _x , NO _x , PM ₁₀ , SPM for stack emission	Quarterly/ As and when required	Tk. 30,000/-
Treated water for drinking: pH, total hardness, chloride, Total and Fecal coliform, Total Dissolved Solids, Arsenic, Iron, Manganese, Electrical Conductivity (salinity), Free Chlorine	Yearly	Tk. 20,000/-
Noise level monitoring at surrounding areas (nearby residential and office areas). Noise emissions from generator.	As and when required	Tk. 30,000/-
Waste water pH, Temperature, DO, SS, TDS, BOD, COD.	Biannual	Tk. 10,000/- (DoE)
Vegetation & Tree plantation around the site including fencing/ conservation/ maintenance for 5 years Total 500 nos. of trees need to be replanted around the periphery	Periodic	Tk. 500,000/-
ECR/EHS team	Monthly	Tk.1,24,000
Ground Water Technical Study	Every Two Year	500000

Notes: The estimated costs for air emission and water quality analysis are based on current rates charged by **third party** for analysis of the parameters and the rates may vary. The monitoring may be out-sourced to a competent Contractor. Equipment for monitoring such as digital camera, sound level meter, GPS etc. may be purchased by PDL.

6.8. 3R (Reduce, Reuse, Recycle)



The principle of reducing waste, reusing and recycling resources and products is often called the "3Rs."

- *Reducing* means choosing to use items with care to reduce the amount of waste generated.
- *Reusing* involves the repeated use of items or parts of items which still have usable aspects.
- *Recycling* means the use of waste itself as resources. Waste minimization can be achieved in an efficient way by focusing primarily on the first of the

3Rs, "reduce," followed by "reuse" and then "recycle." The waste hierarchy refers to the "3Rs" i.e., reduce, reuse and recycle, which classify waste management strategies according to their desirability. The 3Rs are meant to be a hierarchy, in order of importance. The waste hierarchy has taken many forms over the past decade, but the basic concept has remained the cornerstone of most waste minimization strategies. The aim of the waste hierarchy is to extract the maximum practical benefits from products and to generate the minimum amount of waste.

The concept of minimizing waste impacts in terms of quantity or ill-effects, by reducing quantity of wastes, reusing the waste products with simple treatments and recycling the wastes by using it as resources to produce same or modified products is usually referred to as "3R". Purchasing and using resources with care can reduce the pace of consumption of resources and further connected energy and resources. Ultimately reducing wastes multifold for waste streams. When long lasting goods are reused time and again, it offsets harvesting of new similar or same products. This saves fresh resources exploitation and waste generation quantity. Some waste products can be consumed as resources for production of different goods or the same product, meaning recycling the same resource. This too saves fresh resources and offsets waste generation. All in all, the 3Rs individually or collectively saves fresh resources exploitation, add value to the already exploited resources and very importantly minimizes the waste quantity

and its ill effects. Waste minimization efficiency is stated to be better achieved applying 3Rs in a hierarchical order- Reduce, Reuse and R

PDL belief in 3R strategy of the Govt. To reduce water use, project authority will take several initiatives like flow control, installed efficient sanitary equipment, worker awareness training on water use, solid waste management & regular maintenance of plumbing system. To comply with 3R strategy of Govt, PDL has placed environmental sustainability at the top of its list of priorities and has strived to employ only the cleanest and greenest of technologies in its production process. PDL is proud to claim ZERO PHYSICAL WASTAGE for all its production facilities currently operating by ensuring that recycling is done wherever possible.

3R PLAN:

Step 01: Rainwater Harvesting:

Rainwater harvesting provides an independent water supply and often used to supplement the main supply. It provides water when there is a drought, prevents flooding of low-lying areas, replenishes the ground water table, and enables dug wells and bore wells to yield in a sustained manner. It also helps in the availability of clean water by reducing the salinity and the presence of iron salts. Promotes both water and energy conservation.

Rainwater harvesting provides is the accumulation and deposition of rainwater for reuse before it reaches the aquifer. In many place the water collected is just redirected to a deep pit with percolation. The harvested water can be used for any purpose at any time maintaining required water quality.

Rainwater Harvesting calculation

Catchment Buildings and Sheds:

R & D Building (6 Storied), Admin Building (7 Storied), Cutting-Sewing Building (7 Storied), Finishing Building (7 Storied), Accessories Store Building (5 Storied), Chemical Store Building (5 Storied), Washing Shed-01 & Single Storied RCC Building, Washing Shed-02 & RCC Mezzanine, Parking Shed, Dye Process Building (5 Storied), Embroidery Shed, Workshop Shed, Warehouse Building (6 Storied), Production Building (7 Storied), Wastage Godown Shed, Godown Shed.

Average annual rainfall Habiganj: 2,300–2,500 mm/year

(Design value commonly taken: 2,400 mm = 2.4 m)

Rainfall pattern: ~70–75% during monsoon (May–October)

Total catchment area = 814933 ft²

Total roof catchment area (A) = 75,709.7531 m²

Average annual rainfall, Habiganj (P) = 2,400 mm/year = 2.4 m/year

Runoff coefficient (R) = 0.85

Calculation

Annual Harvestable Rainwater = A × P × R

= 75,709.7531 × 2.4 × 0.85

= 154,363.9 m³/year (approx.)

Daily Average Availability

154,363.9 ÷ 365

≈ 423 m³/day

Considering the average annual rainfall of about 2,400 mm in Habiganj district and a total rooftop catchment area of 75,709.75 m², the project has the potential to harvest approximately 154,364 m³ of rainwater per year through a rooftop rainwater harvesting system. The harvested rainwater will be utilized for non-potable purposes such as toilet flushing, washing, gardening and utility makeup water, thereby reducing groundwater abstraction by approximately 420 m³ per day and contributing to sustainable water resource management. Excess monsoon runoff will be diverted to storm drains.

Step 02: Energy saving :

Use energy efficient equipment.

Step 03: Tree Plantation:

New tree plantation within factory (suitable open space).

Step 4: Reduce water use

- Water tap replacement
- Advance process selection can reduce water consumption that we developed and still researches are going on,

Step 5: Process Development:

- Continuous Process
- Any findings or developments, we will apply in future.

Step 6: Water Flow Meter Installation:

- Continuous process
- Install water flow meters in different position of the factory.

Step 7: Solid waste

- Solid waste management
- waste collection and sale for reuse / recycle purpose.

Step 7: Zero Liquide Discharge Plan

To ensure the plans total planning projecting time in 3 years long based on 3Rs procedures.

- ❖ 10 % recycling/Reuse in 1st year (Jun 26 - May 27)
 - Toilet flushing
 - Floor, yard & road washing
 - Gardening & green belt development
 - Fire fighting
- ❖ 30 % recycling/Reuse in 2nd year (Jun 27- May 28)
 - Toilet flushing
 - Floor, yard & road washing
 - Gardening & green belt development
 - Makeup water for utility systems (after filtration)
 - Partial process use.
 - Fire fighting
- ❖ Rest 100 % recycling/Reuse 3rd year after suitable technology available and feasibility study. (Dec 28- Continue).

Detail ZLD plan will be submitted within 3 months after getting ECC and feasibility study.

6.9 Capacity Building and Training Plan

Capacity building of the PDL, implementation of EMP will be carried out through environmental trainings and training on health and safety management. These trainings will help enhance awareness level of the PDL staff and other stakeholders and contractor staff on all matters relating to the environmental and social safeguard management. These trainings will ensure that the requirements of the EMP and OHSMP are clearly understood and followed by the staff and contract throughout the project period.

The primary responsibility for providing trainings to all project personnel will be that of the PDL. The scope of the EMP training will cover environmental and social mitigation guidelines,

general environmental and social awareness, legislative aspects of environmental and social safe-guards compliance and effective house-keeping during operation of activities, in order to minimize the adverse environmental and social impacts of the project. The training on EMP will cover health and safety management during works and to train the workers and contractor staff on using the personal protective equipment in order to ensure safety of workers during project activities.

6.9.1 Performance Improvement Program

PDL conduct an annual environmental and social performance review and implement an improvement process that identifies specific management and mitigation measures (and appropriate operational controls or specific improvement actions) for the environmental impacts identified in EMP.

The procedure also requires provision of technical guidance and appropriate scheduling information for each discrete performance improvement action taken, at appropriate functional levels of the PDL organization.

“Management of Environmental and Social Complaints and Information Requests”) must also be considered in the process of preparing and updating individual improvement instructions. Progress towards the completion of the improvement actions so defined in Performance Improvement Instructions will be monitored as



Figure 6.1: Environmental and Social Management System Continual Improvement Model

❖ CEO

The PDL CEO is responsible for ensuring that appropriate resources are allocated, in balance with the company's other operational needs, in order to help achieve corporate environmental and social policy goals and to effectively implement the management and mitigation measures identified in the EMP. The CEO is also responsible for the review and approval of the PDL Environmental and Social Policies and Commitments.

❖ Head of HR, Admin & Compliance

The Head of HR, Admin & Compliance of individual PDL functional or operational units (e.g. Production, Community Relations, Projects) are responsible for supporting the provisions of the Environmental and Social Management System, and for designating coordinators from each unit to assist in System implementation. Directors or their designees are also a member of the Management Review Board,

❖ Manager EMS

The Manager, Environmental Management is responsible to the Head of HR, Admin & Compliance Permits, Compliance, and Management Systems for ensuring that the environmental portions of the Environmental and Social Management System embodied by the PDL Environmental Management Plan (EMP) are properly implemented and maintained. The Manager, Environmental Management is also responsible for periodically reporting on the performance of the environmental elements of the Environmental and Social Management System through the management review process, and for managing and/or participating in the various monitoring, inspection, compliance verification, performance verification, and corrective and preventive action processes leading to the systematic improvement of environmental and social performance.

❖ Senior executive

The Senior executive reports to the Manager, Environmental Management, and has primary responsibility for identification and maintaining a current understanding of all applicable regulatory compliance requirements for providing assistance in obtaining all required environmental permits; and for periodically verifying continuing compliance with such requirements.

In addition to their routine work assignments, Environmental and Social Management System Coordinators are responsible to their respective line managers or supervisors for assisting the Manager, Environmental Management and Assistant Manager, Community Relations in the

implementation of the Environmental and Social Management System, and for serving as a primary point of contact within them

❖ **Health and Safety Manager (asst. Manager / Admin officer)**

The Health and Safety Manager reports to the Manager EMS and has overall responsibility for ensuring that the workplace health and safety practices documented in the PDL Occupational Health and Safety & fire safety Plan are properly implemented. The Health and Safety Manager also have a key role in the implementation of the Emergency Response Plan,

❖ **Management Review Team**

The Management Review Team is responsible for conducting a comprehensive internal management review of the overall suitability and effectiveness of the Environmental and Social Management System, on an annual basis. “Management Reviews.” The Management Review team is chaired by the Director; other members will include the Functional/Operational Directors and General Counsel, with the assistance of the Manager, Environmental Management and Assistant Manager, Community Relations.

❖ **PDL Personnel**

PDL employees are individually and collectively responsible for:

- Working safely, within the guidelines provided by workplace health and safety procedures, the Occupational Health and Safety Plan, and the Emergency response Plan;
- Supporting the environmental and social policy goals set for the PDL in the daily performance of their work;
- Complying with the specific requirements of the PDL Environmental Management Plan (EMP) and its supporting documents;
- Notifying their immediate manager, supervisor, or Environmental and Social Management System Co-Ordinator’s regarding any spills, equipment malfunctions, or unsafe situations that could have a negative environmental or social impact; and
- Notifying the Manager, Environmental Management or the Assistant Manager, Community Relations of any conditions or weaknesses in practice that could represent a non-conformance with the requirements of this Project Environmental management Plan (EMP)

6.10 In House Monitoring System:

A separate environment management team has been earmarked for monitoring of pollutants from project as well as developing environment management plan and action. any deviation/variation notices shall be immediately taken into consideration for improvement of the same. The organogram for environmental Management System is as given below

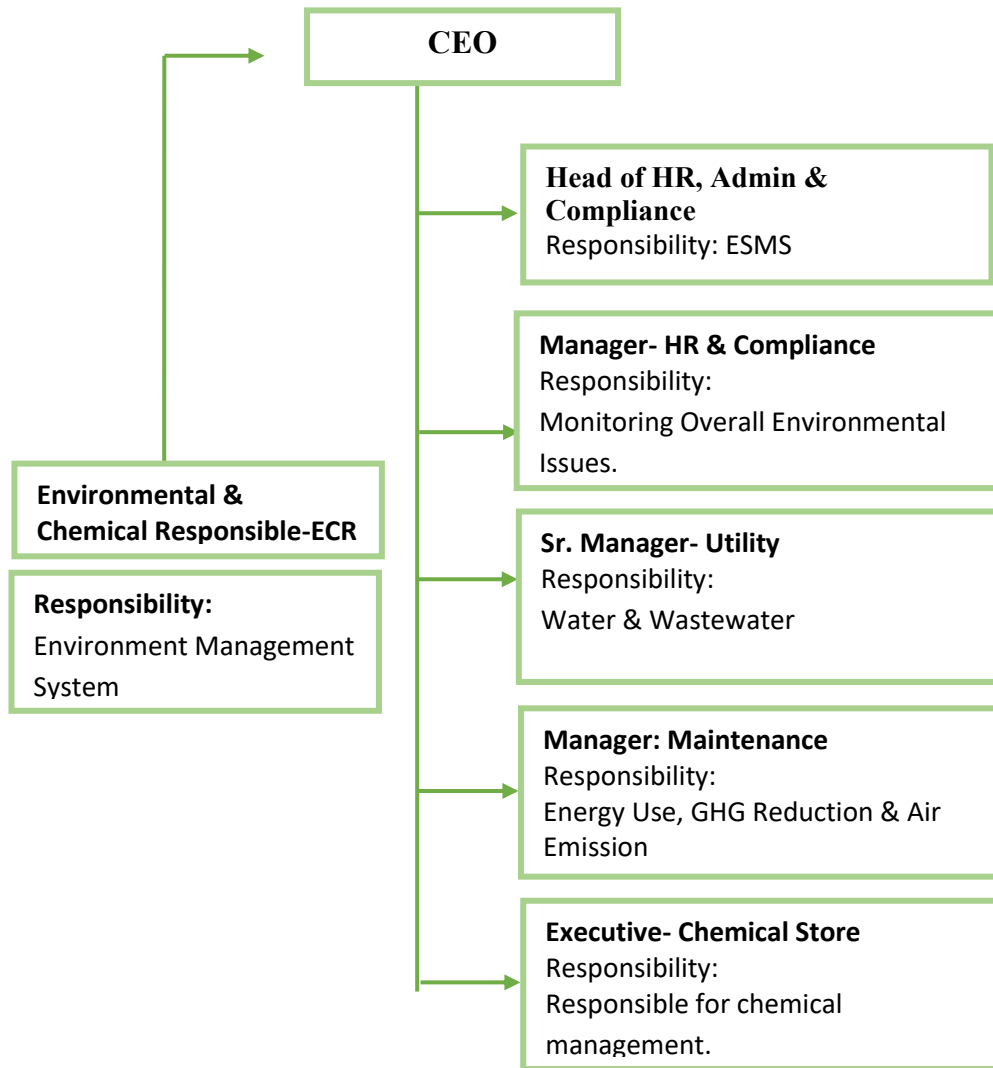


Figure 6.2: Monitoring team

6.11 Safety Directives for Work Equipment

It is the PDL obligation that every possible measure is taken to ensure the safety of the work equipment made available to workers and the project proponent will oversee the situation. During the selection of the work equipment the authority should pay attention to the specific working conditions which exist at

the workplace, especially in relation to safety and health of the workers. A brief list of work equipment safety issues during construction phase of the project is given below:

- Work equipment control devices which affect safety must be clearly visible, identifiable and appropriately marked where necessary.
- All work equipment must be fitted with a control to stop it completely and safely. Where appropriate and depending on the hazards the equipment presents and its normal stopping time, work equipment must be fitted with an emergency stop device
- Work equipment presenting hazards due to emissions of gas, vapor, liquid or dust must be fitted with appropriate containment and/or extraction devices near the sources of the hazard
- Where there is a risk of mechanical contact with moving parts of work equipment which could lead to accidents, those parts must be provided with guards or devices to prevent access to danger zones or to halt movements of dangerous parts before the danger zones are reached
- Work equipment must bear the warnings and markings essential to ensure the safety of workers
- All work equipment must be appropriate for protecting workers against the risk of the work equipment catching fire or overheating, or of discharges of gas, dust, liquid, vapor or other substances produced, used or stored in the work equipment
- All work equipment must be appropriate for protecting exposed workers against the risk of direct or indirect contact with electricity
- Mobile work equipment such as Bulldozer or Road Rollers with ride-on workers must be designed to restrict, under actual conditions of use, the risks arising from work equipment roll-over
- Machinery for lifting loads, such as Crane, must be clearly marked to indicate its nominal load, and must where appropriate be fitted with a load plate giving the nominal load for each configuration of the machinery
- Work equipment must be erected or dismantled under safe conditions, in particular observing any instructions which may have been furnished by the manufacturer

6.11.1 Safety Directives for Protective Gears

Personal Protective Equipment (PPE) must be used by the workers and even by the visitors at the construction site to minimize the risk. All personal protective equipment must:

- be appropriate for the risks involved, without itself leading to any increased risk
- correspond to existing conditions at the workplace
- fit the wearer correctly after any necessary adjustment

The project authority must provide the appropriate equipment to the workers and must ensure that it is in good working order. The Contractor shall organize training and demonstrate the use of personal protective equipment. Workers shall be informed of all measures to be taken. Consultation and participation shall take place on the matters related to the use of this protective equipment. A partial list of protective gears to be worn by the workers at designated work areas is given below:

- **Head Protection:** Protective helmets must be worn at all times in hard-hat areas, such as the building construction sites, under scaffolds, erection and stripping of formworks, etc., where there are possibilities of head injuries from falling/flying objects.
 - **Hearing Protection:** Ear plugs or ear muffs or full acoustic helmets, whichever is appropriate, should be worn in areas where exposure to high noise level is expected. Examples of such activities include percussion drill, bolt driving, etc.
 - **Eye and Face Protection:** Spectacles, Goggles, Face Shield or Arc-welding Mask with Hand Masks, whichever is appropriate, should be worn at times when percussion drilling, spray painting, welding or similar activities are in progress at the field.
 - **Respiratory Protection:** In work areas such as septic tanks, dump sites, sewers etc., where exposure to harmful or toxic gases is likely the workers should wear gas masks, dust filters, or insulating appliances with air supply, whichever is appropriate.
 - **Hand and Arm Protection:** Gloves must be worn at all times when, machineries are used which involve piercing, cutting or vibration. For protection against toxic chemicals special chemical resistant gloves should be worn. Over sleeves must be worn to protect ones arms.
- Foot Protection:** Working on or under scaffolds, roof works, formwork erection at the construction site and dismantling, safety shoes/boots are essential protective measures. When working with chemicals special chemical resistant shoes may be necessary. Electrical works require insulated and antistatic shoes/boots.
- **Trunk, Abdomen and Body Protection:** Where heavy loads need to be lifted and/or physical force becomes necessary body belts are the appropriate protective measure. Safety aprons are essential when welding works are in progress or when handling chemicals. Body harness along with safety ropes and nets are required when working at higher elevation or where possibilities of accidental falls exist.

Table 6.7: List of protective gear to be worn at the construction site

Works/ Equipment Use	Safety Measures for Workers and/or Work Areas
Common Construction Works	HH, STB, HG

Works/ Equipment Use	Safety Measures for Workers and/or Work Areas
Earth-works	HH, STB, HG
Electric works	RSB, HG
Wood works	HH, STB, HG
Road paving	HH, STB, HG, BP, FM
Cranes	HH, STB, HG, WB
Pile Driver	HH, STB, HG, EP, WB
Arc Welder	HH, WV, HG
Bull Dozer	HH, STB, WB
Heavy Roller	HH, STB, HG, WB
Concrete Mixer	HH, STB, HG, WB
Fork Lift	HH, HG, STB, WB
Percussion Drill	HH, STB, HG, WB, EG, EP, WB
Sledge/Pick Hammer	HH, STB, HG, WB
Vibrator	HH, STB, HG, WB
Working on Scaffolds	HH, STB, HG, WB

Note: HH = Hard Hat, STB = Steel-tipped Boot, HG = Hand Gloves, BH = Body Harness WB = Waist Belt, EM = Ear Muff, EP = Ear Plug, WV = Welding Visor, FM = Face Mask, BP = Body Protective Apron, RSB = Rubber Soled Boot, EG = Eye protection Glasses

6.12 Documentation, Record Keeping and Reporting

Site Supervisor should maintain data and records concerning the identification of hazards, assessment, and control of risks of the ongoing activities. The document should establish and maintain procedures for controlling all relevant EHS documents and data. Such documents should include but not limited to EHS Policy, Hazard Identification Records, Incident-Accident Records, Control Methods including process control and machine design, Safe work procedures, In-house work rules, Meeting Records, Training and Drill Reports, Inspection and Audit Records etc. All the incidents and accidents should be reported to the higher relevant authority.

6.13 Emergency preparedness and response plan

The primary objective of developing an Emergency Preparedness and Response Plan is to undertake immediate rescue and necessary measures as quickly as possible. The response plan should include:

- Identification and declaration of potential emergencies

- Signal/warning mechanism
- Activities and their Levels
- Command and control structure
- Individual roles and responsibilities of each specified authority to achieve the activation as per response time
- Emergency procedures
- Alternate plans and contingency measures
- Coordination with External parties

6.13.1 Identification of Emergency

Identification of all the hazards and risks associated with each activity which may lead to an emergency and anticipate the actions to be taken before or after the emergency arises. This section identifies the hazardous areas and activities in both construction and operation phases. Probable emergencies that might arise due to these hazards for the duration of the project have been listed below:

Hazardous Area

- Fuel storage areas
- Kitchen premises in labor camps
- Electrical installations - improper laying of cables
- Scaffolds

The potentially hazardous areas and activities during project operations will be a storage area of broken panels, hazardous waste such as used oil, oily rags etc.

Emergency Situations

The possible emergency situations identified for the construction and operation phases of the Project areas listed below:

- Fire and Explosion
- Leakage of fuel from storage areas
- Short-circuit at campsite/project site

Mechanical and Electrical Hazards

- Structural Collapse
- Accidentally dropped object
- Loss of stability and
- Electrocutation

Occupational Hazards

- Outbreak of Disease / Illness;
- Handling of chemicals

- Accidents due to vehicle movement; and
- Vandalism

6.13.2 Emergency Equipment

To tackle the emergency situation, onsite emergency equipment such as first aid box, firefighting equipment and personal protective equipment shall be available at the project site. The adequacy and condition of these items should be assessment at periodic intervals. Inventory and locations of respective emergency equipment's shall be displayed at project office building, construction areas and other work areas; It is to be ensured that the staff of developer is trained on the usage of each type of emergency equipment First aid boxes shall be provided at identified locations throughout the plant premises. During the construction phase, fire extinguishers and sand buckets will be provided at critical areas such as fuel storage area, waste storage area, labor camps, kitchens, first aid center, areas with electrical installations and project office. Fire equipment list attached in Annexure XVII.

6.13.3 Emergency Response Team (ERT)

The Emergency Response Team (ERT) will be set up at the beginning of the construction phase and the same will be revised for the operation phase. Each personnel identified as part of the ERT shall be designated roles and responsibilities for handling emergency situations. The ERT will comprise of the Site Supervisor, EHS Manager, Safety Officer, Evacuation Officer and representative from workers/employees. The priority in managing emergency situation will be:

- Preservation of Life (self, team, community)
- Protection of the Environment
- Protection or Property/assets
- Preservation of Evidence

The Emergency Response Team should coordinate with external agencies such as Fire brigade, Police Department, Hospitals/Ambulance Services, Utility departments (electricity, gas and water) and local authorities.

6.13.4 Response Process

During the emergency situation such as fire, collapse of scaffolding, cave- in during excavation, etc., all personnel at site including the designated Evacuation officer must be immediately notified. The procedures to be followed during an emergency are:

- All equipment must be shut down.
- In case of fire, it must be contained with the correct extinguisher only by those trained to do so.
- Those requiring assistance must be assisted and first aid must be rendered only by those trained to do so
- All personnel on site must follow the instructions of the Evacuation Officer
- Evacuation must be undertaken in accordance with the emergency layout plan
- Visitors that are not familiar with the evacuation procedure must be assisted
- Personnel must follow the directional pointers to the nearest assembly points
- The evacuation officer must be the last one to leave the area
- Personnel in the immediate vicinity of the collapsed building move away from the building to a safe location - there could be a secondary collapse

The task of the professional Emergency Services must not be obstructed.

Table 6.8: Action for disaster management

Disasters	Protection steps	Action
Fire	<ul style="list-style-type: none"> ○ fire exists ○ water reserve in water storage ○ fire hydrant ○ emergency light/signal ○ regular fire drill operation 	<ul style="list-style-type: none"> ○ safely removal of employees ○ provide healthcare in safe place ○ communicate with hospital/civil defense management ○ put off by fire extinguisher
Explosion	<ul style="list-style-type: none"> ○ inspect plants machineries regularly ○ install alarming machineries ○ prepare manual and provide regular training on alertness for plant operation ○ arrange safe area for replacement in emergency ○ provide first aid 	<ul style="list-style-type: none"> ○ quick shut down operation ○ remove workers safely ○ provide healthcare in safe place ○ communicate with hospital/civil defense management ○
Toxic material or gas emission/ discharge	<ul style="list-style-type: none"> ○ inspect plants machineries regularly ○ install automatic shut down device with alarm system if toxic material or gas emission or discharge cross the limit ○ prepare manual and provide regular training on alertness for plant operation ○ Stock sufficient medicine for treatment of toxic material or gas 	<ul style="list-style-type: none"> ○ quick shut down the plant ○ remove workers safely ○ provide healthcare in safe place ○ communicate with hospital/civil defense management ○
Harmful material for	<ul style="list-style-type: none"> ○ inspect plants liquid and gas emission/discharge line regularly 	<ul style="list-style-type: none"> ○ quick shut down related unit ○ inform DoE

Disasters	Protection steps	Action
environment discharge	<ul style="list-style-type: none"> ○ regular inspect and maintenance of Plumbing system. ○ inspect and maintenance of installed machineries/unit regularly for controlling air pollution ○ stock sufficient chemicals, spare parts and ensure alternative electricity supply 	<ul style="list-style-type: none"> ○ inform local authority ○ provide necessary compensation ○ take mitigation measures after consulting with DoE
Death risk or serious injury of labor by risky work	<ul style="list-style-type: none"> ○ introduce automation system for avoiding death risk or serious injury of labor ○ prepare manual and provide regular training for reducing or avoiding risk 	<ul style="list-style-type: none"> ○ provide first aid ○ quick hospitalization ○ ensure legal compensation

6.13.5 Training, Reporting and Documentation

All site personnel, including contractors, are to be trained in the appropriate responses to possible emergencies and disasters. Training is to include, but not limited to the following:

- Firefighting
- First Aid
- Emergency Evacuation

Information on all emergency situation should be documented and reported to the proper authority. All near misses and unsafe acts will be written in logbooks / reported in the 'Near miss, unsafe acts, hazards and sub-standard conditions report' and verbally communicated to the concerned Site Supervisor within a reasonable time. All accidents and incidents will be immediately reported to the EHS Officer, and requisite forms completed.

6.14 Grievance Redress Mechanism:

A Grievance Redress Mechanism (GRM) will be established to receive, evaluate, and facilitate the resolution of affected people’s concerns, complaints, and grievances about the project. During the building construction new project period, grievances of individual/institutional will be addressed. The experts from PMU will provide instruction to contractor to compile the safeguard requirements at mentioned in EMP. The Social and Environment expert from PMU will play key role to solve the grievances in consultation with contractor and complainer. If not

satisfied he/she will file the written complaint in PDL office. The team from PDL will provide best solution based on project scope and limitation. If the complaint does not satisfy then he/she will move for legal treatment as per the legal provision.

The risk assessment should be reviewed and revised upon the occurrence of any injuries to any person as a result of exposure to a hazard in the workplace; or where there is a significant change in work practices or procedures.

6.15 DO'S and DON'T, S Checklist

Checklist of DO'S and DON'T, S of preventive measures:

DO'S

- All new equipment's should be procured as per user's safety requirement and designed accordingly
- The equipment should be qualified for installation operation and performance.
- To create the health, safety and environment awareness at all levels of management and to communicate the specific risk/hazards, at a relevant location health, safety and environmental sign, warning labels, Instruction to be displayed.
- As a part of regular training program, job safety training should be carried out at different levels of the management.
- As a part of "off the job" safety and in order to create awareness for health, safety and environment training on the subjects like vehicle safety, road safety etc to be carried out at different levels of management.
- Emergency handling training is a must for all emergency handling team members.
- The supervisor and worker must determine what is considered appropriate protective clothing in their work area.
- Check fire extinguishers periodically to ensure that they are all in good condition.
- Make sure, when using fire hose that the jet of water breaks into a fine contact with live electrical apparatus.
- Turn away your face whenever an arc or a flash is expected.
- Discharge to earth thoroughly all cables before working on the cores
- Please see that all splices and connections are securely made.
- Make sure that all employees are familiar with the location and use of fire fitting Instrument.

- Hearing protection devices shall be provided and used in areas where the noise level exceed 90 dB (A) and when all other controls have been applied to reduce the level.
- There should be proper ventilation for fumes and dust to prevent its concentration as it could be hazardous.
- Noise monitoring as per the legal requirement will be carried out as per schedule.

DON'TS

- Don't throw water on live electric equipment in case of fire. it's dangerous.
- Don't close or open a switch or fuse slowly or hesitatingly. Do it quickly, positively and firmly.
- Don't be haste and careless. This causes many accidents.
- Don't use wires with poor and deteriorated insulation.
- Don't work on a pole or elevated position stands on the ground nearby to direct operations and give warning.
- Don't go near noisy areas and machines without ear muffs/ear plugs.
- Don't mix hazardous wastes with normal wastes. It must be stored separately.
- Don't wear Loose cloths
 - Sandals high heeled and open toed shoes.
 - Don't Smoke
 - Eat, drink, or chew gum
 - Store food, dishes or drinks.

6.16 Tree plantation program

A factory should not become a place of only machine, dust, pollution, and noise, but should also be provide with nicely laid out parks and garden. This is not only needed from the point of beautification but also to fight pollution and dust. The primary aim in a factory garden will be to plant tree to arrest the drifting dust and smoke and to cut down noise. Another important aim is to provide ample shade and coolness so that the workers get a respite under the coolness of tree from the hostile hot interior of the factory. Moreover, in a well planted factory tree bring down the temperature in the factory premises to considerable extent.

PDL should be taken initiative to planting tree for landscape and noise attenuation in suitable open spaces of the factory area. Also, they should use mosquito repellent nets in the windows,

keep the surroundings clean as much as possible and keep mosquito repellent plants inside the factory so that mosquitoes cannot breed.

Table:6.9 - Suitable tree for the project site

Fruit Tree	Timber Tree	Fuel Wood Tree	Medicine
AMRA (<i>Spondias pinnata</i>)	JARUL (<i>Lagerstroemia speciosa</i>)	Bakphul (<i>Saabania grandiflora</i>)	NEEM (<i>Azarlira chlaindica</i>)
MANGO (<i>Mangifera indica</i>)	SHEGUN (<i>Tectona grandis</i>)	KADAM (<i>Anthocephalus chinensis</i>)	ARJUN (<i>Teominalia arjunna</i>)
Black berry (<i>Syzygium cumini</i>)	AKASHMONI (<i>Acacia auricoliformis</i>)	DEBDARU (<i>Polyalthia longifolia</i>)	BOHERA (<i>Terminalia belliricha</i>)
JAM (<i>Syzygium cumuin</i>)	MEHOGONI (<i>Swietenia mahagoni</i>)	PITALI (<i>Trewta mudiflora</i>)	HORTOKI
TAMARIND(<i>Tamerindus indica</i>)	RAIN TREE (<i>Samanea saman</i>)	KRISHNOCHURA (<i>Delonix regia</i>)	AMLOKI
DATE PALM (<i>Phonix sylvestries</i>)			TULSHI
Jackfruit (<i>Artocarpus Heterophoillus</i>)			



Chapter 7

Public Consultation

7.0 PUBLIC CONSULTATION

PDL recognizes the importance of social and environmental factors for successful implementation of the proposed project. PDL authority plans to undertake a comprehensive process of public consultation and environmental investigation as per ECR 2023. Feedback from the consultation process will play an integral role in development of the social and environmental programs.

7.1 Objectives

The purpose of consultation is to inform local inhabitants/primary stakeholders to make them aware of the project and to gather their opinion/suggestions about the proposed development program as well as to incorporate their suggestions during project planning and implementation stage.

7.2 Methodology

As per ECR 2023 a notice was published in the local daily Prabhakar and Daily Amar Desh newspapers on 05 January 2026. Local residents, public representatives and local businessmen and more than 65 people from different professions were present at the meeting. Mr. Dr. Md. Yusuf Ali, Deputy Director, Department of Environment, Habiganj District Office was present at the meeting.

As part of the EIA process, discussion with stakeholders were organized and conducted to record views and opinions of the stakeholders. Participants in the consultation meeting included elected representatives, local leaders, women groups, representatives of professional groups like agriculturist, businessmen, etc. In addition, a number of Key Informant Interviews (KIIs) were carried out with selected key individuals. Photographs of public consultation is presented in the Figure 7.1. The lists of attendance attached in approved regulation.

7.3 Checklist Used for Public Consultation

For uniformity and clarity in conducting the public consultation meetings, a checklist as devised by the consultants were used to enable the participants to comprehend the issues easily, so that they could participate in the discussions more effectively and express their opinions and views objectively. This participatory approach was well accepted by all the participants. During the public consultations, social, environmental as well as cross-cutting

issues were discussed in detail, including potential impacts of the project activities on environmental and social parameters, identification of sensitive issues, risks, potential threats, public concerns and expectations from the project.

7.3.1 Consultation Checklist

- ✓ Location of consultation
- ✓ Name and occupation of participants
- ✓ Awareness of participants about the project
- ✓ Description of the project
- ✓ Benefits of the projects
- ✓ Impacts of the Project on social and environmental components
- ✓ Concerns about the Project
- ✓ Expectations from the project
- ✓ Suggestions about the Project.

7.4 Key Stakeholder's View

During the public consultation, key stakeholders including local residents, community leaders, nearby landowners, and representatives of local institutions shared their views on the proposed project. Stakeholders generally expressed support for the project, citing potential employment opportunities and local economic benefits. However, concerns were raised regarding possible impacts on drainage and waterlogging during the monsoon season, groundwater abstraction, wastewater and solid waste management, and construction-phase disturbances such as dust, noise, and traffic safety. Stakeholders emphasized the need for strict compliance with environmental regulations, proper operation of pollution control facilities, and regular environmental monitoring. These concerns have been considered in the project design and incorporated into the Environmental Management Plan (EMP).

7.5 Views of DoE Personnel

The Deputy Director & Inspector of the Department of Environment, Habiganj district office was present there. Dr. Md. Yusuf Ali (DD) patiently listened to the opinions, advice, and experiences shared by all participants during the consultation.

He expressed his views and emphasized that the proposed project must fully comply with the Bangladesh Environmental Conservation Act, 1995 and Environmental Conservation Rules, 2023 and ensuring that effluent discharge, emissions, noise levels, and waste management practices remain within permissible limits.

He strongly stressed the need for implementing an effective solid waste management plan, establishing appropriate sewage treatment plant (STP) & Effluent treatment Plan (ETP) and ensuring improved surface water drainage to prevent waterlogging and environmental degradation. He further recommended that a zero liquid discharge (ZLD) approach should be adopted gradually considering the nature and scale of the project.

Dr. Md. Yusuf Ali also highlighted the importance of preventing air pollution, noise pollution, and land pollution, and emphasized strict compliance with national environmental standards. In addition, he underscored the necessity of ensuring occupational health and safety measures for workers during both construction and operational phases of the project.

DoE personnel also advised that any public complaints related to environmental issues should be addressed promptly and that compliance reports should be submitted to DoE as required.

Overall, both stakeholders and DoE personnel indicated no major objection to the proposed project, subject to effective implementation of mitigation measures, continuous environmental monitoring, and strict regulatory compliance.

PDL has agreed to do all precautionary measures for this. PDL assured the community of performing under existing DoE accepted rule and regulations and limit.

7.6 Suggestions / expectations from the Local People

Overall suggestions from the local area as follows:

- (a) Local people urged to give them all sorts of employment opportunity both temporary and permanent.
- (b) They want khal digging facility / cooperation from project authority. (N.B: Proposed khal's concern authority is LGED/WDB)
- (c) Water pollution /logging should be avoided.

7.7 Summary of Public Consultation

Public consultation was conducted in accordance with the Environmental Conservation Rules (ECR), 2023 and Department of Environment (DoE) guidelines as part of the environmental

assessment of the proposed project to inform local stakeholders and obtain their views on potential environmental and social impacts. Local residents and community representatives participated in the consultation and generally expressed support for the project due to expected employment and local development benefits, while raising concerns related to drainage and waterlogging, wastewater and solid waste management, groundwater use, construction-related dust and noise and protection of environmental quality. The Deputy Director, Department of Environment, Habiganj District Office, Dr. Md. Yusuf Ali attended the consultation, listened to the views of the participants, and emphasized that the project must not cause any environmental damage. He advised implementation of an effective solid waste management plan, establishment of sewage treatment plant, Effluent Treatment Plan, improvement of drainage systems, and gradual adoption of a zero liquid discharge (ZLD) approach, along with strict control of air, noise, and land pollution and provision of adequate occupational health and safety measures. The concerns and recommendations raised during the consultation have been considered and incorporated into the project design and Environmental Management Plan (EMP), and no major objections were raised subject to compliance with DoE requirements.

As per ECR 2023 approved regulation has been attached in **Annexure VII**





Figure 7.1: Photographs of public consultation



Chapter 08

Conclusion and Recommendation.

8.1 Conclusion

The following conclusions are drawn from this EIA study:

Pioneer Denim Limited (Garment Division) is going to set up a newly Washing unit for the existing fully automated 100% export-oriented denim garments industry. It was established at 2023 with all modern facilities based on buyer's requirements which is situated at Horitola, Shahpur Bazar, Madhabpur, Habiganj with world-class infrastructure, including **22** buildings, 13 sheds, and one of the largest biological ETP plants in Bangladesh with 21,600 m³/day capacity. The main products of the project are different kinds of denim garments. The project will increase production capacity from 30,000 to 300,000 pieces per day by 2028 and is expected to generate significant local employment and economic benefits. The proposed Unit including the washing unit, is a strategic Backward Vertical Integration initiative that will enhance Pioneer Denim Limited's denim composite operations.

The project proponent has obtained all the necessary preliminary documents and NOCs/permissions from various concerned authorities to comply with environmental and other necessary national laws for setting up the industry.

This Environmental Impact Assessment (EIA) report has been prepared for Pioneer Denim Limited (Garment Division) in accordance with approved ToR by the DOE. The report is one of the requirements of the DOE for issuing necessary environmental clearances it is mandatory in the Bangladesh Environmental Conservation Act (BECA), 1995 & The Environment Conservation Rules, 2023 for any new industrial set up.

Multiple data collection technique has been used in conducting the EIA study which included document review, observation, and interview with key informants, focus group discussions, Stakeholders and interaction with the project proponent & DOE personnel. The EIA is prepared through identifying the potential impacts, assessing them and recommending possible mitigating and enhancing measures for adverse and positive impacts respectively.

Environmental and social assessments indicate that no significant adverse impacts are anticipated if proper mitigation measures are implemented.

The potential negative environmental impacts identified and their mitigation measures suggested in the EIA indicates that there will be minimal environmental adverse impact. However, appropriate mitigating measures would be undertaken that would reduce the small to moderate impacts to an acceptable level as prescribed in the Environmental Quality Standards of Bangladesh. All these mitigating measures have been discussed in details in Section 5 of this report.

The EIA includes identification of potential impacts and recommendations for mitigation measures for the proposed project. The EIA has provided detailed recent environmental baseline information and illustrates the project activity and environmental interactions. An

Environmental Management Plan is also provided based on recommended measures to mitigate all the listed issues including accidental risks and occupational health etc. PDL will make necessary institutional arrangements and also commits to provide fund for the implementation plan. The EMP will address specific management recommendations for Water, Solid Waste, chemicals, emissions etc.

The project also has a positive impact in terms of employment both its construction and operational phase. In addition to this, the area has become more commercially developed. The land value has been increased. Local people have encouragement to involve themselves in self-employment and other commercial activities.

Apart from these positive impacts mentioned above, other beneficial impacts include benefit to the local transport business, local economy because of employment, community development etc.

Public consultation showed general support from stakeholders.

8.2 Recommendations

1. Install a monitoring well to measure the groundwater level at the project site
2. Implement effective Solid Waste Management to manage all hazardous and non-hazardous wastes generated from production and washing units.
3. Construction of Sewage Treatment Plant (STP) as per proposed time.
4. Ensure proper operation of the Effluent Treatment Plant (ETP) and maintain strict compliance with DoE effluent discharge standards.
5. Gradually adopt a Zero Liquid Discharge (ZLD) system particularly for the ETP and STP to minimize water pollution.
6. Improve stormwater drainage across the site to prevent waterlogging during the monsoon season.
7. Implement air, noise, and land pollution control measures including dust suppression, proper ventilation, and noise barriers where required.
8. Ensure occupational health and safety of all workers through regular training, safety equipment, and monitoring.

9. Maintain continuous environmental monitoring and reporting including regular audits to ensure compliance with national regulations and mitigation measures outlined in the Environmental Management Plan (EMP).
10. Ensure Stakeholders / local communities' engagement.

With the implementation of these recommendations, the project is expected to operate sustainably, contribute to industrial development and minimize environmental and social impacts. Hence considering the strong commitment from the project authority to take any actions necessary to conserve the environmental conditions of Pioneer Denim Limited (Garment Division) and the surrounding area the Environmental Clearance Certificate can be issued.

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