Final Report on

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

OF

NORP KNIT INDUSTRIES LTD.

(UNIT-2)

Shi-152/2 (Old), B-01/1 (New), Islampur, Kodda Nandun, Bason, Gazipur.

Prepared By

greenbud

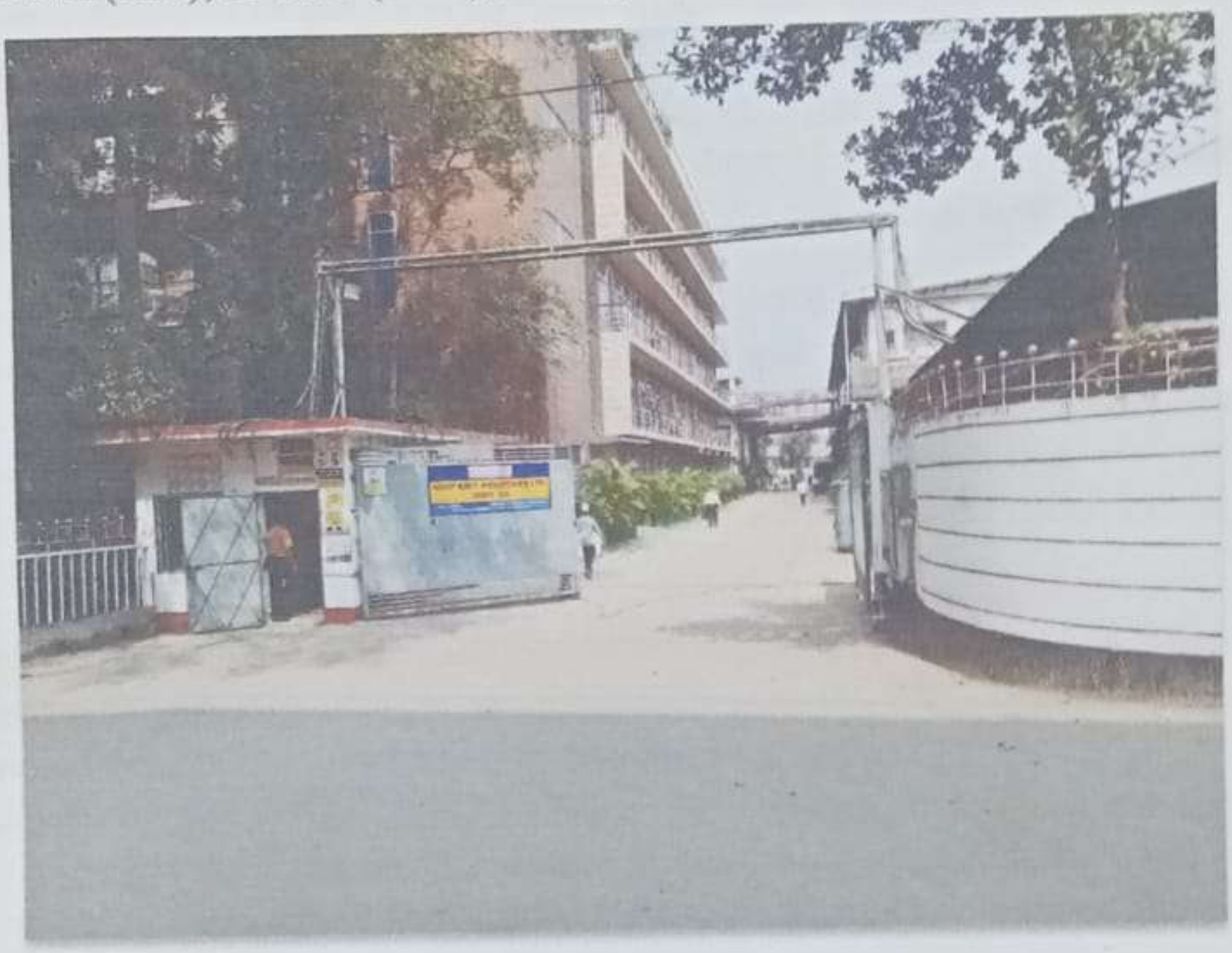
February, 2025

ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

Of

Norp Knit Industries Ltd. (Unit-2)

Shi-152/2 (Old), B-01/1 (New), Islampur, Kodda Nandun, Bason, Gazipur.



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February, 2025

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Disclaimer

Norp Knit Industries Ltd. (Unit-2) have assigned GREENBUD to conduct the study of Environmental Impact Assessment in accordance to the standards of Department of Environment (DoE) of People's Republic of Bangladesh. GREENBUD has undertaken a detailed environmental survey has developed a comprehensive Environmental Impact Assessment (EIA) for the **Norp Knit Industries Ltd. (Unit-2).**

Our assessment and review are based on the facts and details provided to us during our discussions specific to the project and may not be similar across the organization. If any of these facts or details provided to us are not complete or accurate, the conclusions drawn from subsequent complete or accurate facts or details could cause us to change our opinion. The conclusions drawn and recommendations made are based on the information available at the time of writing this report.

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N. B. If you have any query regarding this report please contact with us within three months from the issuing date of this report.

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ACRONYM

ADB	Asian Development Bank
BBS	Bangladesh Bureau of Statistics
BMD	Bangladesh Meteorological Department
CO_2	Carbon Dioxide
NKIL	Norp Knit Industries Ltd. (Unit-2)
DoE	Department of Environment
ECA	Environment Conservation Act, 1995
ECR	Environment Conservation Rules, 2023
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EMS	Environmental Management System
IEE	Initial Environmental Examination
IFC	International Finance Corporation
MoEFCC	Ministry of Environment, Forest and Climate Change
NEMAP	National Environmental Management Action Plan
NGO	Non-Government Organization
NOx	Oxides of Nitrogen
$PM_{2.5}$	Particulate Matter < 2.5µm
PM_{10}	Particulate Matter < 10µm
SOx	Oxides of Sulfur
SPM	Suspended Particulate Matter
TSS	Total Suspended Solids

LEXICON

Adverse impact: An impact that is considered undesirable.

Ambient air: Surrounding air.

Aquatic: Growing or living in or near water.

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".

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.

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: 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.

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

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.

Project: Norp Knit Industries Ltd. (Unit-2)

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).

Terrestrial: Living on land.

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. Upazila introduced in 1982.

Zilla: Bengali word of district.

Executive Summary

This document constitutes the Environmental Impact Assessment (EIA) of **Norp Knit Industries Ltd. (Unit-2)** and has been developed by GREENBUD in close collaboration with the management of **Norp Knit Industries Ltd. (Unit-2).** The report is prepared following the EIA guidelines for Industries (DoE, ECR 2023) to a certain extent, but not limited to those.

All the relevant social and environmental risks and potential impacts have been taken due care of as part of the assessment in compliance with the Performance standards set by the International Finance Corporation (IFC) and also that of the Safeguard Standard of the Asian Development Bank besides following the guidelines set forth by DoE.

The EIA presents background information about the project. Several national legislations by which the project should abide have been presented. A baseline environmental examination was conducted by the consultants. The project activities were closely examined to find the relationship and dependency in between project activities and environmental components. This information was used to identify the impacts of the project activities on the surrounding environment. Later on, the evolution of this impact was done by examining existing environmental components. Several mitigation measures to reduce adverse impacts were suggested. Finally, a management plan with monitoring requirements was developed.

Project Definition, Location & Site

Norp Knit Industries Ltd. (Unit-2) is 100% export-oriented dyeing-washing & garments factory in Bangladesh. The area enjoys necessary facilities like electricity, transportation, communication, etc. for years.

Norp Knit Industries Ltd. (Unit-2) has a total area 220000 sq. ft. with a total floor area of 499373 sq. ft. with a greenery space is 5000 sq. ft. The project coordinates are 23°59'7.93"N and 90°21'12.98"E. The total facility is surrounded by different types factories. The production capacity of **Norp Knit Industries Ltd. (Unit-2)** is 46154 pcs/day.

Objectives of EIA Study

The objective of the study is to provide an examination and assessment of the environmental impacts of the project. An environmental management and monitoring plan has also developed with an indication of the extent of work to be done to minimize the impacts.

EIA Study Methodology

The EIA was conducted by following steps:

- Baseline survey and collection of primary environmental and social information
- Secondary information collection from different government and non-government portal
- Understanding the technical and environmental aspects of the project

- Public consultation to identify their concern and acceptance to the project
- Identification of potential impacts and evaluation of consequences
- Preparation of EIA which includes mitigation measures to reduce adverse environmental impacts along with monitoring requirement in order to sustain the objectives of EIA

Existing Environmental Condition

A Baseline survey was conducted to identify existing physical, meteorological and biological environmental condition conditions of the area where the project is going to be established. It has been found that the air (in terms of particulate) & water (in terms of solid concentration) quality of that area is good like typical urban areas of Bangladesh. The meteorological condition of that area is tropical monsoon. Water, air and noise quality monitoring was conducted at project site, details of which are available in chapter-4. Existing ecological environment, biological resources, flora and fauna are shown in chapter 5. Chapter 6 focuses on the socio-economic status of the project adjacent area and locality.

Potential Positive Impacts

Positive impacts of the project are creation of jobs; support of local businesses; infrastructure development and revenue to local council.

Potential Negative Environmental Impacts and Mitigation Measures

Major environmental components that may be affected by construction and operation of the project activity are water, acoustic environment, air etc. Some of the major environmental impacts and mitigation measures are shown below:

Table 1: Major Environmental Impact and Mitigation Measure

Affected Environmental Component	Anticipated Impact	Proposed Mitigation/ Enhancement Measures
Water Environment	Water level depletion and water quality degradation	❖ Minimize impervious surfaces and increase tree plantation ❖ Monitor drainage situation especially during wet season ❖ Secondary containment to prevent oil and chemical spillage ❖ Ensure proper sanitation facilities ❖ Increase awareness and training
Acoustic Environment	Noise pollution	❖ Noise shielding by baffle wall ❖ Green belt development beside the noisy machineries ❖ Strict use of PPEs inside noisy areas ❖ Install canopy to the generator ❖ Proper management of vehicular traffic and swift work practice at entrance
Air Quality	Air Pollution	❖ Burning good quality fuel ❖ Install on-site abatement measures ❖ Proper management of solid waste ❖ Effective control of vehicular traffic
Soil/surface water quality	Water and Soil Pollution	❖ Proper solid waste management system ❖ Proper segregation and storage of hazardous and nonhazardous waste ❖ Sufficient number of waste handling bins

Affected Environmental Component	Anticipated Impact	Proposed Mitigation/ Enhancement Measures
		❖ Awareness and training

Environmental Management Plan

In order to minimize major adverse impacts, the following management strategy has been developed

- Water and Wastewater Management
- Noise Management
- Solid Waste Management
- Atmospheric Emission Management

For effective implementation of the management plan a management cell has been suggested. A comprehensive monitoring plan has also been suggested in the EIA. The present study finds that though there are certain adverse environmental impacts associated with the project under consideration, those are however manageable. Given the location, proponent's commitments, measures undertaken and commitment for further measures to be adopted in due course of time if needed, **Norp Knit Industries Ltd. (Unit-2)** is going to be an internationally important and environmentally compatible industrial venture.

Environmental Monitoring Plan

For effective implementation of the management plan, a comprehensive monitoring plan has been suggested in the EIA. The monitoring plan also identified the monitoring location, monitoring parameters, monitoring frequency, and responsible authority as well as the tentative cost of monitoring.

Norp Knit Industries Ltd. (Unit-2) is the Executing Agency, responsible for overall project implementation, and will establish a Project Management Unit (PMU) to manage the project. This will be headed by a Project Director (PD), supported by technical staff who will design the infrastructure, management of Contractors, and supervise the project.

Chapter One

Introduction

1.1 Background

The textile and clothing industries provide a single source of growth in Bangladesh's rapidly developing economy. Exports of textiles and garments are the principal source of foreign exchange earnings. By 2002 exports of textiles, clothing, and ready-made garments (RMG) accounted for 77% of Bangladesh's total merchandise exports.

Bangladesh's textile industry has been part of the trade versus aid debate. The encouragement of the garment industry of Bangladesh as an open trade regime is argued to be a much more effective form of assistance than foreign aid. Tools such as quotas through the WTO Agreement on Textiles and Clothing (ATC) and Everything but Arms (EBA) and the US 2009 Tariff Relief Assistance in the global clothing market have benefited entrepreneurs in Bangladesh's ready-made garments (RMG) industry. In 2012 the textile industry accounted for 45% of all industrial employment in the country yet only contributed 5% of the Bangladesh's total national income.

After several building fires and collapses, resulting in the deaths of thousands of workers, the Bangladeshi textile industry and its buyers have faced criticism. Many are concerned with possible worker safety violations and are working to have the government increase safety standards. The role of women is important in the debate as some argue that the textile industry has been an important means of economic security for women while others focus on the fact that women are disproportionately textile workers and thus are disproportionately victims of such accidents. Measures have been taken to ensure better working conditions, but many still argue that more can be done. Despite the hurdles, riding the growth wave, Bangladesh apparel making sector could reach 60 percent value addition threshold relying on the strong backwardly linked yarn-fabric making factories directly from imported raw cotton, reaching a new height of exports worth of US$30.61 billion in the fiscal year 2018.

From the point of the country's economic growth and creation of employment opportunities, **Norp Knit Industries Ltd. (Unit-2)** started its journey on 2010 with its production facility and most modern machinery. Since then, it became specialized in manufacturing and supplying product for world-famous fashion houses like Kohl's, Primark, Inditex, Walmart, Macy's, PVH, American Eagle (AEO), Target AUS, Mango, BASSPRO, NORDSTROM, Next, etc.

The project is situated in Shi-152/2 (Old), B-01/1 (New), Islampur, Kodda Nandun, Bason, Gazipur. The location of the project is in a very lucrative place where all the modern-day necessities and requirements are sited at a close distance. The project site is located only 18.8 kilometers away from Hazrat Shahjalal International Airport, Dhaka. **Norp Knit Industries Ltd. (Unit-2)** has a total area 220000 sq. ft. with a total floor area of 499373 sq. ft. with a greenery space is 5000 sq. ft. Since the projects is an export-oriented dyeing-washing & garments factory, the **Norp Knit Industries Ltd. (Unit-2)** falls under the "**Orange**" category as per the Environmental Conservation Rules, 2023 schedule-01. **Norp Knit Industries Ltd. (Unit-2)** has already obtained an Environmental Clearance Certificate & No Objection Certificate. A copy of the ECC & NOC is attached to **Annexure C &** Annexure **D** as evidence.

The project proponent also has a strong commitment to their client and local stakeholder to protect and preserve the environment. In compliance with these requirements, GREENBUD,

an emerging firm in the environmental consultancy has been assigned by **Norp Knit Industries Ltd. (Unit-2)** to conduct the EIA study and prepare the EIA Report. This EIA report will show the path to reducing the impact of the project in an environmentally sound manner.

1.2 Objectives of the EIA

The objective of the study is to provide an examination and assessment of the principal environmental impacts of proposed project. The outline of an environmental management plan also suggested with an indication of the extent of work to be done to keep the development and environment compatible. The specific objectives of this EIA are to:

- Present a general description of the project and the process
- Identify and describe elements of community and environment likely to be affected by the proposed project, including natural and socio-economic environment;
- Identify the aspects of the project likely to result in significant impacts to the resources/receptors.
- Predict and evaluate the significance of the impacts of the project.
- Identify the (environment, social and health) aspects of the project that need to be managed and recommend appropriate and justified mitigation and enhancement measures.
- Develop plans for management and monitoring of the impacts during the construction and operation of the project.

1.3 Scope of the EIA study

The scope of the study includes identification of statutory requirements, prediction of potential environmental and socio-economic impacts and formulation of EMP. Detailed scope of this study are:

- Development and implementation of the environmental management system
- Mitigation and conservation of natural resource by the proper implementation of EIA.
- Conservation of environment and human health by the implementation of the EIA.
- Contribution to weather and climate by managing its aspects and mitigating impacts.
- Sustainable development of biodiversity based on assessment status of surrounding flora and fauna.

1.4 Consistency with the DoE and Bangladesh Bank Guidelines

The report has been prepared based on information on the factory's activities supplied by **Norp Knit Industries Ltd. (Unit-2).** GREENBUD's multi-disciplinary team of experts made reconnaissance and exploratory site visits. The interaction between the factory activity and the significant environmental components was made based on a checklist. The checklist was prepared following the DoE guidelines for selected industries (DoE, ECR 2023), Environmental Guidelines for selected industrial and water development projects (ADB, 1990), and the Consultant's experience with similar factories.

The environmental data were collected from the factory sites, association and substations through an environmental questionnaire. Public consultation was also made to obtain the people's view, as suggested in the EIA guidelines.

Environmental data from different sources (B.B.S., DoE, BMD, BWDB; Agro-climatic survey of Bangladesh, BARC and other IEE/EIA reports) of the factory were collected to prepare an environmental baseline profile. GREENBUD's multi-disciplinary team of experts made a visit to visualize the condition of the factory site and its surroundings and to identify issues. The environmental baseline, project components, possible environmental impacts, mitigation measures and environmental management plan are presented in this report following the DoE and Bangladesh Bank guidelines.

1.5 Methodology

For environmental assessment following the methodology developed based on the procedures described in EIA guidelines published by the Department of Environment (March 2023) has been adopted:

- Undertaking a field survey toward the collection of primary baseline environmental and social information about the project area
- Collection of secondary information from different government and non-government portals
- Analysis of project component and its activities concerning environmental aspects
- Public consultation to identify their concern and acceptance of the project
- Identification of sources of pollution during the construction and operation phases of the proposed project
- Identification of potential impacts and evaluation of consequences, the scrutinization of mitigation measures for elimination or minimization of impacts

Identification of impact was done using the checklist method. All the relevant environmental and social risks and potential impacts have been taken due care of as part of the assessment in compliance with the guidelines set forth by the DoE.

1.6 EIA Team

GREENBUD has prepared this report with its multidisciplinary team of EIA experts of have experience of conducting Environmental Impact Assessment of medium and large-scale industrial projects. The name of the professionals' involved in the study is listed below:

Table 2: EIA Team Member

S/l	Name	Educational Qualification	Responsibilities
1	Engr. Syed Tasnem Mahmood	B.Sc. and M.Sc. in Civil and Environmental Engineering, Shahjalal University of Science and Technology, Bangladesh	Team Leader
2	Thasnuba Sajjad	M.Ss. in Economics, University of Chittagong	Economist
3	Mosharof Hossain	M.Sc and B.Sc in Environmental Science, KU	Team Member

S/l	Name	Educational Qualification	Responsibilities
4	Md. Shaharia Ahmed	B.Sc. in Environmental Science, IUB	Team Member
5	Basil Kubi	B.Sc. in Environmental Science, BUP	Team Member
6	Majharul Islam	B.Sc. in Environmental Science, BUP	Team Member

1.7 Limitations of the study

As per the EIA guidelines for industrial sector projects, EIA studies require the collection of detailed data and information through the observation of the environmental consequences for one full year covering both dry and wet seasons. However, the baseline data were collected during the dry season which covered only one season and due to the time constraints, wet season data was collected from historical data of previous years.

1.8 Acknowledgment

The EIA report has been prepared with the support of **Norp Knit Industries Ltd. (Unit-2)** also with various government agencies and NGOs 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), etc. We would like to say thanks to each organization and its employees for their contribution in conducting the study.

1.9 Report Structure

The issue and the corresponding section of the report where it has been addressed is summarized in the following table.

Table 3: Structure of the Report

Sl. No	EIA Review Issues	Sections where Addressed
01	Introduction	Chapter One
02	Policy and Legal Consideration	Chapter Two
03	Project Description	Chapter Three
04	Description of Environmental and Social Baseline	Chapter Four
05	Environmental Impacts & Mitigation Measures	Chapter Five
06	Environmental Management Plan	Chapter Six
07	Risk Assessment and Management	Chapter Seven
08	Conclusion	Chapter Eight

Chapter Two

Policy and Legal Consideration

2.1 Background

The emerging environmental scenario calls for attention to conservation and judicious use of natural resources. There is a need to integrate the environmental consequences of development activities and to plan suitable measures to ensure sustainable development. The environmental considerations in any developmental process have become necessary for achieving sustainable development. To achieve such goals, the basic principles to be adopted are:

- To enhance the quality of the environment in and around the project area by adopting proper measures for conservation of natural resources;
- Prevention of adverse environmental impact to the maximum possible extent;
- To mitigate the possible adverse environmental and socio-economic impact on the project-affected areas.

2.2 Environment Related Policies in Bangladesh

The government of Bangladesh has developed a policy framework that requires environmental issued to be incorporated into economic development planning. The key tenets of the various applicable policies are detailed in the following subsections:

2.2.1 National Environmental Policy 2018

Taking into account the challenges of environment, environment and biodiversity conservation and management, the government has finalized the National Environment Policy 2018 on 3 October 2017 and published it in 2019 with the aim of developing the overall environmental conservation management of the country.

In the newly adopted National Environmental Policy 2018, out of 9 more sectors/areas including the previous 15 sectors, mountain environment, biodiversity and environment conservation and life security, eco-friendly tourism, etc. sectors have been included with special emphasis. In order to implement the activities included in the 24 sectors mentioned in the National Environmental Policy 2018, the concerned ministries/ divisions/agencies have been identified which will be implemented by their respective ministries/divisions/agencies

2.2.3 National Conservation Strategy, 1992

National Conservation Strategy (GoB/IUCN, 1992) was drafted in late 1991 and submitted to the Government in early 1992. This was approved in principle; however, the final approval of the document is yet to be made by the cabinet. It underwent a number of modifications over the last five years, and is waiting to be placed before the cabinet finally sometime in late September 1997. 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.

2.2.4 National Environnemental Management Action Plan (NEMAP), 1995

National Environmental Management Action Plan, also referred to as NEMAP (GoB, 1995) is a wide-ranging and multi-faceted plan, which builds on and extends the statements set out in the National Environmental Policy. NEMAP was developed to address issues and management requirements during the period 1995 to 2005, and sets out the framework within which the recommendations of the National Conservation Strategy are to be implemented.

NEMAP has the broad objectives of:

- Identification of key environmental issues affecting Bangladesh;
- Identification of actions necessary to halt or reduce the rate of environmental degradation;
- Improvement of the natural and built environment;
- Conservation of habitats and biodiversity;
- Promotion of sustainable development;
- Improvement in the quality of life of the people.

One of the key elements of NEMAP is that sect oral environmental concerns are identified. In outline, the environmental issues of the industrial sector include the following:

- Pollution arising from various industrial processes and projects throughout the country causing varying degrees of degradation of the receiving environment (Air, Water, and Land).
- There is a general absence of pollution abatement in terms of waste minimization and treatment.
- Low level of environmental awareness amongst industrialists and entrepreneurs.
- Lack of technology, appropriate to efficient use of resources and waste minimization leading to unnecessary pollution loading in the environment.
- Economic constraints on pollution abatement and waste minimization such as the cost of new technology, the competitiveness of labor, and intensive production methods as compared to more modern methods.
- Concentration of Industry and hence pollution in specific areas which exacerbate localized environmental degradation and exceed the carrying capacity of the receiving bodies.
- Unplanned industrial development has resulted in several industries located within or close to residential areas, which adversely affects human health and quality of human environment.
- Establishment of industries at the cost of good agricultural lands and in the residential areas.

- Lack of incentives to industrialists to incorporate emission/discharge treatment project in their industries.

2.2.5 Bangladesh National Building Code, 2020

Part-7, Chapter -1 of the Bangladesh National Building Code (BNBC) clearly sets out the constructional responsibilities according to which the relevant authority of a particular construction site shall adopt some precautionary measures to ensure the safety of the workmen. These however will not absolve the owner from any of his responsibilities under the various provisions of this Code and other applicable regulations and bye-laws. The terms of contract between the owner and the contractor will determine the responsibilities and liabilities of either party in the concerned matters, within the provisions of the relevant Acts and Codes (e.g.) the Employers' Liability Act, 1938, the Factories Act 1965, the Fatal Accident Act, 1955 and Workmen's Compensation Act 1923". (After the introduction of the Bangladesh Labor Act, 2006, these Acts have been updated.).

Section 1.4.1 of chapter-1, part-7 of the BNBC, states the general duties of the employer to the public as well as workers. According to this section, "All equipment and safeguards required for the construction work such as temporary stair, ladder, ramp, scaffold, hoist, run way, barricade, chute, lift etc. shall be substantially constructed and erected so as not to create any unsafe situation for the workmen using them or the workmen and general public passing under, on or near them".

Part-7, Chapter-3 of the Code has clarified the issue of safety of workmen during construction and with relation to this, set out the details about the different safety tools of specified standard. In relation with the health hazards of the workers during construction, this chapter describes the nature of the different health hazards that normally occur in the site during construction and at the same time specifies the specific measures to be taken to prevent such health hazards. According to this chapter, exhaust ventilation, use of protective devices, medical checkups etc. are the measures to be taken by the particular employer to ensure a healthy workplace for the workers.

To prevent workers falling from heights, the Code in section 3.7.1 to 3.7.6 of chapter 3 of part 7 sets out the detailed requirements on the formation and use of scaffolding. According to section 3.9.2 of the same chapter, "every temporary floor opening shall either have railing of at least 900 mm height or shall be constantly attended. Every floor hole shall be guarded by either a railing with toe board or a hinged cover. Alternatively, the hole may be constantly attended or protected by a removable railing. Every stairway floor opening shall be guarded by railing at least 900 mm high on the exposed sides except at entrance to stairway. Every ladder way floor opening or platform shall be guarded by a guard railing with toe board except at entrance to opening. Every open sided floor or platform 1.2 meters or more above adjacent ground level shall be guarded by a railing on all open sides except where there is entrance to ramp, stairway or fixed ladder for the above precautions shall also be taken near the open edges of floors and roofs".

The major challenge is the proper implementation of the Code as section 2.1 of chapter 2 of part 1 duly states that, "The Government shall establish a new or designate an existing agency

responsible for the enforcement of this Code with a given area of jurisdiction. For the purpose of administering and enforcing the provisions of the Code, the enforcing agency shall have the authority of the Government and shall herein be referred to as the Authority."
Part 9, 1.2.1 states that if the land is changed and the occupants of the area are against the change, no change in use of an existing building will be allowed.

Section 1.2.3 of Part-9 also states that in case of partial changing of a building, fire resistance should be ensured and all provisions with greater public safety should be applied to the entire building structure.

Section 1.2.4 of Part 9 states "Additions to existing building shall comply with all of the requirements of the BNBC for new constructions. The combined height and area of the existing building and the new addition shall not exceed the height and open space requirements for new building specified in Part 3 of the Code. Where a fire wall that complies with Table 3.3.1 of Part 3 is provided between the addition and the existing building, the addition shall be considered as a separate building."

2.2.6 Other Policies relevant to Environment.

Additional Bangladesh policies, their key features and applicability to the project are detailed in Table 4.

Table 4: Policies Relevant to Environment

Policies	Key Feature	Applicability
The National Water Policy, 1999	❖ Protection, restoration and enhancement of water resources ❖ Protection of water quality, including strengthening regulations concerning agrochemicals and industrial effluent ❖ Sanitation and potable water ❖ Fish and fisheries ❖ Participation of local communities in all water sector development	Applicable as water will be collected from ground water source
The National Forest Policy, 1994	❖ Afforestation of 20% land ❖ Bio-diversity of the existing degraded forests ❖ Control of Global warming, desertification ❖ Control of trade in wild birds and animals ❖ Prevention of illegal occupation of the forested land, tree felling and hunting of wild animals	Not applicable, as no diversion of forest land is involved in the Project.
National Fisheries Policy, 1998	❖ Preservation, management and exploitation of fisheries resources in inland open water ❖ Fish cultivation and management in inland closed water. ❖ Prawn and fish cultivation in coastal areas ❖ Preservation, management and exploitation of sea fishery resources	Not applicable as collected from ground water
The Energy Policy, 1996	❖ Provides for utilization of energy for sustainable economic growth, supply to different zones of the country, development of the indigenous energy source and environmentally sound sustainable energy development programmes	Applicable as the Project will utilize power and also have potential for sustainable energy development

Policies	Key Feature	Applicability
The Power Policy, 1995	❖ Is an integral part of the Energy Policy and deals with policy statement on demand forecast, long term planning and project implementation, investment terms, fuels and technologies, institutional issues, private sector participation, technology transfer and research programme, environmental policy and legal issues	Applicable as the Project will utilize power
Industrial Policy, 1999	❖ Deals with industrial development, direct foreign investments, investment by public and private sector, introduction of new appropriate technology, women's participation, infrastructure development and environmentally sound industrial development	Applicable as the Project is a privately funded project, industrial development

2.3 National Policies

The main Acts and Regulations guiding environmental protection and conservation in Bangladesh are outlined in the following subsections:

2.3.1 Environment Conservation Act 1995 (subsequent amendments in 2010)

The Bangladesh Environmental Conservation (Amendment) Act, 2010, was enacted to provide for further amendments of the 1995 Act. The Act includes sections on "wetlands," "hazardous waste," "hills and tilla," and "ecologically critical areas." It defines "wetlands" as areas with marshy land, flood plain land, water and rainwater, and hazardous waste as any kind of waste that creates toxicity, infection, oxidation, exploration, radioactivity, decay, or other harmful effects to the environment. It also includes sections on "hills and tilla," which are naturally created earth surfaces above the ground from adjacent plain land, and "ecologically critical areas," which are areas rich in unique biodiversity or due to the importance of environmental perspective necessary to protect or conserve from destructive activities. The Act also includes provisions for the declaration of ecologically critical areas, which are areas that are in an environmentally critical situation or are threatened to be in such a situation.

2.3.2 Environment Conservation Rules 2023

The Environment Conservation Rules was updated lastly in 2023 subsequently.

In accordance with section 20 of The Bangladesh Environment Conservation of Act Search for Legal Articles No. 1 of 1995, the Government in March, 2023 passed the Bangladesh Environment Conservation Rules, 2023. This Article discussed various important provision of the Regulation.

Rule-3 Application and Remedies for Environmental Pollution or Degradation Damages Remedies

Sub-section (1) of Section 8 of the Act requires the Director-General to dispose of an application within 30 working days by means of public hearing. The Director General may extend the application period by 15 working days, if necessary, by stating the reason.

Rule-4 Notice for Collection of Samples

According to the provisions of Section 11 of the Act, if an officer authorized by the Director General wants to take samples of air, water, soil or other substances for the purpose of analysis, the owner, occupier or agent of the factory, premises or place concerned shall give a notice in accordance with Form-2.

Rule 5 Classification of Industrial Institutions and Projects for the purpose of issuing environmental and location clearance certificate

Industrial projects and units must be classified based on their activities, pollution, and potential harm to the environment and health. The categories are:

- Green
- Yellow
- Orange
- Red

Obligation to obtain Location Clearance and Environmental Clearance Certificate

According to the Environment Conservation Rules (ECR) 2023 in Bangladesh, obtaining Location Clearance and Environmental Clearance Certificates is mandatory for industrial units and projects to ensure environmental protection. The obligations are as follows:

- Green Category: Industries or projects with low environmental and human health impacts are required to obtain only an Environmental Clearance Certificate.
- Yellow, Orange, and Red Categories: Industries or projects with moderate to severe environmental and human health impacts must first obtain a Location Clearance Certificate before proceeding to secure an Environmental Clearance Certificate.
- Special Zones: Industries or projects within government and private export processing zones, economic zones, and industrial cities of the Bangladesh Small and Cottage Industries Corporation are exempt from obtaining a Location Clearance Certificate, regardless of their category. However, they must still obtain an Environmental Clearance Certificate.
- Infrastructure Development: No infrastructure can be established without a Location Clearance Certificate from the Department of Environment.
- Utility Services: Essential services such as gas, electricity, and water cannot be provided to new industrial units or projects categorized as yellow, orange, or red unless they have obtained a Location Clearance Certificate.

Application should be submitted to the district office, if there is no district office the application should be submitted to the office or departmental office without jurisdiction. In metropolitan area an application should be submitted to metropolitan office. Application must be submitted to district office if there is no separate office for metropolitan area. Application should be submitted to regional office or divisional office if multiple districts under the same division. If the same category is widespread, the application should be submitted to the head office of the department.

2.3.3 Medical Waste (Management & Treatment Rules) 2008

The Government of Bangladesh promulgated the medical waste (management and processing) Rule, 2008 for processing and management of MW in Bangladesh. It was prepared through active participation of MOHFW, MOL and MOEF mainly with the objective of proper management of medical waste and protecting the environment.

The Medical Waste (Management and Treatment) Rules 2008 forms the base of the management of all medical waste in the country. The rules are applicable only to waste management facility/operators i.e. those involved in the transportation, treatment and disposal of medical waste. The law provides for guidance on the collections, storage treatment and disposal of medical waste for management facilities/operators. The institutions or agencies involved in collection, transport, storage, have to obtain authorization from the authorized Department.

The existing Environment Conservation Act, 1995 and the Environment Conservation Rules, 2023 had no specific by laws directly related to management of MW management. According to Bangladesh Environment Conservation Act wastes are classified under section 2(1) as "any liquid, solid and radioactive substance that is discharged, disposed or dumped which may cause adverse/ negative change to the environment. All these procedures were very general for all kind of establishments and not specific for Management of MW. The shortcoming has been addressed by the new medical waste rules, 2008.

Broadly the rule has classified the medical waste (schedule-1) with examples and environment friendly technologies of management. It also contains suggestion for use of different color bins (schedule-3) for segregation of medical –waste at source and symbol to be used on the packaging of medical-waste (schedule-4) for transporting. In schedule -6 the rule specifies the standard Incineration/ Autoclaving, standard of liquid waste with permissible limits, standard of microwaving, standard for deep burial and standard for radioactive waste treatment and disposal along with other issues related to MWM. The new medical waste rule has urged for 'formation of authority' within 3 months of proclamation which will be in charge of all activities related to MWM of their area.

The regulation specified for different color bins to be used for segregation of different MW along with specification of container, standard for operation of equipment, effluent and emission standards.

2.3.4 The Boiler Act 2022

The Boiler Act 2022 has been enacted - scrapping the old law, endorsed in 1923 - to ensure more safety in industrial units.

The new act, approved in the parliament, also makes mandatory boiler operation by the authorized ones having license for the same.

It has been necessary to repeal the Boilers Act 1923 to enact a time-befitting one to ensure more safety in industrial units for reducing risk of boiler-related accidents in factories, raising awareness about its use, construction of quality boiler, and its export, import and maintenance, according to a gazette notification - issued on 23rd February in this regard.

According to the new act, office of the chief boiler inspectorate will be in the capital city, and the government can set up regional offices across the country.

It also defines the functions of the chief boiler inspector that includes controlling the standard of locally manufactured boilers, verifying the standard of imported ones, and ensuring use of safe and quality boilers, and issuance of license to operate boilers.

The chief boiler inspector will also prepare the list of boiler producers and maintenance, inspection and welding companies while also maintaining the directory of code and inspection companies and intenders as well as organizing trainings for the related people to develop skills.

There will also be a 'boiler board' - incorporating members from the stakeholders concerned - to serve the purposes of the act.

The new act, provided with some conditions, also allows local manufacturing of boiler along with its import and export.

Registration and Licensing Process under Bangladesh Boiler Act 2022

- Boiler Registration:

Every boiler must be registered with the relevant regulatory authority before installation and operation. The owner must submit an application with details such as boiler specifications, design, manufacturer details, and intended use. A registration fee must be paid as per the government's schedule.

- Approval from Boiler Authority:

The application is reviewed by the Chief Inspector of Boilers. If required, an on-site inspection is conducted before approval. Once all criteria are met, the boiler is registered and issued a registration number.

- Boiler License and Fitness Certificate:

After registration, the boiler must undergo an inspection by an authorized inspector to ensure it meets safety standards. If the inspection is successful, a Boiler Fitness Certificate is issued. This certificate is mandatory for operation and must be renewed periodically.

- Boiler Operator License:

Only certified and licensed operators are allowed to handle boilers. Operators must complete a training program and pass an examination conducted by the authority. A valid boiler operator license is issued upon meeting qualification criteria.

- Renewal and Compliance:

Boiler registration and licenses must be renewed within the stipulated timeframe. Regular inspections are required to ensure compliance with safety and environmental regulations. Any modification or repair to the boiler must be reported and re-approved by the authority.

- Digital Application Process:

The registration and licensing process is now digitized, allowing for online application, renewal, and tracking through the official government portal.

- Penalties for Non-Compliance:

Operating an unregistered or unlicensed boiler is a punishable offense. Violations may lead to fines, suspension, or legal action under the Act.

2.3.5 Bangladesh Water Rules, 2018

This rule contains provisions for integrated development, management, abstraction, distribution, use, protection, and conservation of water resources. The rule covers water resources such as surface water, groundwater, and rainwater, and also includes flood-plain, wetland, natural or manmade River. According to the Act, all rights over the following water bodies within the state territory, on behalf of the people, is vested with the State-

Under the rule, a National Water Resources Council is constituted, which will have the following functions:

- To make policies, and provide instructions for integrated development, proper use, safeabstraction, proper distribution, protection, and conservation of water resources;
- To give instructions in respect of making National Water Resources Plan and approval ofthereof, for ensuring integrated development of water resources;
- To perform such functions as may be determined by the Council

In violation of any provision of the Act or any prohibition/protection order or any clearance certificate, if any authority undertakes construction activities that create impediments in the normal watercourse or changes the direction of such watercourse, the Executive committee may issue a removal order to such authority for removing infrastructure, or landfilling materials within the time specified in that order.

2.3.6 Electricity (Amendment) Act, 2012

This act is an amendment to The Electricity Act, 1910. In addition to the guidelines provided in the original act (The Electricity Act, 1910), this act includes more specificinstruction relating to obligation on licensee to supply energy. According to section 22A (Sub section 1) of this act: a person authorized by a license, or exempted from the requirement to obtain a license, to generate, transmit, distribute or supply electricity – (a) shall, in generating, transmitting, distributing or supplying electricity, have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological

interest; and (b) shall do what the person reasonably can to mitigate any effect which such generation, transmission, distribution or supply would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects. In section 22A (Sub- section 2) it is mentioned that, without prejudice to the provisions of Sub- section (1), aperson authorized by a license, or exempted from the requirement to obtain a license, to generate, transmit, distribute or supply electricity and the Commission shall, in generating, transmitting, distributing or supplying electricity, or as the case may be, in the discharge of the Commission's functions, avoid, so far as reasonably practicable, causing injury to fisheries orto the stock of fish in any waters. section 22A (Sub- section 3 and 4) of this act also mentions generation licensee shall, in circumstances specified by the Commission, be entitled toconstruct, subject to conditions specified by the commission in consultation with the relevant water authority, water ways and pipelines, and to use water for its licensed activities and the relevant water authority shall not unreasonably deny such right. For this purpose, the 'relevant authority' means such authority, as the Commission shall determine. This act is an amendment of the previous act including guidelines that are more specific

2.3.7 The Acquisition and Requisition of Immovable Property Act, 2017

In 2017, a new law came into force replacing the Acquisition and Requisition of Immovable Property Ordinance, 1982. Though this act was enacted with the purpose to overcome previous faulty measures, unfortunately, the newly adopted law is not providing enough protection to the rights of the affected parties. It is also infected with the previous flaws as found in the mentioned ordinance.

2.3.8 Other Relevant National Legislation for the Project

Table 5 presents an outline of other National legal instruments that will have relevance to the project with respect to the environmental and social considerations.

Table 5: National Policies and Acts Relevant to the Project

Name of the Act/Rule	Enforcement Agency/Authority	Key Features	Applicability to the Project
Employment of Children Act 1938	Ministry of Labor	No child who has not completed his fifteenth year shall be employed or permitted to work in any occupation - (a) connected with transport of passengers, goods or mails by railway; or (b) Involving the handling of goods within the limits of any port. (2) No child who has completed his fifteenth year but has not completed his seventeenth year shall be employed or permitted to work in any occupation referred to in sub-section (1), unless the period of work of such child for any day are so fixed as to allow an interval of rest twelve consecutive hours which shall include at least such seven consecutive hours between 10 p. m and 7 a.m.	Applicable as no children will be allowed to work during the operation phase
Antiquities Act 1968	Ministry of Cultural Affairs	This legislation governs preservation of the national cultural heritage, protects and controls ancient monuments, regulates antiquities as well as the maintenance, conservation and restoration of protected sites and monuments, controls planning, exploration and excavation of archaeological sites.	Applicable as the project made sure no such infrastructure is harmed or damaged during its construction
Workmen's Compensation Act 1923 amendment 1983	Ministry of Labor	This act focuses on the workmen's wages and compensation, The amount of compensation and how the wages will be calculated.	Applicable as the project appointed a majority of workforce and immigrant workers as well
The Ground Water Management Ordinance, 1985	Upazila Parishad	❖ Management of ground water resources ❖ Installation of tube-wells at any place after license from Upazila Parishad only	Applicable as groundwater is used for operation purpose for the project.
Central Motor and Vehicle Act 1988	Bangladesh Road Transport Authority (BRTA)	❖ Sticking to strict procedures for granting licenses and calculating the validity period of such licenses. ❖ To maintain road safety requirements, dangerous and explosive material transportation rules, and pollution control measures.	Applicable since the project utilize a significant number of vehicles during its operation purposes

Name of the Act/Rule	Enforcement Agency/Authority	Key Features	Applicability to the Project
		❖ To maintain the country's rapidly growing quantity of personal and commercial cars. ❖ To raise the amount of compensation available to hit-and-run cases. ❖ To eliminate the time limit for traffic accident victims to file a compensation claim.	
Environment Conservation Act, 1995 (amendments in 2000 & 2002)	Ministry of Environment, Forest and Climate Change	❖ Define Applicability of environmental clearance ❖ Regulation of development activities from environmental perspective ❖ Framing applicable limits for emissions and effluents ❖ Framing of standards for air, water and noise quality ❖ Formulation of guidelines relating to control and mitigation of environmental pollution, conservation and improvement of environment ❖ Declaration of Ecologically critical areas	Applicable as according to this act (Section 12), no industrial unit or project shall be established or undertaken without obtaining, an Environmental Clearance Certificate (ECC) from the Director General of DoE.
Factory Act 1995	Ministry of Labor	It was adopted with the objective of regulating the appointment of workers, their wages and the working conditions in factories, including health and hygiene, safety, welfare, working hours, leave and holidays, and punishments and penalties for both the owners and workers for non-compliance of the requirements	Applicable as workers are present within the project site
Water Supply and Sanitation Act, 1996	Ministry of Local Government, Rural Development and Cooperatives	Management and Control of Water Supply and Sanitation in Urban areas	Applicable as the project involves activities of water supply and sanitation.
Environment Court Act, 2000 (subsequent amendments in 2002)	Ministry of Environment, Forest and Climate Change and Judiciary	❖ GoB has given highest priority to environment pollution ❖ Passed 'Environment Court Act, 2000 completing environment related legal proceedings effectively	Applicable for completing environmental legal requirements effectively
National Biodiversity Strategy and Action Plan (2004)	Ministry of Environment, Forest and Climate Change	❖ Conserve, and restore the biodiversity of the country for wellbeing of the present and future generations; ❖ Maintain and to improve environmental stability for ecosystems;	Applicable as the project corridor consists of variable biodiversity

Name of the Act/Rule	Enforcement Agency/Authority	Key Features	Applicability to the Project
		❖ Ensure preservation of the unique biological heritage of the nation for the benefit of the present and future generations; ❖ Guarantee the safe passage and conservation of globally endangered migratory species, especially birds and mammals in the country; and ❖ Stop introduction of invasive alien species, genetically modified organisms and living modified organisms.	
Sound Pollution (Control) Rules, 2006	Ministry of Environment, Forest and Climate Change	❖ Prevention of Noise pollution ❖ Standards for noise levels	Applicable since several noise generating sources like motorized vehicles and heavy machineries
Bangladesh Labor Law, 2006; Bangladesh Labor Rules 2015	Ministry of Labor	This Act pertains to the occupational rights and safety of workers and the provision of a comfortable work environment and reasonable working conditions	Applicable. Project Proponent to include all relevant clauses of this act in contract document to ensure that labor's right is protected.
Environment Conservation Act, 2010 (Amendment)	Ministry of Environment, Forest and Climate Change	This Act aims to provide for further amendments to the Bangladesh Environment Conservation Act No. 1 of 1995. Amendments regulate and give new definition to several aspect of the original Act, such as: wetland; hazardous waste; ecologically critical area; restriction on cutting hill; restriction on production, import, storage, loading, transportation etc. of hazardous waste to protect the environment; restriction on pollution; environmental clearance certificate; penalties; claim for compensation; confiscation of materials and equipment involved; etc.	Applicable as the project need to protect the environment during its operation phase
The Climate Change Trust Act' 2010	Climate Change Trust, GoB	An Act to establish a trust to be called the Climate Change Trust to redress the adverse impact of climate change on Bangladesh and to take measures on other matters relating there.	Applicable as the project potentially have an adverse impact on climate change due to GHG emission
National 3R Strategy for Waste Management, 2010	Ministry of Environment, Forest and Climate Change	❖ Provide guideline to develop waste management strategy according to 3R ❖ Sector specific promotion strategy for 3R	Applicable as the project site generate waste

Name of the Act/Rule	Enforcement Agency/Authority	Key Features	Applicability to the Project
Hazardous Waste Management Rules, 2011	Ministry of Environment, Forest and Climate Change	❖ Restriction of storage of hazardous waste more than 90 days ❖ Enforcement to dispose only through the licensed collector	Applicable as the project generate hazardous waste during its operation phase
Bangladesh Water Act 2013	Ministry of Water Resources	❖ Right to water ❖ Adoption of National Water Policy and National Water Resources Plan ❖ Clearance Certificates ❖ Water Stressed Areas and Safe Yield ❖ Restricting abstraction, Protection Orders and Compliance Order ❖ Right to information and false information ❖ Water resource protection / pollution control and water quality standard	Applicable as the project consist of consuming water
Fire Prevention & Extinction Act- 2003 & Fire Prevention & Extinction Rule-2014	Bangladesh Fire Service & Civil Defense	Legislation to form rules and regulations for Fire Prevention and Extinction and Rescue Work from the Fire Combustion	Applicable since the project involve activities demanding fire-fighting arrangement
Sludge Management Guidelines 2015	Ministry of Environment, Forests and Climate Change	❖ General considerations and requirements for sludge management ❖ Classification of sludge ❖ Sludge management options ❖ Management options for Category A – Municipal sludge including comparable sludge ❖ Management Options for Category B and C Sludge from Industry	Applicable due to the discharge of sludge from the facility
The Acquisition and Requisition of Immovable Property Act 2017	Ministry of Land	❖ Current GoB Act and Guidelines, relating to acquisition and requisition of land ❖ It has been replaced with the 1982 ordinance in order to overcome its shortcomings ❖ "Acquisition means acquiring the ownership and possession of any immovable property for any requiring person or organization in exchange for compensation or rehabilitation or both."	Applicable as the project acquired land from various parties
Bangladesh Water Rules 2018	Ministry of Water Resources	❖ It was enacted after the Bangladesh Water Act 2013 ❖ Right to water and clean drinking water	Applicable as the project has the use of water

Name of the Act/Rule	Enforcement Agency/Authority	Key Features	Applicability to the Project
		❖ Impose of national water policy ❖ Compliance order, removal order by national committee	
The Bangladesh National Building Code (BNBC) 2020	Building Construction Committee, GoB	Sets out the constructional responsibilities of relevant authority to adopt precautionary measures to ensure the safety of the workmen. According to Section 1.2.1 of Chapter 1 of Part 7, "In a construction or demolition work, the terms of contract between the owner and the ZZHE-MIL JV and between a consultant and the owner shall be clearly defined and put in writing	Applicable since the project involves establishments
Solid Waste Management Rules 2021	Ministry of Environment, Forest and Climate Change	❖ When recovering resources from waste, the principles of management that consider the waste hierarchy, such as the 3Rs, segregation, and reduction, must be followed at all stages from waste generation to final disposal. ❖ Responsibilities of waste generators, consumers, and users	Applicable as the project site generate various solid wastes

Name of the Act/Rule	Enforcement Agency/Authority	Key Features	Applicability to the Project
Solid Waste Management Rules 2021	Ministry of Environment, Forest and Climate Change	Dispose of waste in accordance with the regulations of authorities including local government. Dispose of waste separately. Do not dump, store, or burn waste outdoors. ❖ Responsibilities of manufacturers (*not defined) and importers of products Collect non-biodegradable products such as glass, plastic, polyethylene, multi-layered packaging, bottles, and cans from consumers and recycle or dispose of them if appropriate. ❖ Determine work plans and implementation procedures for recycling and disposal. ❖ Ensure that EPR is properly implemented. ❖ Submit an annual report to the Department of Environment (DoE) on the amount of plastic recycled. Raise public awareness of proper waste management.	Applicable as the project site generate various solid wastes
Air Pollution Control Rules-2022	Ministry of Environment, Forests and Climate Change	❖ Prevention of Air Pollution ❖ Standards for Ambient Air Quality	Applicable since several air pollution sources like construction activities and other project activities.
Environmental Conservation Rules, 2023	Ministry of Environment Forests and Climate Change	❖ Declaration of Ecologically critical areas ❖ Requirement of environmental clearance certificate for various categories of projects ❖ Requirement of IEE/EIA as per category ❖ Renewal of the environmental clearance certificate within 30 days after the expiry ❖ Provides standards for quality of air, water and sound and acceptable limits for emissions/discharges from vehicles and other sources	Applicable as the project falls under the **"Orange"** Category according to schedule 01

Table 6 presents an outline of other National legal instruments that will have relevance to the Project with respect to the environmental and social considerations.

Table 6: Permission/ Permits Relevant to the Project

Environmental Regulation & Permits				
Name of the Act/Rule	**Area Of Applicability**	**Reference**	**Cause Of Applicability of The Act/Rule**	**Related Permit/License**
Air Pollution Control Rules-2022	Ambient Air Exhaust	Schedule-01	❖ Prevention of Air Pollution ❖ Standards for Ambient Air Quality	License Not Required
Bangladesh Biodiversity Act, 2017	Biodiversity and related activities undertaken and transfer restrictions, approved and rejected applications Biodiversity strategy and action plan, traditional activities causing adverse effects on biodiversity, etc.	Act II	Regulates the Biodiversity conservation and sustainable use of its resources, biota and the fair and equitable share of the benefits derived from their use of and other matters.	License Not Required
Boiler Act, 2022	Steam Generation	Chapter 03	The factory might operate boiler so according to Chapter 03 of the act, the factory needs boiler certificate	Boiler License
BERC 2003 BERC License Regulation, 2006 (amd. 2016)	Power generation	Section:29 Regulation: 9	The factory operates generator so according to sec 29 & regulation 9 the factory needs the BERC certificate	Generator License
Bangladesh Labor Law 2006	Establishment of better work environment	Sec 52,53	The factory has to assure better work environment for the factory employee	Factory License
Bangladesh Labor Rules 2015	Establishment of better work environment	Sec 45,46	Assure better work environment for the factory employee	Factory License
Bangladesh Water Act 2013	Ground Water Extraction	Section:19(3)	The facility has to obtain the permission from union parishad for setting up deep tube well to extract ground water	No Objection Certificate
Bangladesh Water Rules 2018	Water Use	Bangladesh Water Act 2013	The factory uses a huge amount of water for its various purposes	No Objection Certificate

Environmental Regulation & Permits				
Name of the Act/Rule	**Area Of Applicability**	**Reference**	**Cause Of Applicability of The Act/Rule**	**Related Permit/License**
ECA, 1995 (Amendment, 2010)	Factory establishment	Section: 12	No industrial unit or project shall be established or undertaken without obtaining, an Environmental Clearance Certificate from the Director General	Environmental Clearance Certificate
ECR 2023	1) Categorized list of projects 2) Procedure for ECC 3) standards related to water pollution, as well as permitted discharge/emission levels of water and effluent discharge	Schedule 1 Rules: 5(1)	According to schedule one, the factory falls under the **"Orange"** category so following schedules of ECR 2023 will be applicable for the facility: Drinking water, Sewage discharge, Waste water discharge	Environmental Clearance Certificate
The Hazardous Waste Management Rules, 2021	Hazardous waste storage and disposal	Sec 20	the factory cannot store hazardous waste more than 90 days and has to sell to the licensed collector	License Required
Medical Waste Disposal Rules, 2008	Medical care unit falls under the rules	Section: 2 (1) (E)	1) To separate, storage, disposal & incineration of medical waste 2) To collect & transport medical waste	License Not Required
National 3R Strategy for Waste Management	Solid waste management	Section: 5.2	The factory has to prepare and implement 3R based waste management plan to obtain the Environment clearance certificate	Environment Clearance Certificate
Noise Pollution Control Rules, 2006	Process and utility area, outside premises	Section: 5(2)	The factory should monitor all of its sections and check precaution & actions accordingly	License Not Required
Ozone Depleting Substances (ODS) Regulations, 2014	Ozone Depleting Sources	Column II of Schedule 1	Factory will install AC & so according to The Regulation prohibit the manufacturing and emission into the air of ODS. They place restrictions in the importation or exportation of (recycled) substances set out in column II of Schedule 1 ("controlled substances"), equipment, or goods that are dependent on controlled substances.	License Not Required
Solid Waste Management Rules 2021	Waste handling and segregation	Refer to the act	The factory generates a significant amount of solid waste which should be applicable to the factory	License Not Required

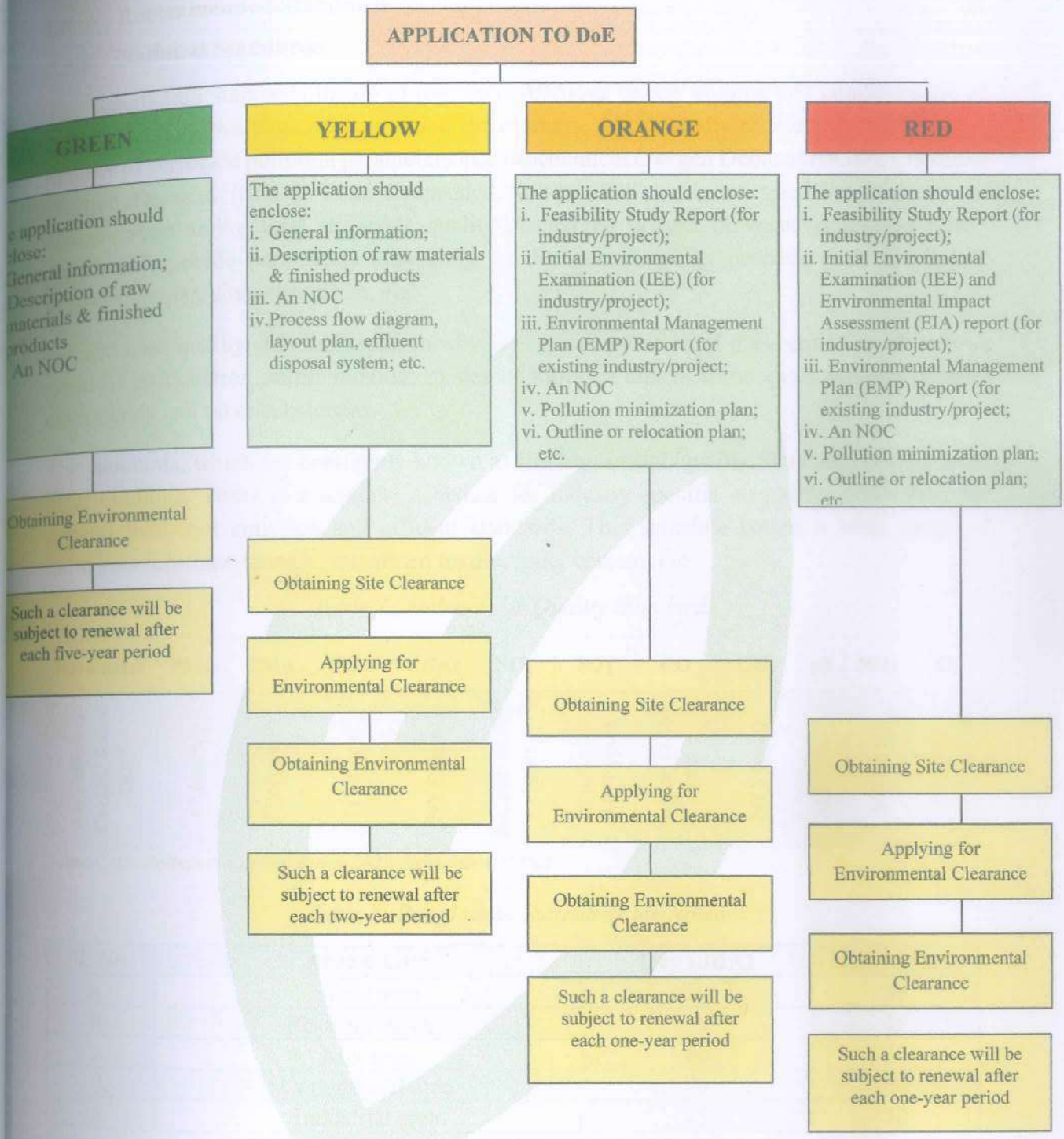
2.4 Environmental Clearance

Bangladesh has very simple administrative framework regarding environmental aspect. It has strong interface between local government and federal Government. The Department of Environment (DoE) is responsible for grant of environmental clearance to a project. In addition to three are other ministries to deal with specific area of importance to the country like Forests, Water.

Procedure for Issuance of Environmental Clearance Certificate

The Environmental Clearance Certificate (ECC) is a mandatory approval issued by the Department of Environment (DoE) under the Ministry of Environment, Forest and Climate Change (MoEFCC) in Bangladesh, ensuring that projects comply with environmental regulations. The Environmental Conservation Rules (ECR) 2023 outline the detailed procedure for obtaining the ECC, categorizing projects into four groups based on their environmental risk: Green, Yellow, Orange, and Red. The issuance process involves multiple steps, starting with application submission by the project proponent to the DoE along with required documents, including the project profile, feasibility study, layout plan, and environmental management plan (EMP). For Green Category projects, which have minimal environmental impact, a simplified process is followed where the applicant submits a self-declaration and an environmental undertaking. Upon review, the DoE grants the ECC without requiring an Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA). For Yellow Category projects, which pose moderate environmental risks, an IEE is required, along with an EMP and necessary mitigation measures. After submission, the DoE evaluates the documents and issues the ECC if compliance is ensured. Orange Category projects, which involve significant environmental risks, necessitate a more detailed assessment, including both IEE and EIA reports, stakeholder consultations, and public disclosures. The DoE conducts a thorough review, potentially requiring modifications before granting approval. The Red Category projects, which have the highest environmental risks, require the most stringent evaluation. These projects must conduct comprehensive EIA studies, hold public hearings, and submit detailed Environmental and Social Impact Assessments (ESIA) along with pollution control and mitigation plans. After reviewing these documents, the DoE may conduct site inspections, request expert opinions, or impose additional conditions before issuing the Environmental Clearance Certificate. All ECCs are valid for one to five years, depending on the category, and require periodic renewal by submitting an environmental monitoring report and compliance statement. The ECR 2023 has streamlined the digital application and approval system, ensuring transparency and efficiency in the clearance process. Failure to obtain an ECC before commencing project operations may result in legal penalties, operational suspension, and environmental liabilities.

A schematic representation of the various steps involved in obtaining the Environment Clearance certificate from DoE, Bangladesh is given in Figure below.



2.5 Recommended Standards

2.5.1 National Standards

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

Air emission quality standards refer mostly to the concentration of mass emission of various types of particulates, sulfur dioxide, oxides of nitrogen and in some cases volatile organic compounds and other substances.

The standards, which are commonly known as Environmental Quality Standards (EQS), have legal bindings. There is a separate schedule for industry-specific standards, other than the general industrial emission and effluent standards. This schedule covers a wide range of industries fertilizer, tannery, integrated textile, food, cement, etc.

Table 7: Ambient Air Quality Standards

Parameter	$PM_{2.5}$	PM_{10}	VOC	CH_2O	NO_2	SO_2	CO	CO_2	pb	NH_3	O_3
Air Pollution Control Rules 2022[1]	65 (µg/m³)	150 (µg/m³)	NYS (µg/m³)	NYS (ppm)	80µg/m³ (0.043 ppm)	80 µg/m³ (0 0.031 ppm)	5mg/m³ (4.36) ppm	NYS (ppm)	0.5 µg/m³	400 µg/m³	100 µg/m³ (0.051) ppm

Source: Air Pollution Control Rules-2022, Schedule-01, DoE

Table 8: Bangladesh Standards for Noise

Sl. No.	Area Class[2]	Day (dBA)	Night (dBA)
a.	Silent area	50	40
b.	Residential area	55	45
c.	Mix area	60	50
d.	Commercial area	70	60
e.	Industrial area	75	70

Source: Noise Pollution Control Rules 2006 Schedule 05, Department of Environment.

Note:

a) Daytime start from 6.00 am morning and end at 9.00 pm night.
b) From night 9.00 pm to 6.00 am morning; identify as night time.

[1] Air Pollution Control Rules'2022 Schedule-01, Department of Environment, Govt. of Bangladesh
[2] Noise Pollution Control Rules 2006 Schedule 05, Department of Environment, Govt. of Bangladesh

Table 9: Standard for Inland Surface Water

SL. No.	Way of Usage	Parameter											
		pH	DO mg/L	BOD mg/L	NO_3-N mg/L	NH_4-N mg/L	PO_4-P mg/L	Total Cr. mg/L	Pb mg/L	Hg mg/L	Total Coliform CFU/100ml	TDS mg/L	COD mg/ L
1.	Source of Drinking water for supply only after disinfecting	6.5-8.5	≥6	≤ 2	7.0	0.1	0.1	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: Environmental Conservation Rule-2023, Standards for inland surface water.

Note: Electrical Conductivity for Irrigation water -2250 µS/cm (at a temperature of 25° C: Sodium less than 26%: boron less than 0.2%).

Table 10: Bangladesh Standards for Drinking Water

Sl. No.	Parameter	Unit	Standards
1	Fecal Coliform	NFU/100ml	0
2	Total Coliform	NFU/100ml	0
3	Free Residual Chorine	mg/L	0.20
4	Nitrate ($NO3^-$)	mg/L	45
5	Arsenic (As)	mg/L	0.05
6	Turbidity	NTU	5
7	Aluminum (Al)	mg/L	0.2
8	Ammonia (NH_3)	mg/L	1.5
9	Barium (Ba)	mg/L	0.7
10	Benzene (C_6H_6)	µS/cm	0.01
11	Boron (B)	mg/L	1
12	Cadmium (Cd)	mg/L	0.003
13	Calcium (Ca)	mg/L	75
14	Chloride	mg/L	250*
15	Carbon tetra Chloride (CCl_4)	mg/L	0.005
16	1,1 Dichloroethane (1,1 $C_2H_4C_{12}$)	mg/L	0.03
17	1,2 Dichloroethane (1,2 $C_2H_4C_{12}$)	mg/L	0.03
18	Tetrachloroethane ($C_2H_2C_{14}$)	mg/L	0.04
19	Trichloroethane ($C_2H_3C_{13}$)	mg/L	0.02
20	Pentachlorophenol	mg/L	0.009
21	2,4,6 Tricholorphenol	mg/L	0.2
22	Chloroform ($CHCl_3$)	mg/L	0.09
23	Total Chromium (Total Cr)	mg/L	0.05
24	Color	mg/L	15
25	Copper (Cu)	mg/L	1.5
26	Cyanide (CN)	mg/L	0.05
27	Fluoride (F^-)	mg/L	1
28	Hardness as CaCO3	mg/L	500
29	Iron (Fe)	mg/L	0.3-1.0
30	Total Kjeldahl Nitrogen	mg/L	1
31	Lead (Pb)	mg/L	0.01
32	Magnesium (Mg)	mg/L	30-35
33	Manganese (Mn)	mg/L	0.4
34	Mercury (Hg)	mg/L	0.001
35	Nickel (Ni)	mg/L	0.05
36	Nitrite (NO_2^-)	mg/L	1
37	Odor	-	Odorless
38	Oil & Grease	mg/L	0.01
39	pH	-	6.5-8.5
40	Phenols	mg/L	0.002
41	Potassium	mg/L	12
42	Radioactive Materials Emitting Alpha Radiation	BQU/L	0.1
43	Overall beta variance	BQU/L	1
44	Selenium (Se)	mg/L	0.01
45	Silver (Ag)	mg/L	0.02
46	Sodium (Na)	mg/L	200
47	Suspended Solids (SS)	mg/L	10
48	Sulfide as H_2S	mg/L	0.05

Sl. No.	Parameter	Unit	Standards
49	Sulfate (SO_4^{-2})	mg/L	250
50	Total Dissolved Solids (TDS)	mg/L	1000
51	Temperature	°C	20-30
52	Tin (Sn)	mg/L	2
53	Zinc (Zn)	mg/L	5
54	Aldrin/Dieldrin	µg/L	0.03
55	Anionic detergents	mg/L	0.2

Source: ECR 2023 Schedule 02, Rule 31,

Note: * sea costal area 1000 mg/L

Chapter Three

3 *Project Description*

3.1 General

Norp Knit Industries Ltd. (Unit-2) is an export-oriented dyeing-washing & garments factory. It was established on 2010 based on local investment. Since then, it became specialized in manufacturing and supplying product for world-famous fashion houses like Kohl's, Primark, Inditex, Walmart, Macy's, PVH, American Eagle (AEO), Target AUS, Mango, BASSPRO, NORDSTROM, Next, etc.

Inside the premises of **Norp Knit Industries Ltd. (Unit-2)**, there are 14 (fourteen) buildings & sheds, which house all the production and utility activities of the factories. The facilities have obtained many International Certifications such as BSCI, Smeta (Sedex), SLCP, WRAP, SCAN, SCS, Oekotex-100, GOTS, OCS, RCS, GRS, Regenagri, GTW and Higg Index (Worldly). The production activity of the factories is divided into several sections. The processes are cutting, embroidery, sewing, washing-dyeing, finishing and packing.

Norp Knit Industries Ltd. (Unit-2) has a total area 220000 sq. ft. with a total floor area of 499373 sq. ft. with a greenery space is 5000 sq. ft. The production capacity of **Norp Knit Industries Ltd. (Unit-2)** is 46154 pcs/day and the produced products are Dresses, Jackets, Pants, Shirts, Skirts, T-shirt, Leggings & Tights.

3.2 Location

Norp Knit Industries Ltd. (Unit-2) is situated at Shi-152/2 (Old), B-01/1 (New), Islampur, Kodda Nandun, Bason, Gazipur. The access way to the factory is very convenient as the factories are located just 0.75 Km away from the highway. The project site is located only 18.8 kilometers away from Hazrat Shahjalal International Airport, Dhaka. The total facility is surrounded by different types factories. The nearest Bazar is Islampur Bazar and the nearest River is Turag River.

The coordinates of the project site are 23°59'7.93"N and 90°21'12.98"E. The access route to the factories, satellite image of the project location, and multilayer ring buffer map is shown below in figures 1, 2, and 3 respectively. Besides, the maps of Gazipur Sadar Upazila and Gazipur district are shown in Figures 4 and 5 respectively.

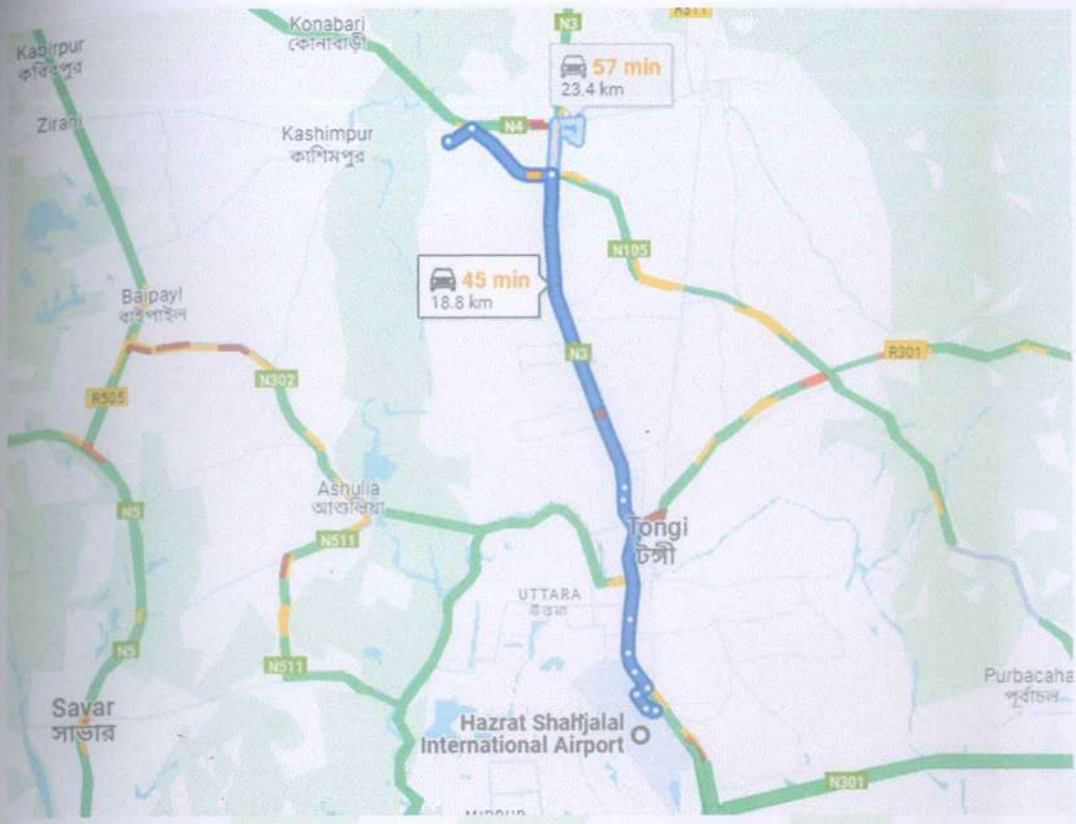


Figure 1: Access Way of the Factory

Figure 2: Satellite Image of Project Location

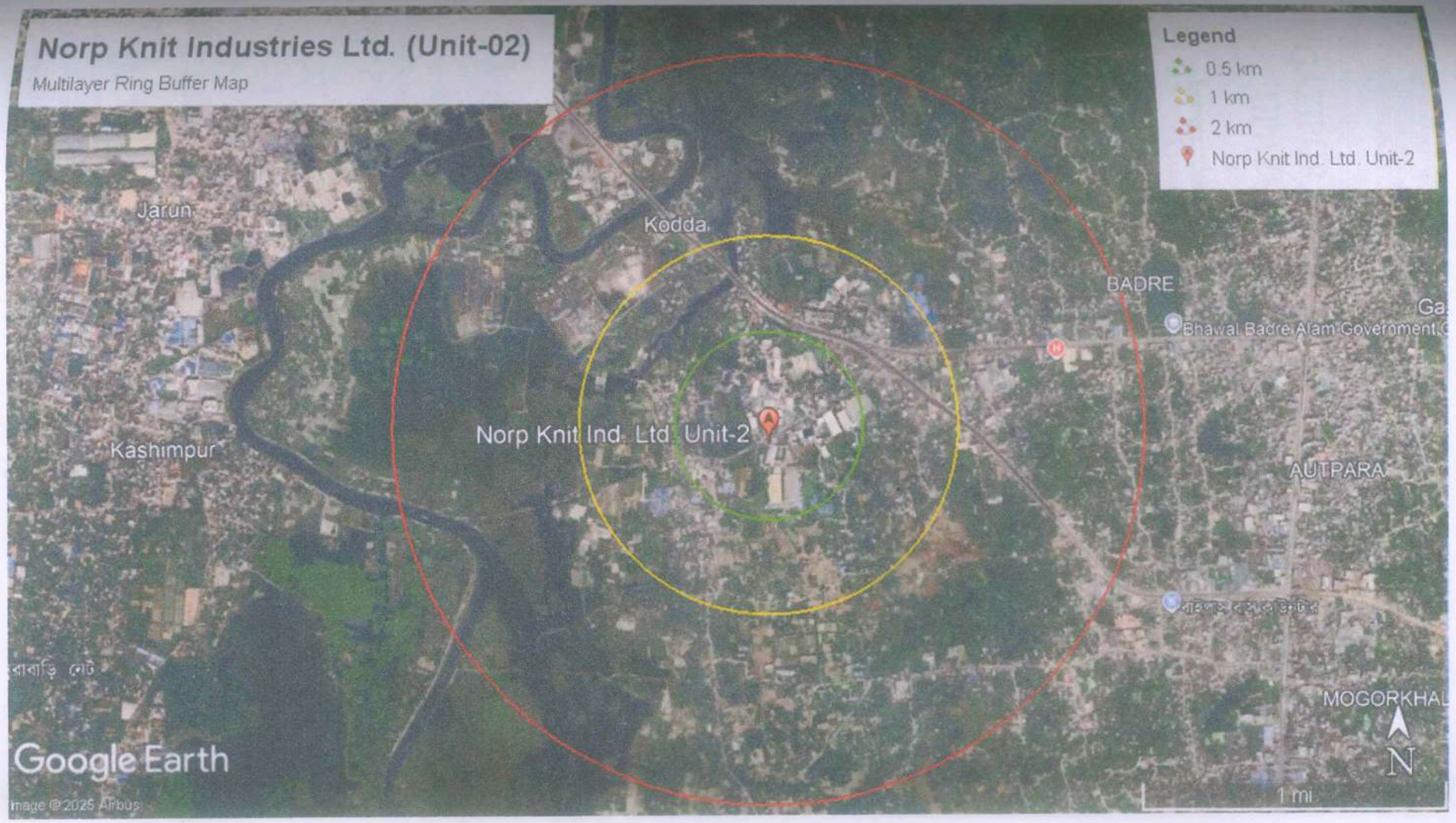


Figure 3: Multilayer Ring Buffer Map

Figure 4: Map of Gazipur Sadar Upazila

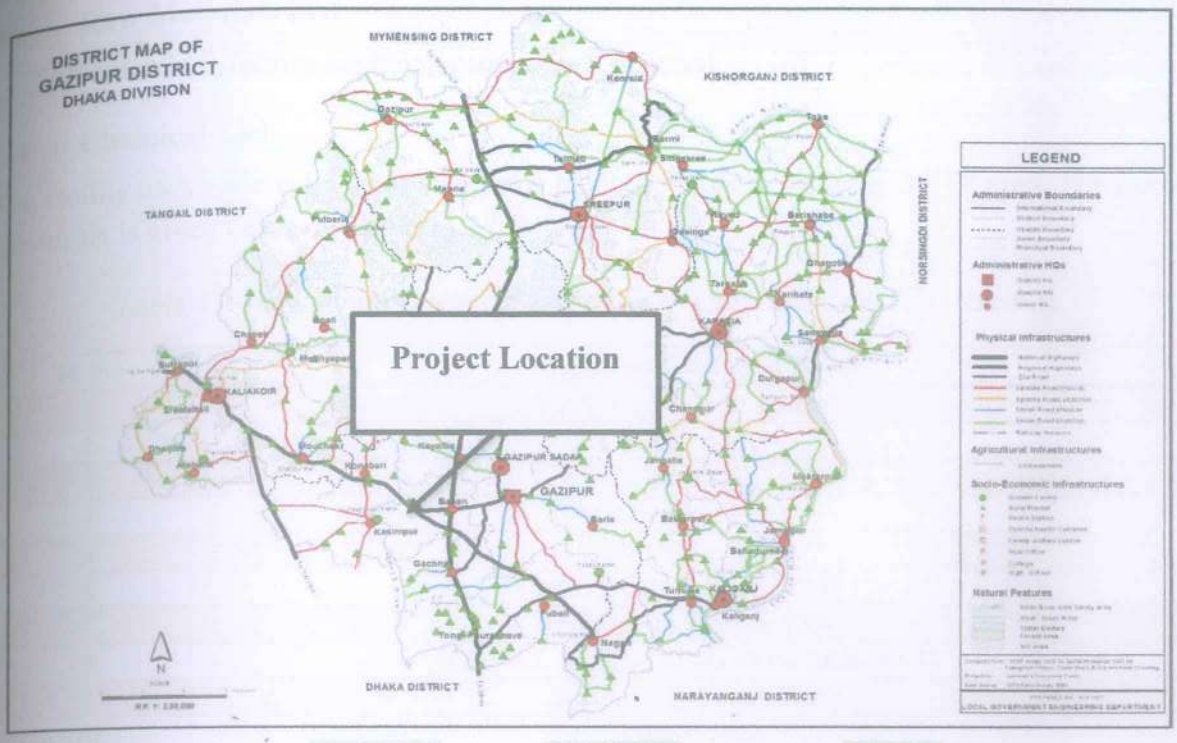


Figure 5: Map of Gazipur District

3.3 Raw Materials List

Only Chemicals & fabrics are being used as raw material.

3.4 Chemical List

The facility uses various kinds of chemicals in its production, utility and ETP area. The list of chemicals is given below in Table 11,12 & 13.

Table 11: Production Chemical List of Norp Knit Industries Ltd. (Unit-2)

Sl. No	Production Chemical Name
1	LAVA FIN U 41 Special
2	Lava Con PAP
3	Lava Cell NHC Cold
4	Lava Fix FF
5	Evo Soft PEN
6	NOVOCRYL S-TP NEW
7	Hydrogen peroxide 50%
8	STABLE BLEACHING POWDER (KCI)
9	Sodium Hydrosulphite
10	Caustic Soda
11	Pumice stone (2/4cm)
12	Soda Ash Light
13	Sodium Metabisulfite
14	Potassium permanganate
15	Anhydrous SODIUM SULFATE (Glauber Salt)
16	JAPANI BLECH (Premium Calcium hypochlorite 70%)
17	ECO Stone
18	MORDIENTE M NEW
19	Protector CR2-E
20	ASUBLANC E-RW FF (White paste)
21	ERIOPON R LIQ.
22	ACRAMIN PREFIX K
23	Anti slipping Agent AP New
24	CTF - 1101
25	NOVACRON YELLOW S-3R IN
26	NOVACRON DEEP CHERRY S-D IN
27	NOVACRON DARK BLUE S-GL IN
28	NOVACRON BLACK NN ECO
29	NOVACRON RUBY S-3B
30	NOVACRON BRILLIANT RED EC-3GL
31	NOVACRON BRILLIANT BLUE E-G
32	NOVACRON OCEAN S-R
33	ASUDEL RED M-GR
34	ASUDEL NAVY BLUE M-SB
35	ASUDEL YELLOW GL
36	ASUDEL BLACK M-SD
37	ASUDEL BLUE R
38	ASUDEL TURQUOISE GL
39	MODERDIRECT SUPRA YELLOW RL
40	MODERDIRECT SUPRA Brown GTL

Sl. No	Production Chemical Name
41	MODERDIRECT SUPRA RED BWS
42	Indosol Black NF P
43	EMACOL CT YELLOW 4631 N
44	NOVACRON NAVY W-B IN
45	SETABINDER ET
46	DYEX DPH
47	COMFORT PEN
48	ONURGAL CA
49	ASAHIFIX BLUE XP-B
50	ONURWET PWD 100
51	Cotton Leveling Agent MCH-317
52	REDUCER MG
53	MORDANT OLD WASH
54	NOVANTIC YELLOW-GBD
55	NOVANTIC RED-SBD
56	NOVANTIC NAVY BLUE-DBD
57	NOVANTIC BLUE N 4GL
58	BOND SD
59	ASAHIFIX BORDEAUX XP-D
60	RICO-WHITE AC CONC
61	LYCRA PROTECTOR MCH-618
62	ASUFIX ORANGE DEL-R/P
63	ASUFIX RED DEL-B
64	ASUFIX NAVY BLUE DEL-D
65	ONURDEN LP
66	SYNO WHITE 4BK
67	AQUALESS ACTIVATOR
68	NOVOFIX FF_25
69	RESSILK HDF
70	BASE OT CONC
71	DRY BAG
72	NOAMIN WHI-Z
73	UVITEX BBT LIQ.
74	NC NTR 7240
75	NOVAFAST BHT/M
76	ASUDEL OLIVE GWL
77	NOVASTONE SUPER COLD
78	SILKSOFT Q
79	FIXER CR
80	CP POWDER
81	DELTAPERS MC
82	ONURWET COMBI I
83	COMFORT SFN
84	Substitute Alkali TK-660
85	NOAMIN AZ NEW
86	SOFTGRIP VS
87	RESOKO GLOSSY

Table 12 Non-process Chemical List of Norp Knit Industries Ltd. (Unit-2)

Sl. No	Chemical Name
1	WD-40
2	Silicone oil
3	SILICONE EXTRA
4	Diesel Fuel
5	ELGI AIRLUBE UT
6	CAT NATURAL GAS ENGINE OIL ADVANCED 40
7	Centoplex-2
8	FUCHS RENOCAL FN
9	Machine oil
10	MOBIL DELVAC MX 15W-40
11	NC Thinner
12	HARPIC
13	Mr. Brasso
14	Jet Detergent
15	CAT Ball bearing grease
16	MOBIL HYDRAULIC AW 68
17	Lifebouy Liquid Handwash.
18	WD-40 Specialist® Contact Cleaner
19	Machine oil
20	NF-CEM 201
21	NF-CEM 203
22	NF-CEM 206
23	NF-CEM 208
24	J-ONE HYDRAULIC OIL-68
25	Fast Super Glue
26	Spot lifter (RustGo) - JJW 833
27	SOLVE

Table 13 ETP Chemical List of Norp Knit Industries Ltd. (Unit-2)

Sl. No	Chemical Name
1	Polymer (ANIONIC POLYACRYLAMIDE)
2	Urea
3	Dap (Diammonium Phosphate)
4	Water De-Color
5	Pac 31%
6	White Magic DSK

3.5 Machinery List

The facility uses various types of machinery and equipment in various units. All equipment is given below in table 14.

Table 14: List of Machineries

SL No.	MACHINE NAME	BRAND	MODEL	QUANTITY
SEWING MACHINES				
1	SINGLE NEEDLE PLANE MACHINE	BROTHER/JUKI	S-6200A-303, DDL8700-7	1103
2	OVER LOCK	PEGASUS/JUKI	M-752-13H, MO6714-S	374
3	ZIGZAG	GOLDEN WHEEL	CSZ-3211	3
4	DUBBLE NEEDLE (AUTO/SPLIT BAR)	BROTHER/JUKI	.T-8452B-403, LH-3588S-7	103
5	3 NEEDLE COVER/ CHAIN STITCH	KANSAI	WX-8842-1, LX-5803PHD	28
6	2 NEEDLE COVER/CHAIN STITCH	KANSAI/JUKI	LX-5802M, MH-380	47
7	DUBBLE NEEDLE (MANUAL / FIXED BAR)	BROTHER	T-8420B-003	34
8	EDGE CUTTER/SIDE CUTTER	BROTHER/JUKI	SL-777B-3, DLM-5200N	63
9	FIT OF THE ARM - 30 Sets	BROTHER/JUKI/VBMC	DA-9280-D, 2261H	46
10	BUTTON HOLE	BROTHER/JUKI	HE-800A-02	32
11	BUTTO ATTACH	BROTHER/JUKI	BE-438 D, LK-1903-ASS	33
12	BUTTO EYLET HOLE	BROTHER/JUKI	RH-9820-02, MEB-3200C	24
13	SNAP BUTTON ATTACH/ EYELATE	NAGI-SHINE	NS-47-U	39
14	WEST BAND ATTACH/ KANSAI	KANSAI	DFB-1411PXP, DFB-1412P	42
15	LOOP MACHINE	KANSAI	B-2000C	13
16	APW	JUKI	LH-895	20
17	FLAT LOCK	PEGASUS/JUKI	W1162-01G, MF7723	78
18	BARTACK	BROTHER/JUKI	KE-430D, LK-1900AHS	94
19	VI.BE.MAC	VI-BE.MACK	1010V3 DCS	3
20	BACK TAPE	PEGASUS	W1-522N-04B	6
21	RIB CUTTER	SUEGEA	EC-40	6
22	KANSAI SMOKING	KANSAI	DFB-1012-PSSM	7
23	SADDEL ST. MACHINE	GALDEN WHEEL	CS-5700-50	3
24	BELLCO ATT. MACHINE	BROTHER	BAS-311H-03A	2
SUB TOTAL				**2203**
OTHERS MACHINES				
SL No.	**MACHINE NAME**	**BRAND**	**MODEL**	**QUANTITY**
1	ELECTRIC IRON	NISSSO/SILVER STAR	NH-5193	60

SL No.	MACHINE NAME	BRAND	MODEL	QUANTITY
2	STEAM IRON	NISSSO/SILVER STAR	NH-6232W	110
3	VACUUM IRON TABLE	RAMSONS, NAGASHING	VEIT	110
4	NEEDLE DITECTOR MACHINE	HASHIMA, Max	HN-770G-100/18647	3
5	CUTTING MACHINE	EAST MAN	629X	17
6	BAND KNIFE MACHINE	EAST MAN	EC-700N	2
7	THREAD SUCKER MACHINE	RAMSONS	TSM77	6
8	FUSING MACHINE	HASHIMA	HP-600LFS, HP-450MS	8
9	EMBROIDERY MACHINE-(18+6 head)	SUN-STAR	SWF/SB-WH918-100	3
10	WAIT SCALE	EXCELL	TCS-AE-300	4
11	GSM CUTTER	PARAMOUNT	811012005/SL	1
12	GSM WAIT SCALE	AND	HL-100	2
13	PULL TEST	IMADA	FB	1
14	MINI WASHING MACHINE	WHIRLPOOL	11585	1
15	WASH DRYER	WHIRLPOOL	AWZ-320GD	1
16	FABRIC INSPECTION MACHINE	RAMSONS	RFI01EC101130	2
17	LIGHT BOX	Verivide	CAC-120	3
18	GERBER MACHINE (CAD)	GERBER PLOTER	XLP-INFINITY-45	2
19	GENERATOR MACHINE(GAS)	BANGLA CAT	3512	2
20	GENERATOR MACHINE(DESEL)	Jakson	ID400P	2
21	BOILER	THERMAX	SM-10DL/10.54/19	2
	SUB TOTAL			342

Sl No	Section	Machine Name	Qty.
1	Washing	CRE Machine, GT -CO1-1A	1
2	Washing	Tearing Machine, GT-C-11B	1
3	Washing	Bursting Machine, GT-C12B	1
4	Washing	3D Machine, Method Makina	3
5	Washing	PP Spray Machine, Method, WSCN-6R	6
6	Washing	Sample Tonello Machine, G1130LW2	1
7	Washing	Sample Wash Machine, 150Kg, DK	3
8	Washing	Sample wash Machine, Ramson	3
9	Washing	Sample Wash Machine, RVW-200	1
10	Washing	Sample Wash M/C, Tolker	2
11	Washing	Sample Dryer M/c Ramsons	2
12	Washing	Sample Dryer M/c Tolker	2

Sl No	Section	Machine Name	Qty.
13	Washing	Wash Machine, Ramson RVW-520	1
14	Washing	Wash Machine, Tolker-3815LT	2
15	Washing	Wash Machine Ramson RVW-200	1
16	Washing	Wash Machine, Smartex, 340	1
17	Washing	Wash Machine, Smartex, 500	3
18	Washing	Wash Machine Tonello-420LWB	1
19	Washing	Wash Machine, Ramsons RVW-430	1
20	Washing	Team Star Belly Wash	2
21	Washing	Ramsons Belly Wash m/c	3
22	Washing	Hydra Extractor Machine, Ramsons	7
23	Washing	Dryer Machine, Tolker 5070LT	7
24	Washing	Tumble Dryer Machine, Ramsons RTD-200	5
25	Washing	Tumble Dryer Machine, Ramsons RTD-300	3
26	Washing	Team Star Belly Wash	2
27	Washing	Tumble Dryer Machine, Ramsons RTD-150	1
28	Washing	Ramsons ACID Wash Machine	1
29	Washing	Team Star Paddle Wash	3
30	Washing	Wash Machine, Tonello-420	1
31	Washing	Team Star Deep Dyeing Machine	3
32	New Wash	Tonello New Machine Model 420G1 LW3	8
33	New Wash	Tonello New Machine Model 130G1 LW3	2
34	New Wash	Tumble Dryer Machine, Ramsons RTD-300	11
35	New Wash	Hydra Extractor Machine, Ramsons	5
36		ACID Wash	2
37	New Wash	Team Star Belly Wash	4
38	Utility	Generator (Gas/ Diesel)	5
39	Utility	Boiler (Gas/Diesel)	4
40	Utility	Compressor Machine	8
41	ETP	ETP 40 m^3	1
42	ETP	ETP 80 m^3	1

3.6 Processes and Operations Involved in the Manufacture

Norp Knit Industries Ltd. (Unit-2) are dyeing-washing & garments factory. The process flow diagram is shown in the below figure.

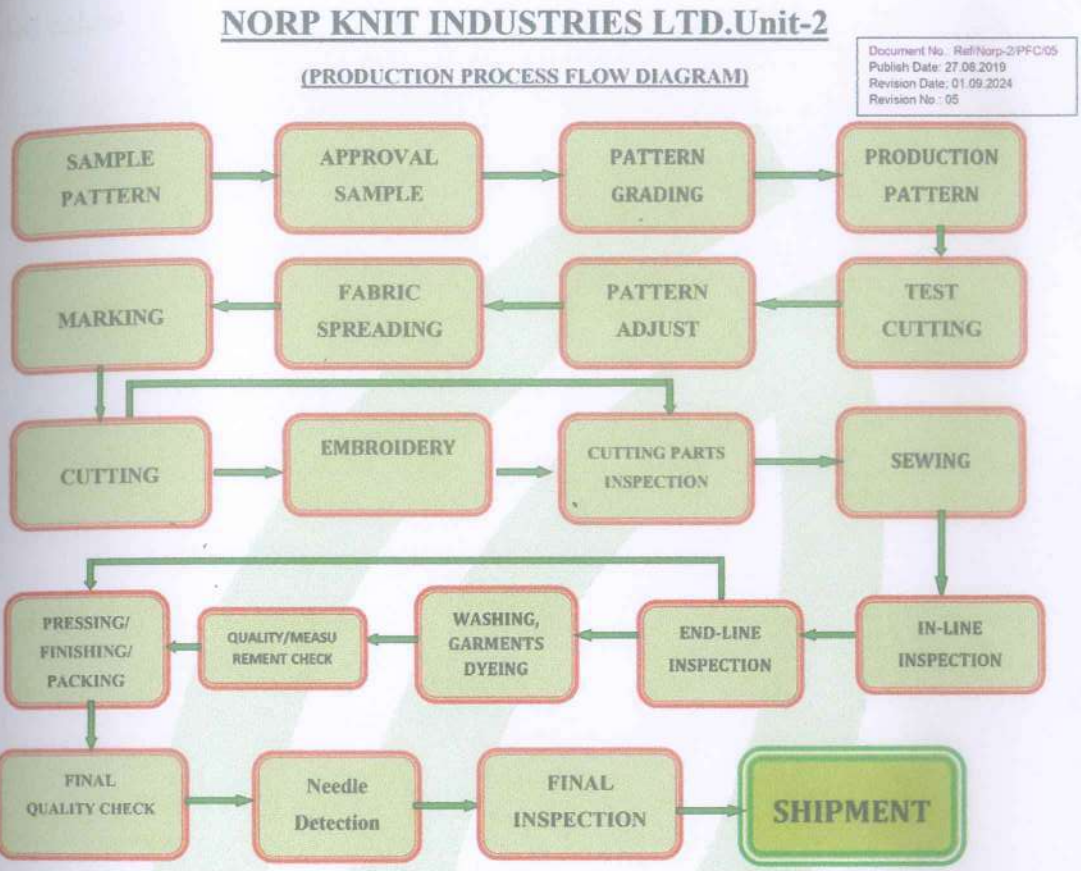


Figure 6: Process Flow Diagram of Norp Knit Industries Ltd. (Unit-2)

3.7 Manpower Requirement

The total manpower of the **Norp Knit Industries Ltd. (Unit-2)** is 5938 of which 4933 are workers, Administration-1001 and 04 EMS Personnel.

3.8 ETP Details

Norp Knit Industries Ltd. (Unit-2) generates a considerable amount of wastewater as part of its operations. The factory's domestic wastewater generation is recorded at 255.53 m³/day, while the Effluent Treatment Plant (ETP) processes significantly more at 536.43 m³/day. This indicates a robust system in place for treating industrial effluents, which is crucial for minimizing environmental pollution and adhering to regulatory standards.

The ETP has a capacity of 120 m³/hour, allowing it to efficiently handle the wastewater produced during manufacturing processes. This capacity ensures that **Norp Knit Industries Ltd. (Unit-2)** can manage its effluent effectively, reflecting the company's commitment to

sustainable practices and environmental responsibility. The sludge agreement of ETP is attached in **Annexure I.** Also, the ETP manual & sludge management plan are attached in **Annexure**.

The detailed process flow diagram of ETP is indicated in the ETP layout diagram which is provided below:

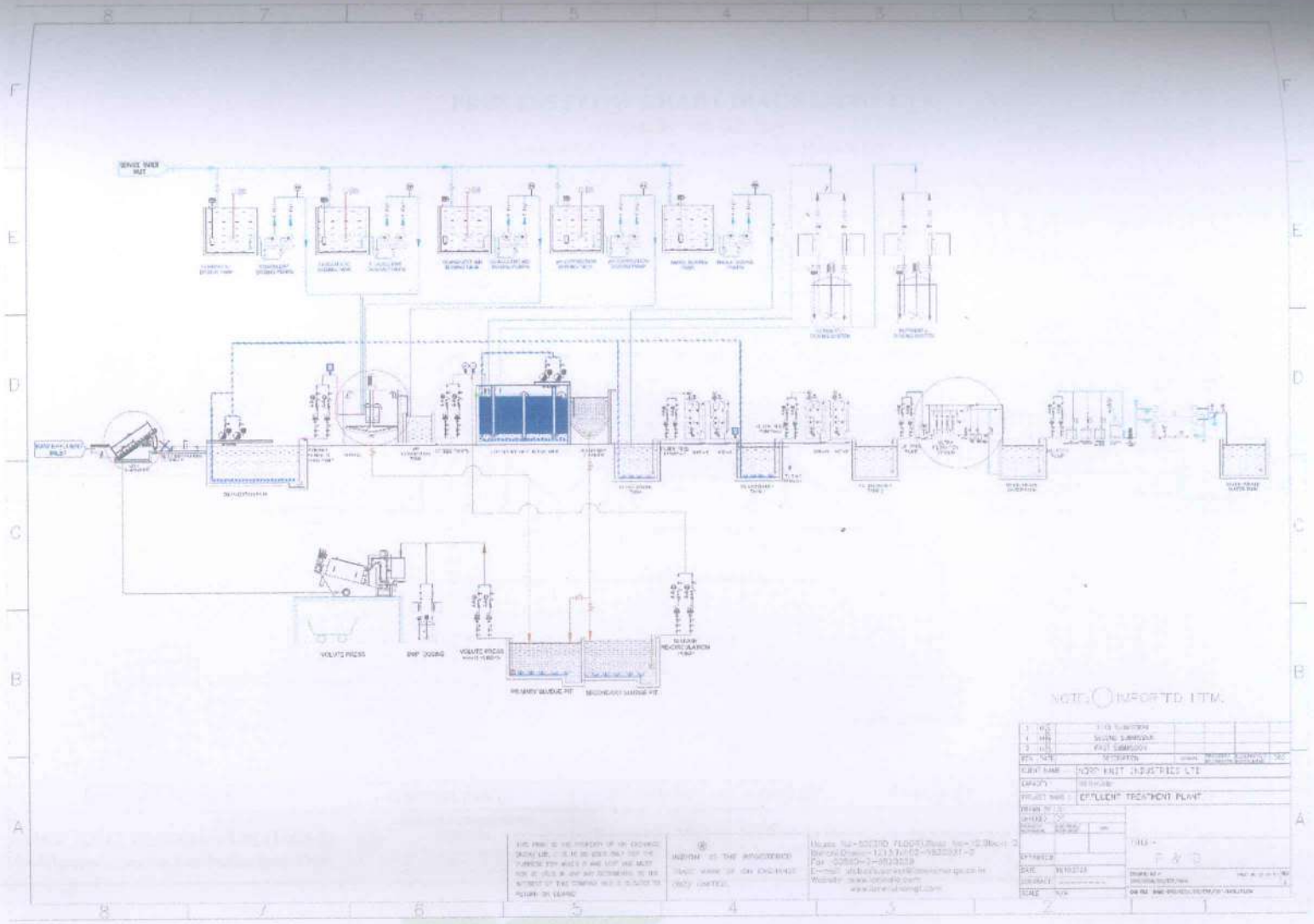


Figure 7: Process flow Diagram of ETP (80m³)

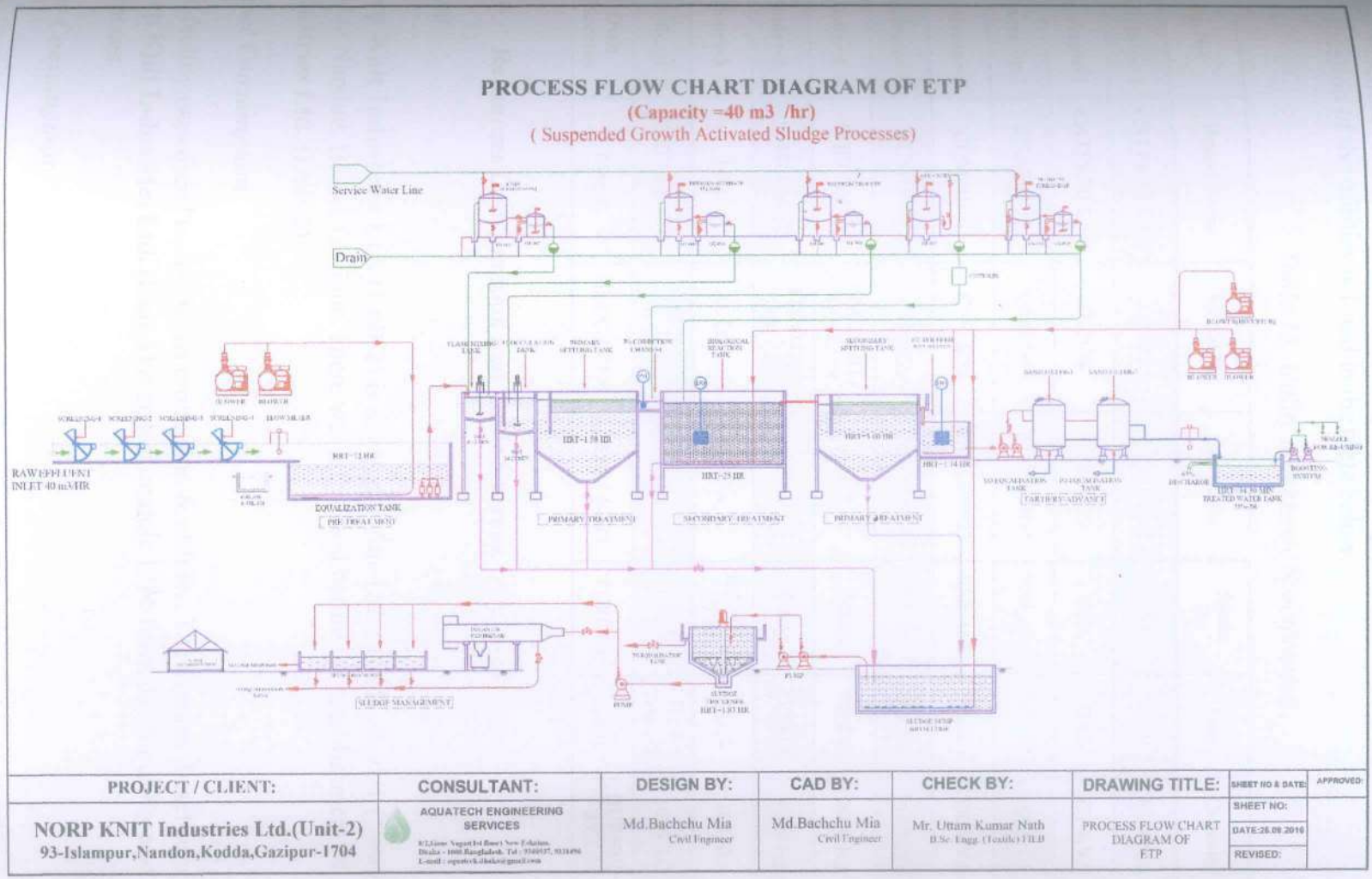


Figure 8: Process flow Diagram of ETP (40m³)

3.9 Utility Specification

Norp Knit Industries Ltd. (Unit-2) uses five (05) generators, four (04) boilers and one (01) oven machine combinedly to supply power and generate steam in the factories. The specification of the utilities is listed in the table below.

Table 15: Utility Machinery Specification

Sl. No.	Brand Name	Model No	Serial No	Made By	Fuel	Capacity	License No
Generator-1	CATERPILLAR	G-3512	CTM 00368	USA	GAS	962 KVA	CPP-0759
Generator-2	CATERPILLAR	G-3508	CPJ00479	USA	GAS	631 KVA	CPP-0759
Generator-3	CUMMINS	C550 D5E	B12K300117	ENLAND	DIESEL	550 KVA	CPP-0759
Generator-4	CUMMINS	C550 D5E	L15K899923	ENLAND	DIESEL	550 KVA	CPP-0759
Generator-5	CUMMINS	C1460D5	C 23D009537	ENLAND	DIESEL	1400KVA	CPP-0759
Boiler-1	SHELLMAX	SM-30DH / 10.54 / 73	N/A	INDIA	DIESEL	3000 Kg	6836
Boiler-2	SHELLMAX	SM-40DH / 10.54 / 83E	N/A	INDIA	DIESEL	4000 Kg	9873
Boiler-3	MEL	500TL - 166	N/A	BANGLA DESH	GAS	500 KG	8393
Boiler-4	SHELLMAX	SM-10DL/ 10.54 /19	N/A	INDIA	GAS / DIESEL	1000 KG	6190
Oven Machine	Metod	IDOC-ECO8	CE09-16-337	TURKEY	CNG	BURNER : WGL30	Not in use

3.10 Resources Consumption and Their Sources

Land

Norp Knit Industries Ltd. (Unit-2) is situated at Shi-152/2 (Old), B-01/1 (New), Islampur, Kodda Nandun, Bason, Gazipur. There was a flat land before the establishment of **Norp Knit Industries Ltd. (Unit-2)**.

Diesel Consumption

The facility uses diesel to operate its production & utilities. The average diesel consumption of **Norp Knit Industries Ltd. (Unit-2)** is approximately 1786 liters/day for utility and production purposes.

Gas Consumption

The facility uses natural gas to operate its production, utilities, and vehicles. The average gas consumption of **Norp Knit Industries Ltd. (Unit-2)** is approximately 12911 m^3/day for utility and production purposes.

Electric Interconnection

The facility collects power from Bangladesh Rural Electrification Board (BREB), which acts as the main power supply source for the factory. **Norp Knit Industries Ltd. (Unit-2)** has also installed a solar system on their roof. The average electricity consumption from the solar system is 241 KW/day. The average electricity consumption requirements for **Norp Knit Industries Ltd. (Unit-2)** is approximately 31100 kW/day from REB and Generator.

Water Consumption

Norp Knit Industries Ltd. (Unit-2) primarily uses groundwater for their production and utility purposes, with an average consumptions of 676.21 m^3/day. Moreover, the facility uses recycled water on their production and utility purposes which is being treated by the effluent treatment plant.

Waste Generation

Solid waste which mainly comprises non-hazardous and some hazardous waste is generated from the production & domestic activity of the facility. Non-hazardous wastes come from various sources such as fabric, poly, waste paper, etc. whereas hazardous waste is generated from both industrial and domestic sources such, as electrical waste, waste drums, medical facilities, etc. A huge portion of domestic solid waste comes from kitchen and dining facilities. The average quantity of solid waste generation of **Norp Knit Industries Ltd. (Unit-2)** is approximately 5325.39 kg/ day. The facility owns a permanent solid waste storage facility which is well ventilated and dry in condition. A copy of the dry waste agreement is added to the **Annexure J.**

Wastewater Generation

The estimated wastewater from domestic sources for **Norp Knit Industries Ltd. (Unit-2)** is 255.53 m^3/day. **Norp Knit Industries Ltd. (Unit-2)** generates waste water from its production section and the estimated wastewater generation is 536.43 m^3/day from production. For treatment of this production wastewater, the facility uses two Biological Effluent Treatment Plant (ETP) with capacity of 80 m^3/hr. & 40 m^3/hr. The treated water is being reused in various activities.

3.11 Worker Safety Equipment List

For the safety of workers, management of **Norp Knit Industries Ltd. (Unit-2)** ensures all types of worker safety equipment which is given below:

Table 16: List of Safety Equipment

Sl. No	PPE List
1	Fabric Mask

2	Respiratory Mask & N95 Mask
3	Gumboot
4	Rubber Hand Gloves
5	Metal Hand Gloves
6	Ear Plug
7	Eye Glass
8	Needle Guard
9	Pulley Cover
10	Cotton Hand Gloves
11	Rubber Mat
12	Papus
13	Goggles
14	Ear Muff
15	Apron
16	Uniform
17	Cap/ Head cover
18	Snap Button Sandle

3.12 Fire Fighting Equipment List

Firefighting safety equipment is a mandatory requirement for a factory. The factories have all kinds of fire equipment for fighting against any fire occurrence, which is given in below table:

Table 17: List of Fire Fighting Equipment

Sl. No	Fire Equipment Name	Total Qty
1	Smoke detector, Heat Detector & Multi-detector	1343
2	P.A System Sound box	141
3	Fire Alarm	212
4	Fire alarm Switch	181
5	Hose pipe	52
6	Frist aid box	74
7	Frist Aider	200
8	5kg ABCE Extinguisher	621
9	5kgCo2	307
10	Foam Tipe	12
11	Stracher	54
12	Gas Musk	115
13	Helmet	115
14	Fire Hook	115
15	Backet	115
16	Gum Boot	115
17	Lock Cutter	30
18	Blanket	114
19	Roof	8
20	Fire Bitter	114
21	Hand Gloves	114
22	Torch Light	16
23	Fire suite	8
24	Total Fire Fighter, Rescuer & First Aider Team	1068

Sl. No	Fire Equipment Name	Total Qty
25	Electrical DB Board	18
26	Emergency light IPS Backup	204
27	Emergency Exit light & Directional Exit	270
28	Emergency Light battery backup	54
29	Evacuation plan	58
30	Sprinkler Head	1774
31	Fire Door	124

Chapter Four

Description of Environmental and Social Baseline

4.1 Physical Environment

As part of the Environmental Impact Assessment (EIA) an environmental baseline study was carried out in areas surrounding the project site. The specific objectives of the baseline study were to gather information on the existing physical environment, biological-ecological environment, and socio-economic environment of the areas in and around the project site; to gather and assess peoples' perception on different aspects of the proposed project. The data and information gathered during the baseline study provide a detailed description of the existing conditions of physical, biological as well as socio-economic environment in and around the project area.

This Chapter describes the existing physical environment of areas in and around the factory, based on the baseline survey and other studies (e.g., water quality, air and noise level measurements) carried out as a part of the present study. Relevant information on climate, topography and drainage, geology and soils, hydrology and water resources, air quality, noise level, and water quality have been described in this Chapter. The possible environmental impacts of the project activities will be evaluated against these baseline environmental conditions.

4.1.1 Climate

Bangladesh is located in the subtropical monsoon region. There are wide differences in the intensity of the seasons in different places of the country. Based on the entire climatic conditions Bangladesh can be divided into the following seven distinct climatic zones. The familiar pattern of northwest to southeast isopleths is revealed in this classification.

The climate of Bangladesh is heavily influenced by the Asiatic monsoon. The monsoonal influence results in three distinct seasons:

- Pre-monsoon hot season (from March to May);
- Rainy monsoon season (from June to September); and
- Cool dry winter season (from October to February).

Bangladesh is located in the tropical monsoon region, and its climate is characterized by high temperature, heavy rainfall, often excessive humidity, and fairly marked seasonal variations. From a climatic point of view, three distinct seasons can be recognized in Bangladesh - the cool dry season from November through February, the pre-monsoon hot season from March through May, and the rainy monsoon season which lasts from June through September. January is the coolest month, with temperatures averaging near 26°C, and April is the warmest, with temperatures from 33 to 36°C. Most places receive more than 1,525 mm of rain a year, and areas near the hills receive 5,080 mm per year.
Most rains occur during the monsoon (June-September) and little occurs in winter (November-February). Moderate rains are also reported in March, April, and October (Rashid 1992)

South-Eastern Zone (A): It comprises the Chittagong sub-region and a strip of land extending from southwest Sundarbans to the south of Comilla. The hills over 300m in height have a north-eastern zone climate. The rest of the area has a small range of temperature, rarely going over a

mean of 32°C and below a mean of 13°C. Rainfall is heavy, usually over 2,540 mm. In winter dew Fall is heavy.

North-Eastern Zone (B): This zone includes most of the east and south Sylhet and a wedge-shaped strip south of the Meghalaya Plateau. Here too, the mean maximum temperature is rarely above 32°C but the mean minimum is 10°C and below. Average humidity is even more than in the south-eastern zone. In this zone winter rain is appreciable. Fog is very common in winter. This is the cloudiest part of Bangladesh. The higher hills and mountains of the Chittagong sub-region can also be classified under this zone.

The Northern Part of the Northern Region (C): This is an area of extremes. In summer the mean maximum temperature is well above 32°C whereas in winter the mean minimum is below 10°C. The summer is dry, with a scorching westerly wind, but the rainy season is very wet, with 2,000 to 3,000 mm of Rainfall.

North-Western (D): Except that the extremes are less and the Rainfall is lower, this zone is similar to the northern part of the northern region. The lower Rainfall makes this area both atmospherically and pedagogically drier.

Western Zone (E): It comprises the greater Rajshahi district and parts of adjacent districts. This is the driest area in Bangladesh with Rainfall generally below 1,500 mm and summer humidity less than 50%. In summer, it is the hottest and driest of all climatic zones. The mean summer maximum temperature is over 35°C.

South-Western Zone (F): Here the extremes of the zones to the north are somewhat tempered. Rainfall is between 1,500 mm and 1,800 mm. The mean summer maximum temperature is below 35°C. Dew-Fall is heavier than in the Western zone.

South-Central Zone (G): In this zone Rainfall is abundant, being above 1,900 mm. The range of temperature is, as can be expected, much less than to the west, but somewhat more than in the South-eastern zone. This is a transitory zone between the South-eastern, North-western, and South-western zones, and most of the severe hail storms, nor'westers, and tornadoes are recorded in this area.

The Climatic sub-regions of Bangladesh are presented in Figure 7 and the proposed project Falls under the **Mid-South Region**. The Bangladesh Meteorological Department monitors different climate components in 35 weather stations in Bangladesh. The climatic data for the study area were obtained from the meteorological station located in Dhaka which is nearest to the project site.

Mid-South Zone (G) in this zone Rainfall is abundant, being above 1,900 mm. The range of temperature is, as can be expected, much less than to the west, but somewhat more than in the South-eastern zone. This is a transitory zone between the South-eastern, North-western, and South-western zones, and most of the severe hail storms, nor'westers, and tornadoes are recorded in this area.

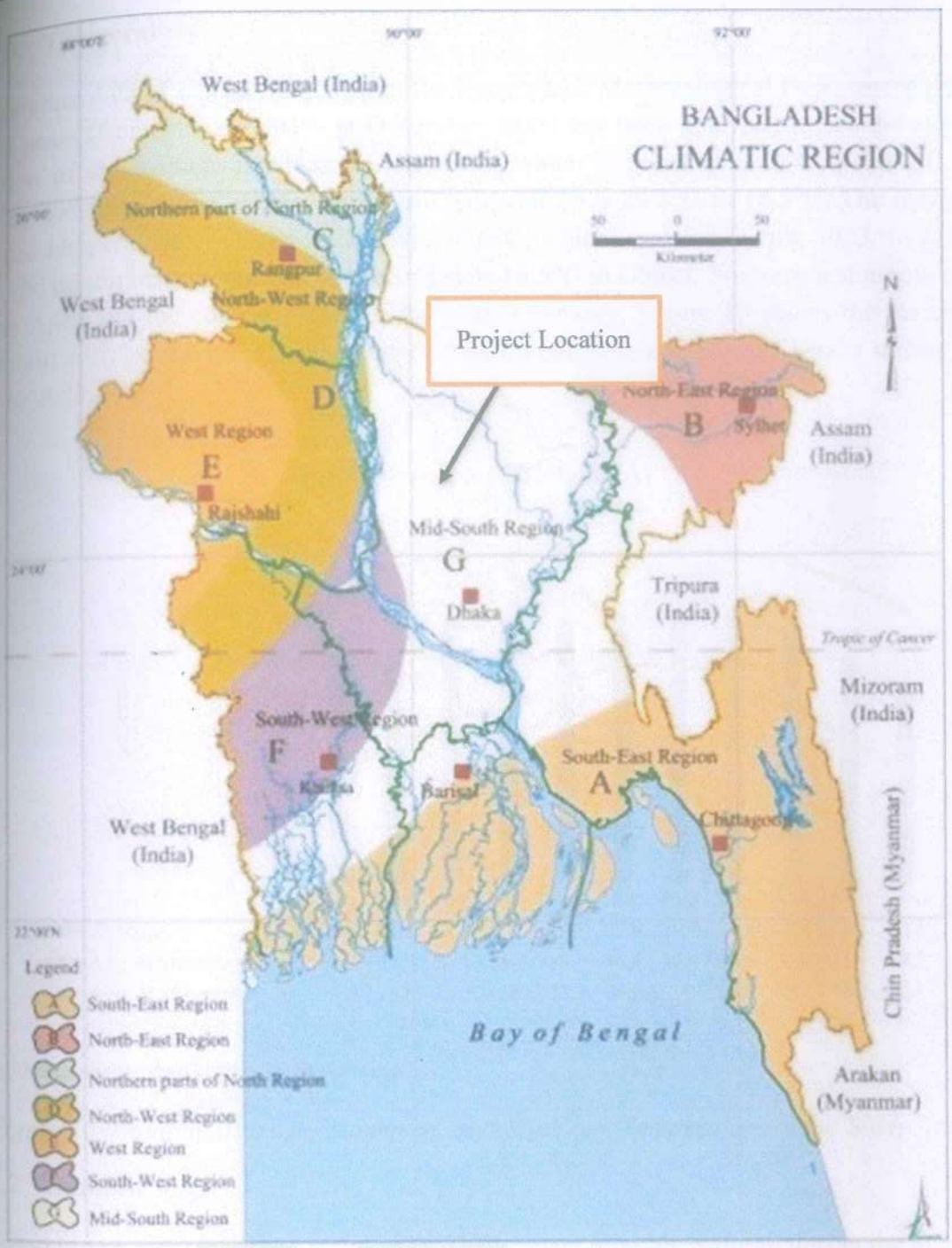
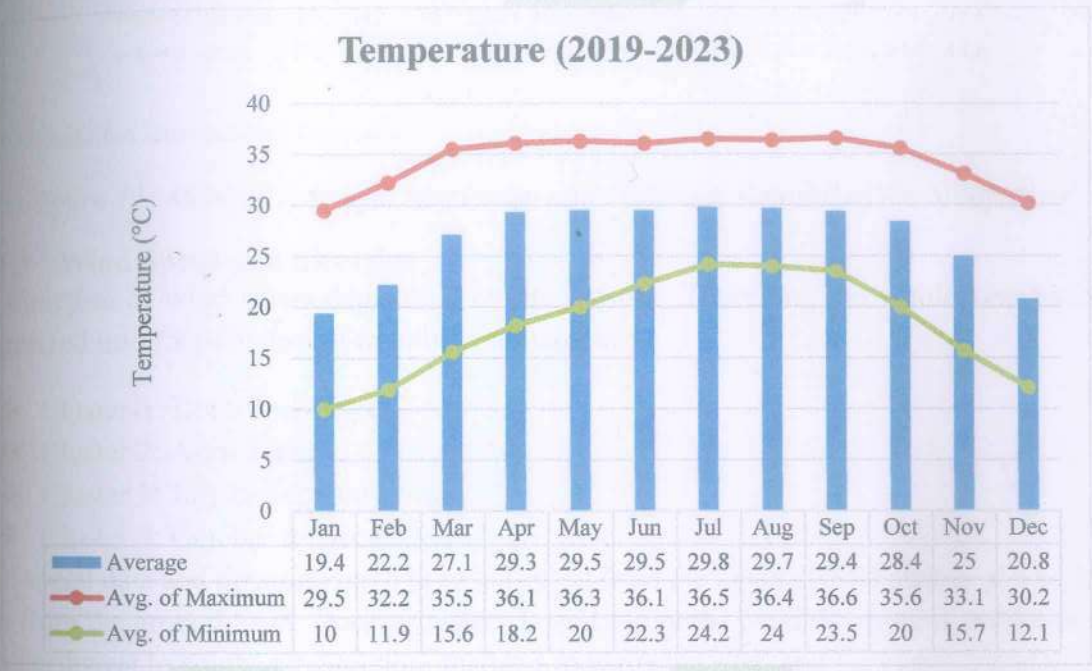


Figure 9: Climatic Zone Map of Bangladesh

4.1.1.1 Temperature

Temperature data of Dhaka Station from the Bangladesh Meteorological Department (BMD) for 05 years (from January 2019- to December 2023) has been analyzed to see the monthly variation of the average maximum temperature which is between 30.6°C to 20.2°C. The monthly variation of the average minimum temperature is 29.3°C to 18.5°C. The maximum recorded temperature in Dhaka station was 30.6°C, which occurred in July 2023. In January 2020, the minimum temperature was recorded as 18.5°C in Dhaka. The warmest month of the year is April and the coldest month of the year is January. Figure 10 shows the maximum, minimum, average maximum, and average of the minimum temperature of Dhaka station from 2019 to 2023.



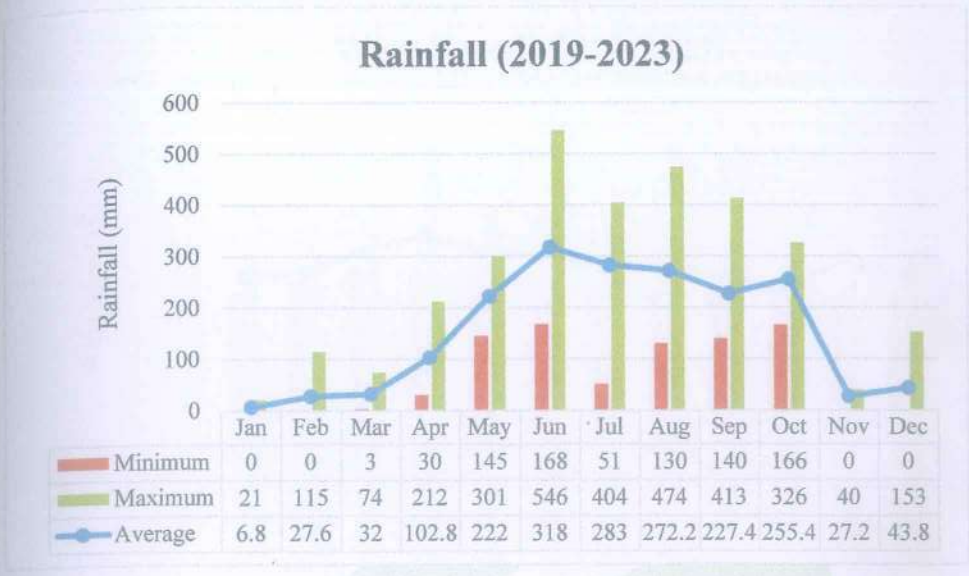
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average	19.4	22.2	27.1	29.3	29.5	29.5	29.8	29.7	29.4	28.4	25	20.8
Avg. of Maximum	29.5	32.2	35.5	36.1	36.3	36.1	36.5	36.4	36.6	35.6	33.1	30.2
Avg. of Minimum	10	11.9	15.6	18.2	20	22.3	24.2	24	23.5	20	15.7	12.1

Source: Bangladesh Meteorological Department

Figure 10: Monthly Average, Maximum, and Minimum Temperature of the Study Area

4.1.1.2 Rainfall

Monsoon is a prominent season in this area. The average monthly Rainfall during the monsoon (June-September) season from 2019-to 2023 is 275.15 mm/month. The variance in the maximum Rainfall during the monsoon season is 546 mm/month to 404 mm/month, whereas the variance in the minimum Rainfall is 168 mm/month to 51 mm/month. A maximum of 546 mm/month of Rainfall was recorded during June of the year 2021. The annual average Rainfall is 151.52 mm/year and the highest recorded yearly Rainfall was 2892 mm in the year 2021. The driest period of the year is winter when the average monthly Rainfall varies from 43.8 mm/month to 6.8 mm/month. Figure 11 shows the maximum, minimum, and average Rainfall from 2019 to 2023.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Minimum	0	0	3	30	145	168	51	130	140	166	0	0
Maximum	21	115	74	212	301	546	404	474	413	326	40	153
Average	6.8	27.6	32	102.8	222	318	283	272.2	227.4	255.4	27.2	43.8

Source: Bangladesh Meteorological Department

Figure 11: Monthly Average, Maximum, and Minimum Rainfall of the Study Area

4.1.1.3 Wind Speed and Direction

The direction of wind varies depending on the seasons. Therefore, the whole year has been categorized into four clusters of months and these are:

- Cluster-1: December-March,
- Cluster 2: April-June,
- Cluster 3: July to September, and
- Cluster 4: October to December.

Wind speed data and direction have been collected from the Dhaka BMD station at a height of 10 m from the ground level. During clusters 1- and 4-months wind direction is predominantly from northwest to southeast direction, inclined towards the east, and for clusters 2 and 3, it is predominantly from south and southeast to north and northwest. In cluster 1 calm wind prevails for 27.2% of the total period, similarly, it is 11.0% for cluster 2, 12.5% for cluster 3, and 56.9% for cluster 4, respectively. Figures 12 and 13 present wind speed and diagram graphically around the year.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Minimum	2.3	2.5	2.8	2.6	2.6	2.4	2.3	2.3	2.4	2	2.2	2.3
Maximum	3.1	3.2	3.7	5.1	3.9	3.8	3.7	3.6	3.2	2.9	3.5	2.9
Average	2.6	2.7	3.1	3.4	3.1	3	2.8	2.8	2.6	2.3	2.9	2.6

Source: Bangladesh Meteorological Department

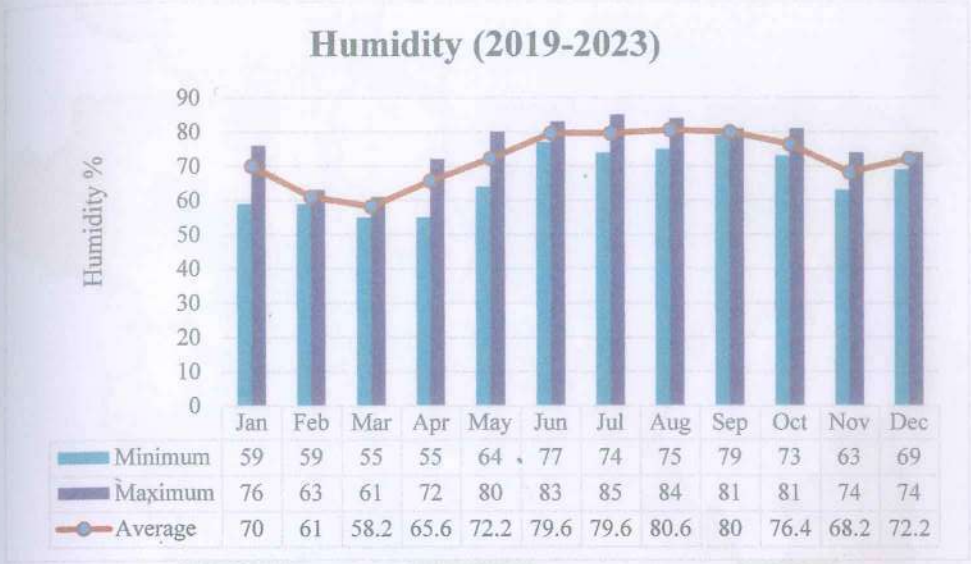
Figure 12: Wind Speed of the Study Area

(Source: ResearchGate)

Figure 13: Wind Rose Diagram of the Study Area

4.1.1.4 Relative Humidity

The average relative humidity remains higher during the monsoon season. The variance in the average relative humidity throughout the year is 80.6% to 58.2%. Figure 14 shows the maximum, minimum, and average relative humidity of Dhaka station from January 2019 to December 2023.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Minimum	59	59	55	55	64	77	74	75	79	73	63	69
Maximum	76	63	61	72	80	83	85	84	81	81	74	74
Average	70	61	58.2	65.6	72.2	79.6	79.6	80.6	80	76.4	68.2	72.2

Source: Bangladesh Meteorological Department

Figure 14: Maximum, Minimum, and Average Relative Humidity of the Study Area

4.1.2 Geology

Rapid urbanization without considering the geological aspects has brought significant changes in the geo-environment of the city area. Waterlogging, pollution, changes in the hydrogeological system, localized land subsidence, and building collapse are the hazards associated with these changes in the geo-environment. Groundwater withdrawal has increased more than 900% over the last 30 years resulting in groundwater mining and lowering of the water level by 20m. Water resources of the city are being polluted by the indiscriminate disposal of untreated industrial and municipal wastes in swamps and natural channels in and around the city.

The subsurface sedimentary sequence, up to the explored depth of 300m, shows three distinct entities: one is the Madhupur Clay of the Pleistocene age, characterized by reddish plastic clay with silt and very fine sand particles. This Madhupur Clay uncomfortably overlies the dupi tila formation of the Plio-Pleistocene age, composed of medium to coarse yellowish-brown sand and occasional gravel. The incised channels and depressions within the city are floored by recent alluvial floodplain deposits and are further subdivided into Lowland Alluvium and Highland Alluvium.

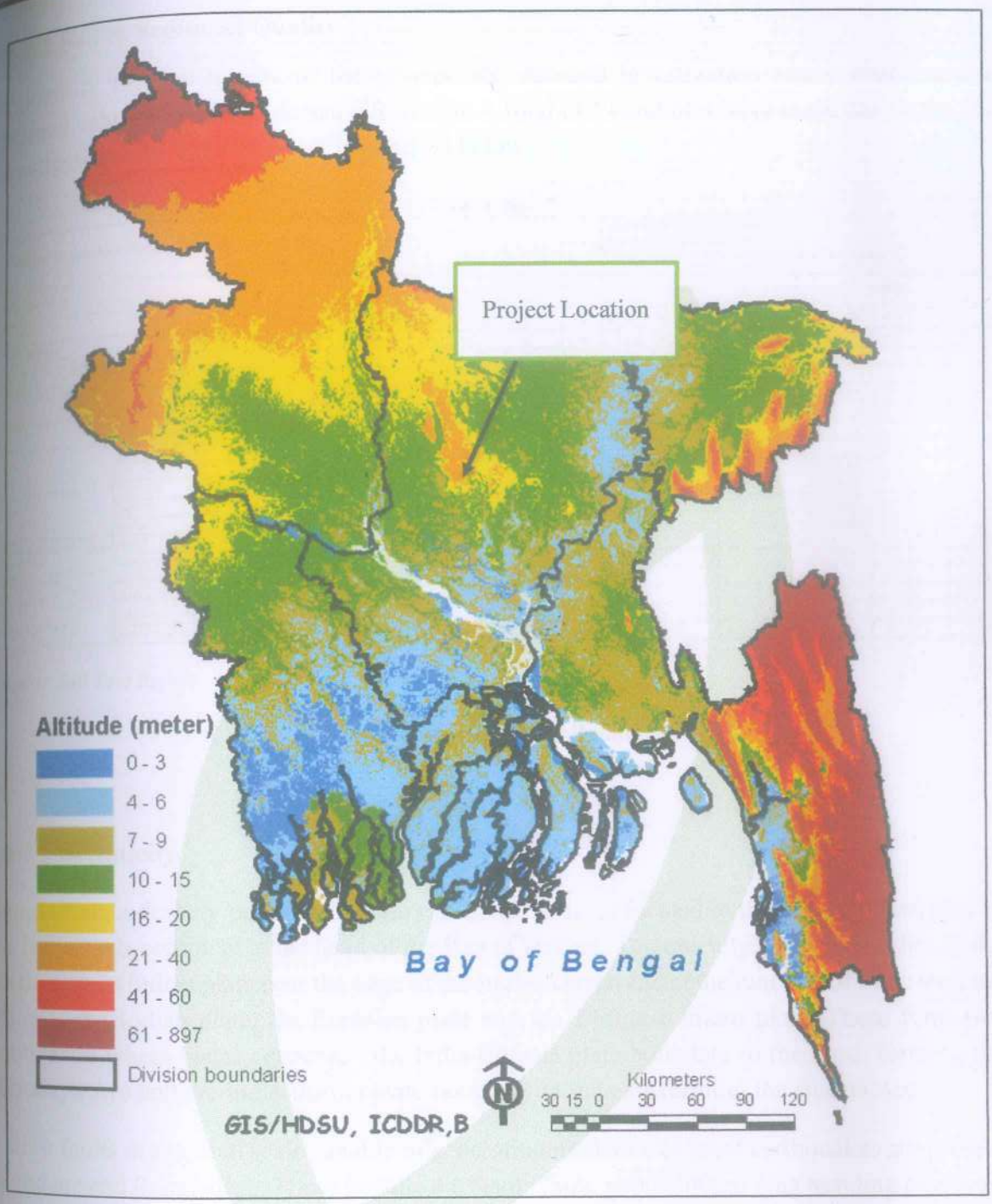


Figure 15: Digital Elevation Model of Bangladesh

4.1.2.1 Soil & Sediment Quality

To identify the soil quality of the project site, sub-soil investigation was carried out and obtained values considered during pile design. A total of 3 boreholes were made during the soil investigation. The soil test result is attached below.

SURVEY2000

SUMMARY OF LABORATORY TEST RESULTS

Client: Pearl Global Industries Ltd.
Project : Norp Knit Industries Ltd.
Project Location : R. L 93, Islampur, Kodda, Monohar, Gazipur

Bore Hole No		BH-01								BH-02						BH-03				
Sample No		D1	UD2	D5	D6	D11	D13			D2	UD3	D6	D7	D11	D7	UD1	D5	D7		
Depth in Meter		1.5	3.2	7.5	12	16.5	19.5			3.0	3.1	9.0	10.5		10.66	2.1	7.5	10.0		
Natural Moisture Content (%)		25.44								24.95		31.85	29		28.89		31.19			
Specific Gravity			2.63							2.63	2.67	2.64				2.65				
Atterberg Limits	Liquid Limit (LL)		43								50		50			52	37			
	Plastic Limit (PL)		20								22		25			28	22			
	Plasticity Index (PI)		23								28		24			24	15			
Grain Size Analysis	Sand (%)	6	5	3	32		2			5	8	5	1	72.00		2	5	43		
	Silt (%)	94	79	91	64		95			90	91	92	97	28.00		90	87	57		
	Clay (%)	2	16	1	4		3			5	1	3	2			8	8			
	D_{50}(mm)	0.018	0.0195	0.019	0.05		0.009			0.01	0.05	0.02	0.01	0.32		0.01	0.02	0.075		
	SR Factor	0.24	0.28	0.24	0.39		0.17			0.14	0.37	0.25	0.13	8.75		0.14	0.22	0.46		
Unconsolidated Undrained Shear Test	c (kPa)		24.0								27.8					25.1				
	Angle ϕ (kPa)		2.0								3.0					3.0				
Natural Density	Wet Density (gm/cm^3)		1.84													1.66				
Dry Density	Dry Density (gm/cm^3)		1.44													1.21				
Direct shear test	Cohesion C (kPa)					2												0		
	Friction Angle ϕ (deg)					8												10		

Source: Soil Test Report

Figure 16: Soil Test Result

4.1.3 Seismicity

Bangladesh, a densely populated country in South Asia, is located in the north-eastern part of the Indian sub-continent at the head of the Bay of Bengal. Tectonically, Bangladesh lies in the north-eastern Indian plate near the edge of the Indian carton and at the junction of three tectonic plates – the Indian plate, the Eurasian plate and the Burmese micro plate. These form two boundaries where plates converge– the India-Eurasia plate boundary to the north forming the Himalaya Arc and the India-Burma plate boundary to the east forming the Burma Arc.

Active faults of regional scale capable of generating moderate to great earthquakes are present in and around Bangladesh. These include the Dauki fault, about 300km long trending east-west and located along the southern edge of Shillong Plateau (Meghalaya- Bangladesh border), the 150km long Madhupur fault trending north-south situated between Madhupur Tract and Jamuna flood plain, Assam-Sylhet fault, about 300km long trending north east southwest located in the southern Surma basin and the Chittagong-Myanmar plate boundary fault, about 800km long runs parallel to Chittagong-Myanmar coast.

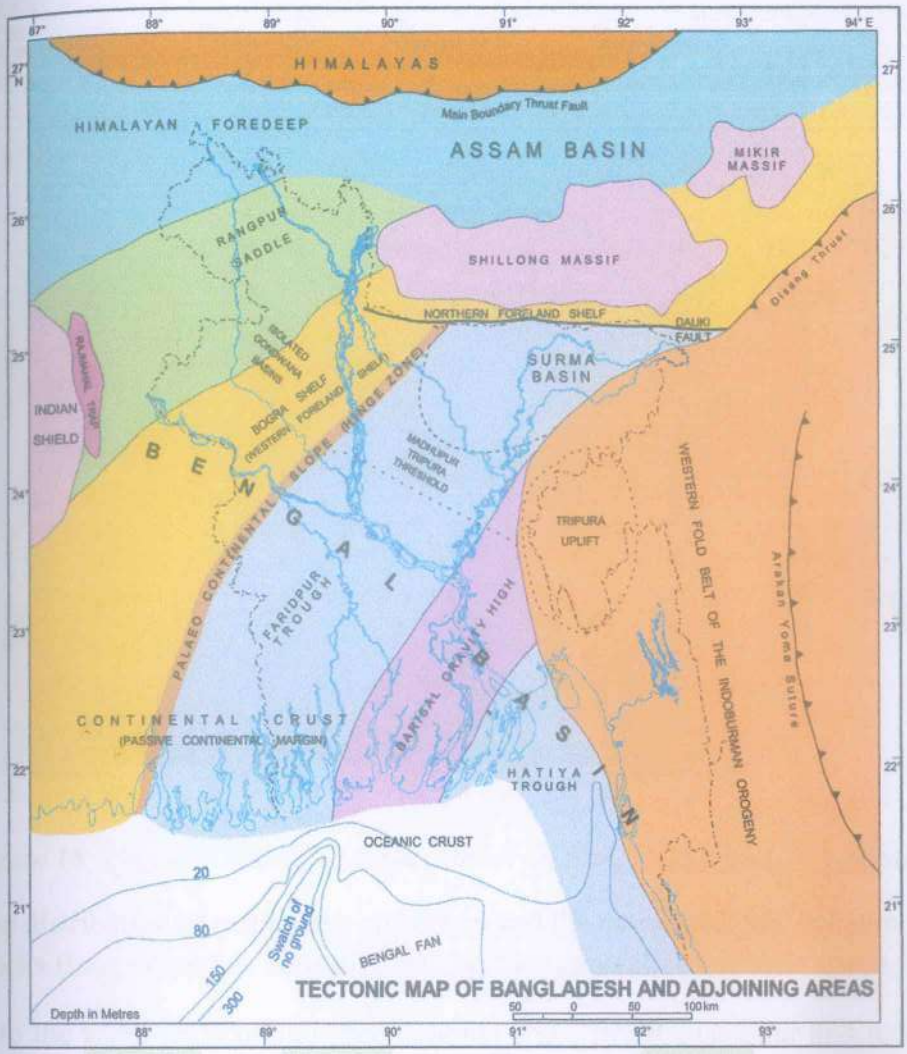


Figure 17: Regional Tectonic Setup of Bangladesh with respect to Plate Configuration

Gazipur is situated in the central part of the country on the bank of the Turag River and at the southern tip of the Madhupur tract dating back to the Pleistocene age. The Madhupur Tract is an area of recent uplift within the delta and the surface of the tract is in general higher on the west, sloping very gently eastward to disappear beneath younger sediments (Fergusson, 1863; Morgan and McIntire, .(1956Dhaka is surrounded by the old Brahmaputra floodplain in the north and east, by the Ganges-Meghna flood plain in the south and by the Jamuna flood plain in the west. Dhaka is slightly elevated above the surrounding floodplains and represents mostly flat land with minor undulations. Topographically Dhaka is of low relief with many low depressions. According to Alam ((1988, the Madhupur Tract is structurally controlled. The Pleistocene sediments of Madhupur Tract have been affected by numerous episodes of faulting. These faults are probably the branch out surface faults from the low dipping western extension of Burma Arc detachment fault. Dhaka lies within 50to 500km distances from the seismogenic faults and sits on the Burma Arc detachment fault.

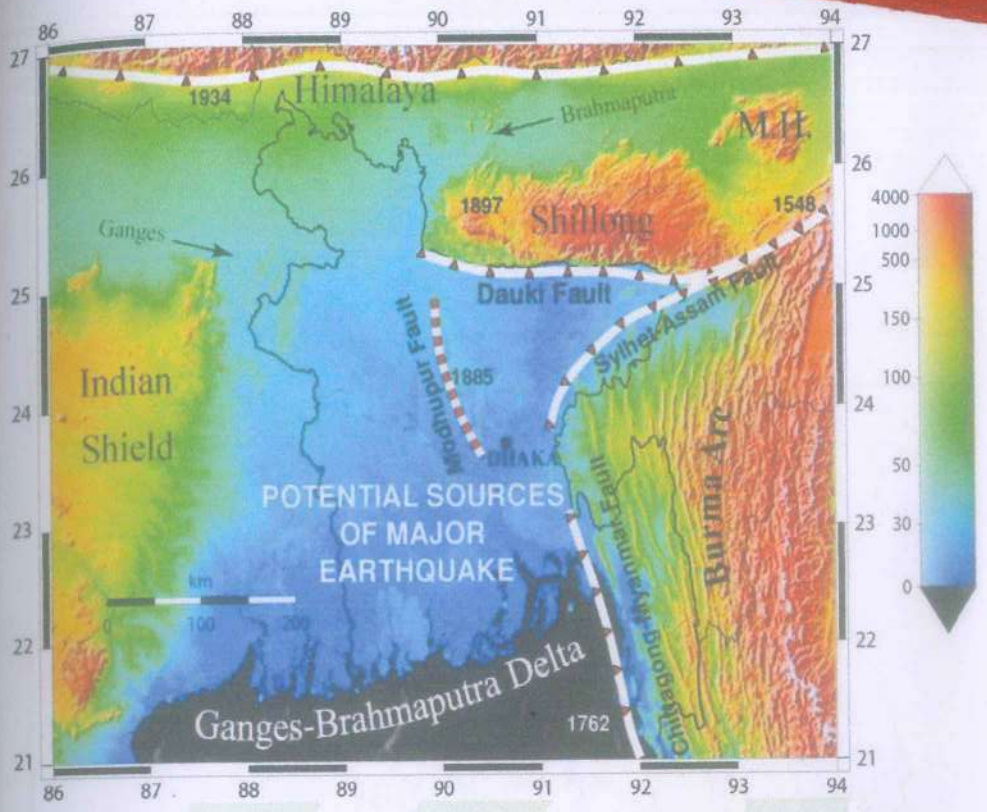


Figure 18: Digital Elevation Model (DEM) Of Bangladesh and Surroundings

Based on the distribution of earthquake epicenters and the morph tectonic behavior of different tectonic blocks Bangladesh has been divided into four generalized seismic zones.

According to the to-be-revised/published national code, BNBC, Gazipur and its surrounding district falls in the seismic intensity zone with Z=0.28 and a maximum PGA value of 0.25g and that requires rethinking the present issues in practices. According to this to-be-published Code, the country has been divided into four seismic zones with different levels of ground motion. Each zone has a seismic zone coefficient (Z) which represents the maximum considered peak ground acceleration (PGA) on very stiff soil/rock (site class SA) in units of g (acceleration due to gravity). The zone coefficients (Z) of the four zones are: Z=0.12 (Zone 1), Z=0.20 (Zone 2), Z=0.28 (Zone 3) and Z=0.36 (Zone 4).

Information on earthquakes in and around Bangladesh is available covering the last 250 years. The earthquake record suggests that since 1900 more than 100 moderates to large earthquakes occurred in Bangladesh, out of which more than 65 events occurred after 1960. There is a slight increase in the frequency of earthquakes in the last 30 years. This increase in earthquake activity is an indication of fresh tectonic activity or propagation of fractures from the adjacent seismic zone. However, the most serious damage has occurred in the northern part of Bangladesh and virtually none has been found in the Dhaka region. **The Project site is located in Zone III and its seismic zone coefficient is 0.28.**

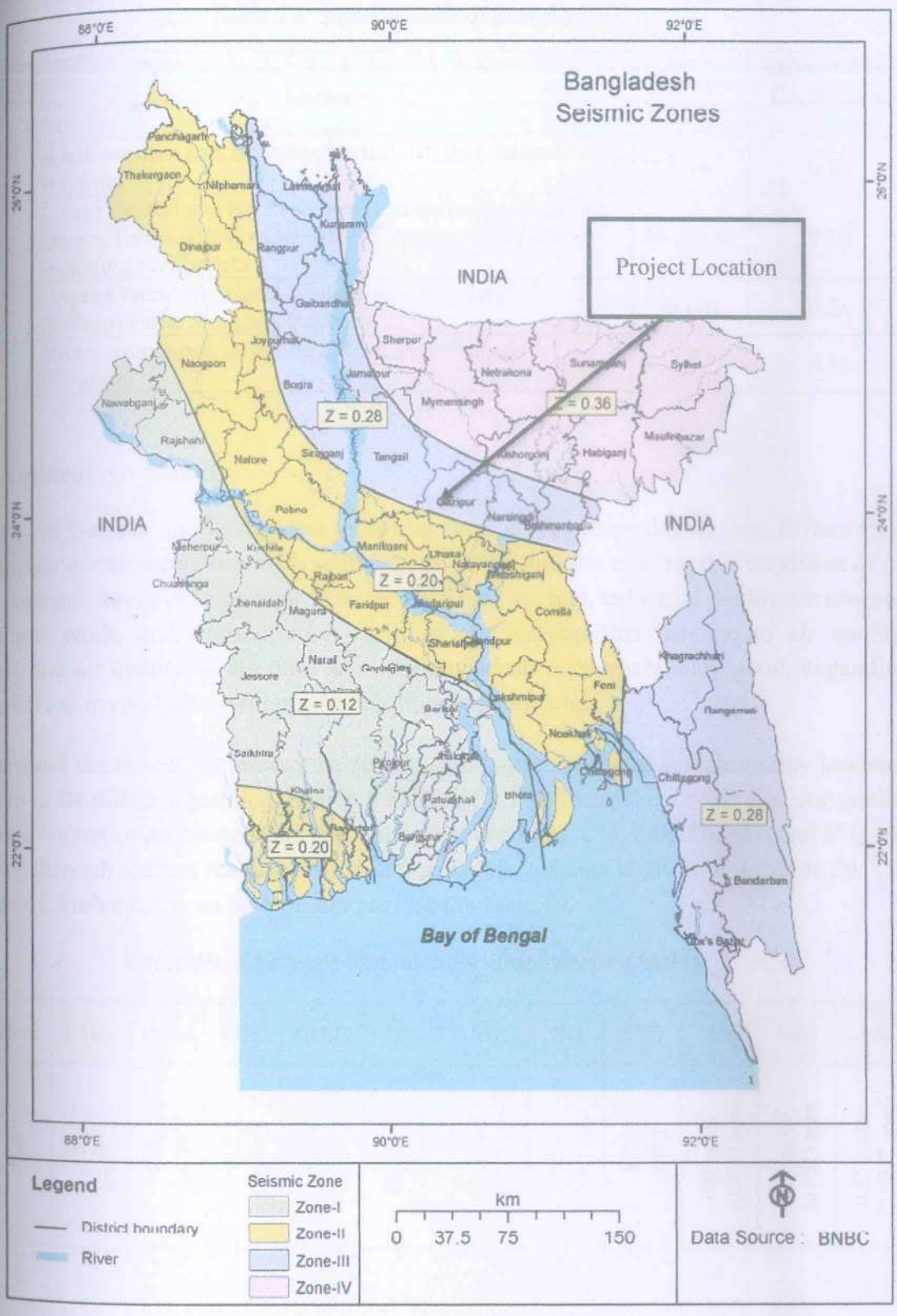


Figure 19: Earthquake Zoning Map of Bangladesh

Table 18: Seismic Zone of Bangladesh

Seismic Zone	Location	Seismic Intensity	Seismic Zone Coefficient, Z
1	South-western part including Barisal, Khulna, Jessore, Rajshahi	Low	0.12
2	Lower Central and North-western part including Noakhali, Dhaka, Pabna, Dinajpur, as well as South-western corner including Sundarbans	Moderate	0.20
3	Upper Central and North-western part including Brahmanbaria, Sirajganj, Rangpur	Severe	0.28
4	North-eastern part including Sylhet, Mymensingh, Kurigram	Very Severe	0.36

4.1.4 Ambient Air Quality

Air quality in Gazipur and its adjacent industrial areas is worsening day by day. Effects from the manmade occurrence along with some natural calamities are causing this condition of air quality. As a process of development, activities like burning fuel, industrial production process, construction work, and transportation facilities are causing this damage to air quality. Although, the air quality of the rural area of Bangladesh is comparatively good, expanding industrial areas in rural areas will not let this situation stay long.

To understand the air quality around the project site, sampling of ambient air quality has been conducted at 04 different locations within a radius of 0.5 km from the project site. Air quality monitoring for major parameters like particulate matters, NOx, CO, CO_2, Pb, NH_3 and SO_2 was conducted through a direct reading instrument, and collected data is given in the table 20. The standards of Ambient Air set by DoE are provided in table 19.

Table 19: Reference Standard for Ambient Air Quality

Parameters	$PM_{2.5}$	PM_{10}	VOC	CH_2O	NO_2	SO_2	CO	CO_2	O_3	NH_3	Pb
Air Pollution Control Rules 2022[3]	65 ($\mu g/m^3$)	150 ($\mu g/m^3$)	*NYS* (mg/m^3)	*NYS* (mg/m^3)	80$\mu g/m^3$ (0.043 ppm)	80 $\mu g/m^3$ (0 0.031 ppm)	5mg/m^3 (4.36) ppm	*NYS* (ppm)	100 $\mu g/m^3$ (0.051) ppm	100 $\mu g/m^3$ (0.051) ppm	0.25 $\mu g/m^3$ (2.5E-7 ppm)

[3] DOE, "Air Pollution Control Rules'2022" Schedule-01, Department of Environment, Govt. of Bangladesh

Table 20: Ambient Air Quality around the Project Area

Sl. No	Inspection Area		SPM	PM_1	$PM_{2.5}$	PM_{10}	VOC	CH_2O	NO_2	SO_2	CO	CO_2	O_3	NH_3	Pb
	Point	Sample	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(mg/m³)	(mg/m³)	(µg/m³)	(µg/m³)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
1	Location - 01 (North Side)	Sample-01	81	27	41	62	0	0	0	0	0	409	0	0	0
2		Sample-02	77	26	39	59	0	0	0	0	0	411	0	0	0
3	Location - 02 (East Side)	Sample-01	92	38	54	71	0	0	0	0	0	432	0	0	0
4		Sample-02	90	39	53	69	0	0	0	0	0	429	0	0	0
5	Location - 03 (South Side)	Sample-01	68	23	36	52	0	0	0	0	0	401	0	0	0
6		Sample-02	64	24	35	49	0	0	0	0	0	403	0	0	0
7	Location - 04 (West Side)	Sample-01	94	41	56	72	0	0	0	0	0	422	0	0	0
8		Sample-02	95	42	55	73	0	0	0	0	0	421	0	0	0

Source: Field Survey by Greenbud

It shows that in terms of major air quality indicators, the project surrounding has a mixed air quality. Based on the obtained air quality monitoring data, the ambient air quality around the facility area can be considered acceptable, as all parameters have been found in compliance with the national standard.

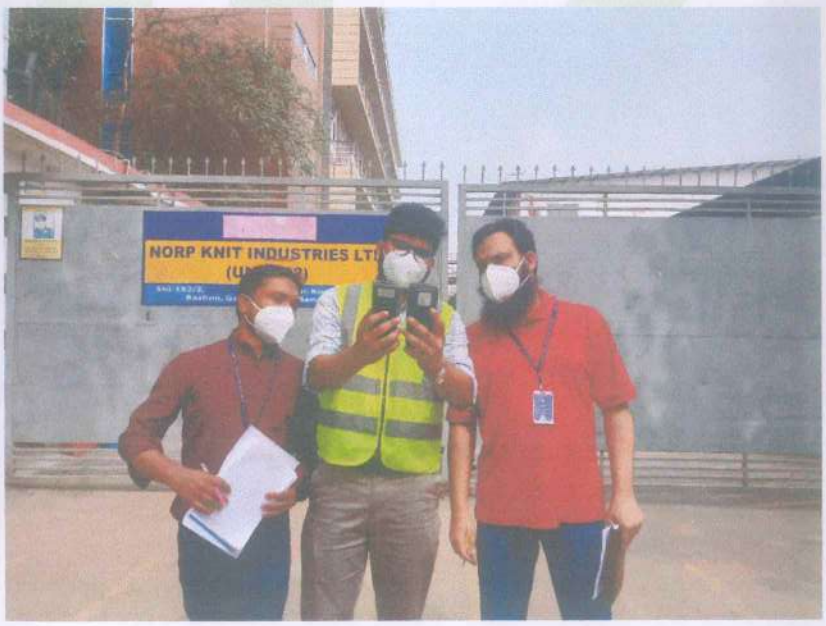


Figure 20: Ambient Air Quality Monitoring

Figure 21: Ambient Air Quality Inspection Location

4.1.5 Ambient Noise Level

The ambient noise environment consists of the total noise generated in the area at various distances around the sampling locations. The noise level varies depending on the type of activities carried out in the surrounding area. The baseline noise environment was studied at the project site as well as the surrounding locations at four locations. Noise levels were recorded in the form of sound pressure levels with the help of a digital sound level meter.

The locations considered for the noise monitoring along with sampling data are given below in tables 22.

Noise is an important part of the environment. The World Bank and Bangladesh has different recommended value for noise standard. The below table shows the standards set by DoE & WHO.

Table 21: Standard for the Noise

Standard	Zone	Day time – dB	Night time-dB
IFC/World Bank Group EHS Guideline, 2007[4]	Residential, Institutional, educational	55	45
	Industrial, commercial	70	70
Bangladesh SPCR[5], 2006	Mixed area	60	50
	Commercial	70	60
	Industrial	75	70

All the site condition was in running state when the data were collected by GREENBUD team.

Table 22: Ambient Noise Level around the Project Area

Sl. No	Inspection Area		Inspection Status				
			Reference of Relevant Standard		Obtained Result (dB)	SPCR, 2006 Limit	WHO Limit
	Point	Sample	Sound Pollution Control Rules-2006 (dB)	WHO Guide Line (dB)			
1	Location - 01 (North Side)	Sample-01	60	70	56	√	√
2		Sample-02	60	70	57	√	√
3	Location - 02 (East Side)	Sample-01	60	70	54	√	√
4		Sample-02	60	70	53	√	√
5	Location - 03 (South Side)	Sample-01	60	70	59	√	√
6		Sample-02	60	70	58	√	√
7	Location - 04 (West Side)	Sample-01	60	70	52	√	√
8		Sample-02	60	70	51	√	√

Source: Field Survey by Greenbud

[4] Guidelines values are for noise levels measured out of doors. Source: Guidelines for Community Noise, World Health Organization (WHO), 1999

[5] SPCR=Sound Pollution Control Rules 2006, DoE,

It has been observed from the samplings that overall noise levels in and around the project site are comparatively lower than the standards set by DoE and WHO.

The workers are provided with adequate safety facilities to refrain from any kind of health hazard. The use of horns has also been restricted within the project site to prevent any further damage.

Figure 22: Ambient Noise Level Monitoring

Figure 23: Ambient Noise Level Monitoring Location

4.1.6 Water Quality

Norp Knit Industries Ltd. (Unit-2) use groundwater for production, domestic, utility, and drinking purposes. However, the facility also uses recycled water in its production area. Ground water level exists at a moderate (Generally below 8.0 m) depth, which is being recharged mainly by infiltration of rainwater. According to Bangladesh Water Development Board the ground water level of Savar is about 15-20.5 m. The ground water zoning map is shown in Figure 24. Ground water is the source of water for domestic use in this area. To determine quality of ground water, water sample was collected from the water extraction point of the existing plant and analyzed for different parameters. The results show that all the parameters remain within the allowable limit of drinking water value as per as Environmental Quality Standards for Bangladesh. The parameters which have been analyzed during this study are presented below in Table 23 and the referred document is attached in **Annexure H**.

Table 23: Ground Water Quality of the Factory Site

Sl. #	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOO
1	Arsenic (As)	0.05	0.001	mg/L	AAS	0.001
2	Chloride	150-600	20	mg/L	Titrimetric	1
3	Coliform (Faecal)	0	0	N/100 ml	MFM	0
4	Coliform (Total)	0	0	N/100 ml	MFM	0
5	Hardness	200-500	130	mg/L	Titrimetric	1
6	Iron (Fe)	0.3-1	0.39	mg/L	AAS	0.03
7	Manganese (Mn)	0.1	0.05	mg/L	AAS	0.01
8	pH	6.5-8.5	7.59	-	pH Meter	-
9	Total Dissolved Solid (TDS)	1000	158	mg/L	Multimeter	-
10	Turbidity	10	0.28	NTU	Turbidity Meter	-

Source: Drinking Water Test Report

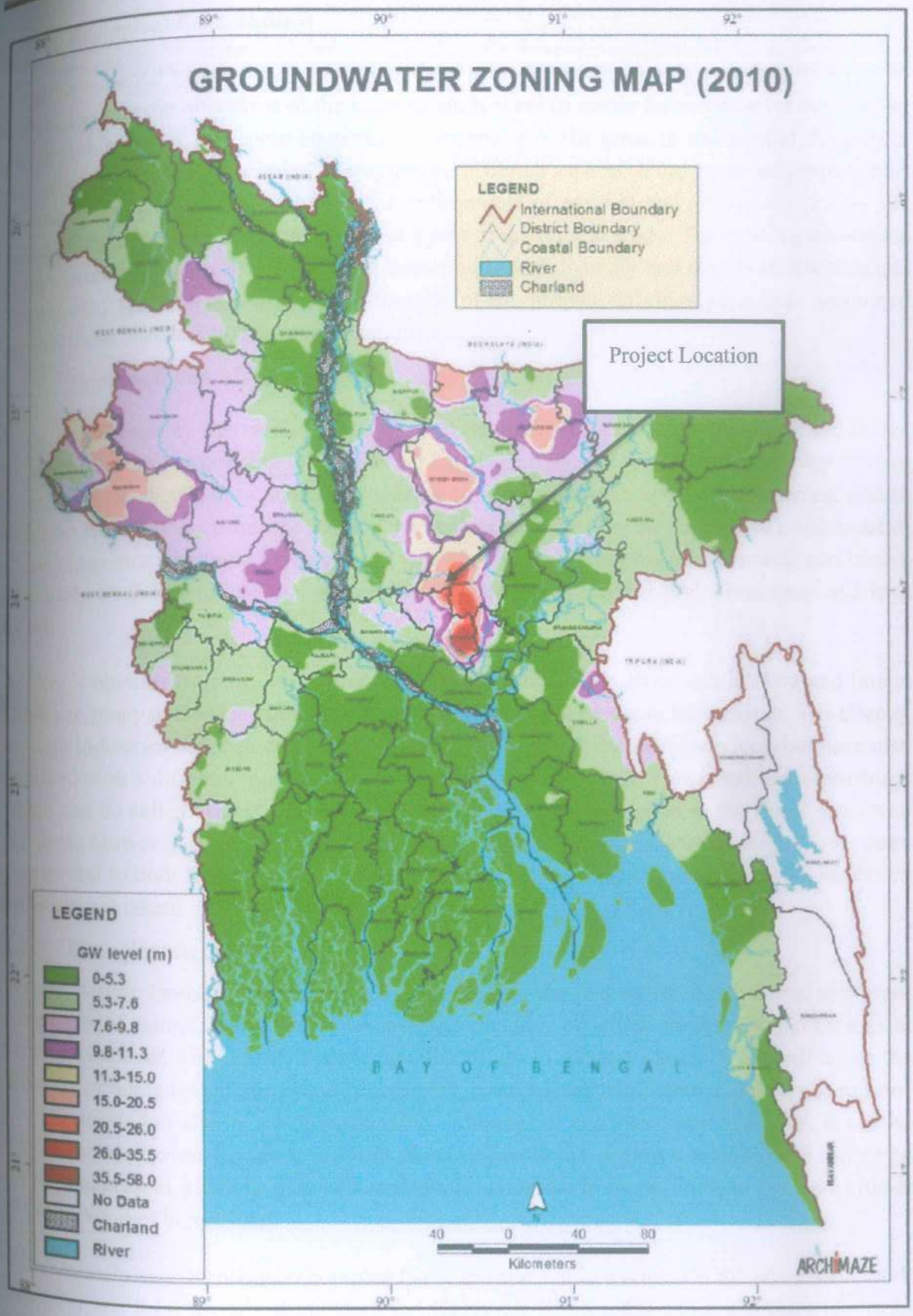


Figure 24: Ground Water Zoning Map of Bangladesh

4.2 Ecological Environment

An environmental baseline study was carried out in areas surrounding the project site. As noted earlier, the specific objectives of the baseline study were to gather information on the existing physical, biological, and socio-economic environment of the areas in and around the project site; to gather and assess peoples' perception on different aspects of the proposed project. This Chapter describes the existing biological environment of areas in and around the project site based on the baseline survey carried out as a part of the present study. The baseline ecological survey primarily focused on identifying floral and faunal diversity and distribution within and surrounding the project site. Possible impacts of the project activities have been evaluated against these baseline environmental conditions.

4.2.1 Approach and Methodology

An ecological survey was carried out as a part of the EIA in order to assess the floral and faunal diversity in areas surrounding the project. The main purposes of the ecological survey were to investigate the distribution and abundance of flora and fauna including fish species, and to make an assessment of the impacts for the Project activities on the ecological environment. These concentrated among others, on the wildlife (reptiles, amphibians, mammals and birds), separately on fishes and a floral species (Grass, shrubs, and timber/fuel wood trees and fruit trees).

As this is obvious from the above-mentioned tables, the area is quite rich in flora and fauna. However, many of those are quite common for different other areas in Bangladesh. The already existing industries in the study area not just brought, some of the utility services, but have also provided with a different look of infrastructure setting in the area. This is still not something, which can be called aesthetically unacceptable or directly detrimental to the floral growth of the area. However, the industrial activities along with their discharges may prove quite detrimental to both flora and fauna in the area eventually, provided no appropriate corrective measures are taken.

4.2.2 Biological Resources

Forests, pasture lands, rivers, surface water and other water bodies, etc. are the most important component of natural ecosystems. They are the foundation on which conservation of biological diversity depends. Biological diversity, which refers to genetic variation as well as to the diversity of human populations and ecosystems, is a resource that belongs not only to regions and to nations but also to all of humankind. Although it is a renewable resource, it can be irreversibly destroyed. Future uses of this resource (medicine, project breeding. etc.) cannot be foreseen at present, although they will certainly be extensive in scope, and they even are crucial to the survival of humankind.

It is extremely rare to encounter completely natural areas now-a-days. On the other hand, both extensive and local use of natural flora and fauna can be regarded as normal occurrences in natural ecosystems. Although the transition from hunting and gathering to settle agriculture in established agro-ecological zones is complete almost everywhere, traditional forms of resource use continue to play an important role in the lives of rural populations.

Current pressure due to increase production and extend the area of land under cultivation is leading to more intensive use of remaining predominantly natural areas. This results in environmental stress and rapid loss of biological diversity, as well as permanent conversion of land to agricultural use. Opening up natural areas in order to exploit their resources with modern technology frequently leads to additional forms of resource use. For example, forests opened up to commercial forestry are more exposed to uncontrolled over exploitation, as well as being subjected to ecological stress by migrants who practice agriculture. Both extensive resource use over large areas and selective, intensive use of every favorable site can severely damage an ecosystem. Small-scale operations preservation of remaining natural areas and resource use in harmony with nature are important if there sources of a region are to be managed in an ecologically appropriate manner. Proper monitoring is needed in order to obtain reliable information about significant changes in an ecosystem.

Every region needs areas set aside to preserve ecological balance (nature reserves, of natural vegetation, fallow land) in order to conserve its biological diversity. The form, extent and location of these areas must be carefully evaluated in each individual case. Because many different products in predominantly natural areas are not traded in great volume and do not appear in statistics on trade, their immediate value to the local population is often underestimated. The use of such areas is often of great economic importance to the poorer segments of rural populations. Intense exploitation of such areas is therefore usually accompanied by corresponding social consequences and social costs, even when it appears reasonable on economic grounds.

Many predominantly natural areas are of environmental and economic value beyond their own borders. Forests, for instance, guarantee safe and regular supplies of water because they protect headwaters. The protective function of forests is often recognized only after its neglect has produced negative consequences (deforestation that leads to erosion, landslides, sedimentation in reservoirs, floods). Intensification of resource use in harmony with nature should be based primarily on indigenous knowledge and modes of production established in the local culture. There is a need to undertake scientific studies in this area since information based on such studies is presently lacking. Locally established responsibility for conservation of natural resources requires appropriate local rights of use. These rights must be regulated by grass-roots organizations.

Table 24: Bio-Ecological Zone of the Project

Features	Norp Knit Industries Ltd. (Unit-2)
Location	It is located between 23°59'7.93"N and 90°21'12.98"E
Relevant ad m hq	The project is established at, Shi-152/2 (Old), B-01/1 (New), Islampur, Kodda Nandun, Bason, Gazipur.
Physiography	Madhupur Tract & Pleistocene uplands
Rainfall	Annual average 1936 mm
Temperature	Maximum 30°C, Minimum 11°C

Features	Norp Knit Industries Ltd. (Unit-2)
Floral Diversity	***Herbs & Shrubs:*** *Various kinds of herbs, shrubs* ***Trees:*** ***Shilkoroi*** *(Albizia procera),* ***fulkoroi*** *(Albizia procera (Roxb.)),* ***Mehagani*** *(Swietenia),* ***Shimul*** *(Bombax),* ***Mango*** *(Mangifera indica),* ***Coconut*** *(Cocos nucifera),* ***Jackfruit*** *(Artocarpus heterophyllus),* ***Beetle nut*** *(Areca catechu),* ***guava*** *(Psidium guajava),* ***starfruit*** *(Averrhoa carambola),* ***Amra*** *(Spondias mombin)* ***Aquatic Flora:*** ***Water hyacinth*** *(Eichhorniacrassipes),* ***Khudipana*** *(Lemnaperpusilla), and* ***Kalmi*** *(Ipomoea aquatic)*
Faunal Diversity	***Aquatic Fauna:*** ***Magur*** *(Clarias batrachus),* ***Shing*** *(Heteropneustes fossilis),* ***Katla*** *(Catla catla),* ***Rui*** *(Labeo rohita),* ***Mrigal*** *(Cirrhinus cirrhosis),* ***Puti*** *(Puntius),* ***Tengra*** *(Sperata seenghala),* ***Boal*** *(Wallago attu),* ***Mola*** *(Mola),* ***Taki*** *(Channa striata)* ***Mammals:*** ***Bandicoot Rat*** *(Bandicota),* ***Common House Rat*** *(Rattus rattus),* ***House Mouse*** *(Mus musculus),* ***Indian Field Mouse*** *(Mus booduga),* ***Indian mole Rat*** *(Bandicota bengalensis),* ***Flying Fox*** *(Pteropus),* ***Grey Musk*** *(Crocidura silacea)* ***Birds:*** ***River Tern*** *(Sterna aurantia),* ***White-breasted Waterhen*** *(Amaurornis phoenicurus),* ***Bronze Winged Jacana*** *(Metopidius indicus)* ***Little Cormorant*** *(Microcarbo niger),* ***House Sparrow*** *(Passer domesticus),* ***Brown Fish Owl*** *(Bubo zeylonensis),* ***Common Sandpiper*** *(Actitis hypoleucos)* ***Reptiles:*** ***narrow-headed soft-shell turtle*** *(Chitra indica),* ***Smooth Water Snake*** *(Enhydris enhydris),* ***Common Garden Lizard*** *(Calotes versicolor),* ***Rat Snake*** *(Pantherophis obsoletus),* ***Common Wolf Snake*** *(Lycodon),* ***Common Krait*** *(Bungarus caeruleus),* ***Common House Lizard*** *(Hemidactylus frenatus),* ***Common Skink Yellow*** *(Plestiodon fasciatus),* ***Monitor Lizard*** *(Varanus)* ***Amphibians:*** ***Common Toad*** *(Bufo bufo),* ***Bull frog*** *(Lithobates catesbeianus),* ***Cricket frog*** *(Acris crepitans), and* ***Maculated Tree frog*** *(Polypedates maculatus)*

4.2.3 Terrestrial Flora and Fauna

4.2.3.1 Flora

The project is in a rural setting with greenery. This includes homesteads horticulture, roadside forest, natural vegetation, and crops. Besides highland (elevated) afforestation and homesteads, the remaining area is mostly lowland and generally interconnected with certain manmade barriers and pakka roads here and there. Due to roadside plantation and certain homestead forests, the area is rich in floral diversities. Different fruit, and fuelwood trees along with various shrubs are abundant. Among the trees, the most widely available ones are Shilkoroi, fulkoroi, Shimul, etc. Also, there are some fruit trees such as Mango, Coconut, Jackfruit, Beetle nut, guava, starfruit, Amra, etc.

Trees

Jackfruit (*Artocarpus heterophyllus*), Wood Apple (*Aegle marmelos*), Custard Apple (*Annona squamosa*), Betel Palm (*Areca catechu*), Monkey fruit (*Artocarpus lacucha*), Star Fruit (*Averrhoa carambola*), Neem (*Azadirachta indica*), Sugar Palm (*Borassus flabellifer*), Papaya (*Carica papaya*), Pomelo (*Citrus grandis*), Indian Olive (*Elaeocarpus robustus*).

Shrubs

Okra (*Abelmoschus esculentus*), Indian Timber Bamboo (*Bambusa tulda*), Paper flower (*Bougainvillea peruviana*), Chili Pepper (*Capsicum annum*), Pepper (*Capsicum frutescens*), Lemon (*Citrus aurantifolia*), Golden Corton (*Codiaeum variegatum*), Tulsi (*Ocimum sanctum*), Rose (*Rosa centrifolia*).

Herbs

Bailly Great Weed (*Ageratum conyzoides*), Spinach (*Basella alba*), Ash/White Gourd (*Benincasa hispida*), Soap Bush (*Calibanus hookeri*), Coriander (*Coriandrum sativum*), Pumpkin (*Cucurbita maxima*), Tomato (*Lycopersicon esculentum*), Hatisur (*Heliotropium indicum*), Water Spinach (*Ipomoea aquatica*).

Homestead Plants

Various types of commonly planted trees like mango (*Mangifera indica*), jackfruit (*Artocarpus heterophyllus*), kalojam (*Syzygium cumini*), betelnut pulm (*Areca catechu*), coconut palm (*cocos nucifera*), guava (*Psidium guajava*), jambura (*Citrus decumana*), mandar (*Erythrina veriegata*), kadam (*Anthocephalus cadamba*), sheel koroy (*Albizzia procera*), sajna (*Moringa obifera*), dalim (*Punica granatum*), palash (*Butea monosperna*) etc.

Agricultural or Crop Vegetation

Banana, betel leaf, sugarcane and vegetables are major crops, together with aus, jute and transplanted aman. On lower platforms the latter are major crops in the monsoon season and vegetables in the dry season. Among rice crops boro covers the largest area followed by aman and aus. Other crops include wheat, potato, pulses, sweet potato, spices, cheena, kaun etc

Moreover, some vegetation like kachuripana (*Telanthera philoxeroides*), topa pana (*Pistiastratiotes lemna spirodela*), khudipana (*Lemna paucicastata*), paniphal (*Trapa bispinosa*) etc. are seen in different ponds of the project area and in the shallower waters are found species of shapla, padma, kalmi, helencha.

Road Side Plants

Common way side trees are tetul (*Tamaraindus indica*), neem (*Azadirachta indica*), hijol (*Barringtonia acutangula*), banyan (*Ficus bengalensis*), ashatha (*Ficus religlosa*), raintree (*Samanca saman*), pitraj (*Aphanamixls polystachia*), Simul (*Bobbax ceiba*), krishnachura (*Delonix regia*), debdaru (*Polyalathia longifolia*) etc.

Common terrestrial flora in the study area includes Betelnut (*Areca catechu*), Coconut (*Cocos nucifera*), Mango (*Mangifera indica*), Raintree (*Samanea saman*), etc. Three types of terrestrial floral habits - tree, shrub, and herb exist in the project area. Floral species particularly trees and shrubs are cultivated and ported and these have commercial values.

Table 25: Identified Terrestrial Flora in the Study Area

SL. No.	Name			Habit
	Scientific Name	Family Name	Native Name	
1	*Mangifera indica*	Anacardiaceae	Am	Tree
2	*Alternanthera sesilis*	Amaranthaceae	Haicha	Herb
3	*Coccos nucifera*	Palmae	Narikel	Tree
4	*Areca catechu*	Plamae	Supari	Tree
5	*Borassus fiabellifer*	Palmae	Tal	Tree
6	*Phoenix sylvestris*	Palmae	Khejur	Tree
7	*Artocarpus heterophyllus*	Moraceae	Kathal	Tree
8	*Saccharum spontaneum*	Graminace	Kash	Herb
9	*Albizia procera*	Leguminosae	Koroi	Tree
10	*Acacia auriculiformis*	Leguminosae	Akashmoni	Tree
11	*Dalbergia sissoo*	Leguminosae	Sisu	Tree
12	*Samanea saman*	Leguminosae	Rendi	Tree
13	*Delomix regia*	Leguminosae	Krishnachura	Tree
14	*Azadirachta indica*	Meliaceae	Neem	Tree
15	*Swietenia mahagoni*	Meliaceae	Mehagini	Tree
16	*Polygonum hydropiper*	Polygonaceae	Bishkatali	Herb
17	*Anthocephalus chinensis*	Rubiaceae	Kadam	Tree
18	*Zizyphus mauritiana*	Rhamnaceae	Boroi, Kul	Tree
19	*Tectona grandis*	Verbenaeae	Teak	Tree

Dalbergia sissoo

Alternanthera sesilis

Acacia auriculiformis

Polygonum hydropiper

Delomix regia

Samanea saman

Figure 25: Terrestrial Flora Diversity

4.2.3.2 Fauna

Mammals & Reptiles

Wild animals that depend on terrestrial habitats are known as terrestrial fauna. Several species of amphibian, reptiles, birds, and mammals are the main components of terrestrial fauna. Areas surrounding the project site have different types of land, including agricultural dry land / seasonal wetland, homestead land, fallow land, and ditches, which provide a typical environment for terrestrial fauna. Terrestrial wildlife is divided into four major groups' viz. mammal, bird, reptile, and amphibians.

Bandicoot Rats, Common House Rats, House Mouse, Indian Field Mouse, Indian mole Rats, Flying Foxes, Grey Musk, and Shrew Indian Pipistrelle are the most common mammals found in the project area.

Among reptiles, narrow-headed soft-shell turtles, smooth water snakes, common garden lizards, rat snake, common wolf snakes, common krait, common house lizards, common skink yellow, monitor lizards, and grey monitor lizard are mostly found. Among birds, Salik, Finge, etc. deserve special mention. The common types of reptiles which are found in the area, water snakes, house lizards, soft-shell, turtles, etc.

Amphibians

Common Toad, Bullfrog, Cricket frog, and Maculated Tree frog is mostly found in the study area.

Aves

River tern, white-breasted Waterhen, bronze winged jacana, little cormorant, house sparrow, brown fish owl, common sandpiper, striated grass bird, common tailorbird, Asian pied starling, common myna fishing cat, small Indian mongoose are found in the study area.

Table 26: Identified Terrestrial Fauna in the Study Area

SL. No.	Scientific Name	English Name	Local Name
	Class: Amphibia		
1	*Bufo melanostictus*	Bufo melanostictus	Bufo melanostictus
2	*Rhacophorusleucomystax*	Rhacophorusleucomystax	Rhacophorusleucomystax
3	*Ranatigrina*	Ranatigrina	Ranatigrina
	Class: Reptilia		
1	*Calotesversicolor*	Calotesversicolor	Calotesversicolor
2	*Gecko gecko*	Gecko gecko	Gecko gecko
3	*NajaNaja*	NajaNaja	NajaNaja
4	*Varanusbengalensis*	Varanusbengalensis	Varanusbengalensis
	Class: Aves		
1	*Copsychussaularis*	Magpie robin	Doyel
2	*Corvussplendens*	Crow	Kaak
3	*Acridotherestristis*	Common myna	Shalik
4	*Passer domesticus*	House sparrow	Charui
5	*Anatidaeanatidae*	Duck	Hash
6	*Eudynamysscolopacea*	Asian cuckoo	Kokil
7	*Egrettagarzetta*	Little egret	Bok
8	*Gallus gallus*	Wild cock	Murgi
9	*Melopsittacus undulatus*	Budgerigar	Tia pakhi
	Class: Mammalia		
1	*Bostauras*	Cow	Goru
2	*Capra aegagrushircus*	Goat	Chagol
3	*Canis lupus familiaris*	Dog	Kukur
4	*Ovisaries*	Sheep	Bhera
5	*Bubalusbubalis*	Buffalo	Mohish
6	*Equuscaballus*	Horse	Ghora
7	*Herpestesedwardsii*	Mongoose	Beji
8	*Viverra zibetha*	Large Indian civet	Bon biral
9	*Sciuruscarolinensis*	Grey Squirrel	Kathbirali
10	*Mus musculus*	Mouse	Nengtiindur
11	*Rattusrattus*	Rat	Indur

Bufo melanostictus

Calotesversicolor

Passer domesticus

Eudynamys scolopacea

Bubalusbubalis

Acridotheres tristis

Figure 26: Avifauna Diversity

4.2.4 Aquatic Flora and Fauna

4.2.4.1 Aquatic Flora

Aquatic flora is divided into three major types - tree, shrub, and herb. Aquatic floral species grow in rivers, canals, ditches, seasonal wetlands, and low-lying agricultural lands in submerged, free-floating, or rooted floating states. Common aquatic floral species in the study areas include Water hyacinth - Eichhorniacrassipes, Khudipana - Lemnaperpusilla, and Kalmi - Ipomoea aquatic.

Table 27: Identified Aquatic Flora in the Study Area

Scientific Name	Family Name	Native Name
Alternanthera philoxeroides	Amaranthaceae	Helencha
Colocasia esculenta	Araceae	Katchu
Aponogeton natans	Aponogetonaceae	Ghenchu
Ipomoea aquatica	Convolvulaceae	Kalmi
Ipomoea fistulosa	Convolvulaceae	Dholkalmi
Enhydra fluctuans	Compositae	Helencha
Ceratophyllum dumersum	Ceratophytaceae	Jhanjhi
Hygroryza aristata	Gramineae	Phutki janglidhan
Hydrilla verticillata	Hydrocharitaceae	Janjhi, Kurcli
Vallisneria spiralis	Hydrocharitaceae	Patajhangi
Lemna perpusilla	Limnaceae	Khudipana
Nymphaea sp	Nymphaeaceae	Shapla
Eichhornia crassipes	Pontederiaceae	Kachuripana
Monochoria vaginalis	Pontederiaceae	Sarkachu
Fagopyrum hydropiper	Polygonaceae	Biskhatali
Utricularia aurea	Utriculariaceae	Jhangi

Colocasia esculenta

Ipomoea aquatic

Eichhornia crassipes

Fagopyrum hydropiper

Figure 27: Aquatic Floral Diversity

4.2.4.2 Aquatic Fauna

Fish is still reasonably available in the area, given the overall and increasing scarcity of fish in the country. Small fishes, which are very popular also in overall Bangladesh, are available, caught, and used widely, particularly during the early monsoon and pre-winter season.

The fishes include catfishes (Magur and Shing), major carps (Katla, Rui, and Mrigal), minor carps (Puti), and others (Tengra, Boal, Mola, Taki, Shol). Also, prawns, particularly the popular small prawns, are locally known as Ichha, Wildlife, and Reptile

2

Tengra (*Mystus Tengara*)

Boal

Rui (Labeo rohita)

Magur (Clarias batrachus)

Figure 28: Aquatic Faunal Diversity

4.3 Social Environment

As noted earlier, the specific objectives of the baseline study were to gather information on the existing socio-economic environment; to gather and assess people's perception on different aspects of the factory. This Chapter describes the existing socio-economic environment of areas in and around the project site based on the social studies carried out as a part of the present study.

4.3.1 Approach and Methodology

As a part of the Environmental Impact Assessment, a rapid socio-economic study was carried out to assess the current baseline of socio-economic condition of the areas surrounding the proposed project site. Efforts were made to identify the socio-economic attributes that may be impacted due to the proposed project activities. The main objectives of the socio-economic study were:

- To understand people's socio-economic condition
- To understand extent of people's access to basic services

- To understand people's perception regarding possible impacts of factory
- To get feedback from people regarding mitigation measures

This has been done on the basis of several surveys around the locality as well as Gazipur Sadar Upazila Profile. In addition to that, Gazipur Sadar Upazila government officers, Local government representatives and public representatives and Key Informants Interviews were taken. Bangladesh Bureau of Statistics (BBS), Banglapedia and periodicals were also considered during the study.

4.3.1.1 Geography

Gazipur Sadar Upazila (Gazipur district) area are consists of 446.38 sq km is located in between 23°53' and 24°11' north latitudes and in between 90°20' and 92°30' east longitudes. It is bounded by Sreepur (Gazipur) upazila on the north, Savar and Rupganj upazilas, and Uttara thana on the south, Kaliganj (Gazipur) and Rupganj upazilas on the east, Kaliakair and Savar Upazilas on the west.

4.3.1.2 Population

The Total population of this Upazila is 866540; of which 471768 are male, 394772 are female; 817926 are Muslims, 45068 are Hindu, 3185 are Buddhist, 188 Christian, and 173 others. Indigenous communities such as Koach and Rajbangshi belong to this upazila.

4.3.1.3 Administration

Gazipur Upazila was established in 1983 consisting of Joydebpur and Tongi police stations. Gazipur Sadar Upazila consists of 2 Municipalities, 8 Unions, 183 Mauzas, and 268 villages. The density of the population of the Upazila is 1941 per sq. km.

4.3.1.4 Occupation

The main source of income of Gazipur Sadar Upazila in the Service sector (32.22%). Sector-wise percentage of occupation is given in the following table:

Table 28: Occupation of the People in Gazipur Sadar Upazila

Occupation	Percentage
Agriculture	17.86%
Non-agricultural laborer	2.58%
Commerce	19.76%
Transport and communication	7.03%
Others	16.58%

Source: http://en.banglapedia.org/

4.3.1.5 Literacy Rate

The average literacy rate is 62.6 %; of which is male 67.3 %, female 56.8%.

4.3.1.6 Educational Institutions

This upazila are consists of five universities, one medical college, 10 colleges, one cadet college, 17 technical colleges, 10 technical schools, 72 secondary schools, 168 primary schools, 36 madrasas.

4.3.1.7 Main Crops

The main crops are Paddy, jute, mustard, turmeric, vegetables. Extinct or nearly extinct crops are indigo, aus paddy.

4.3.1.8 Sources of Drinking Water

From the socio-economic and demographic report of Bangladesh 2001, it is found that Sources of drinking water Tube-well 85.62%, tap 11.12%, pond 0.16%, and others 3.10%. At the factory site Gazipur, deep tube well & tube well is the main source of drinking.

4.3.1.9 Access to Electricity

Electricity in whole Bangladesh is still a relatively scarce commodity, which many households cannot afford even if available at their locality. All the wards and unions of the Upazila are under electrification net-work. However, 78.48% of the dwellings have access to electricity

4.3.1.10 Sanitation

74.11% of dwelling households of the Upazila use sanitary latrines and 20.20% of dwelling households use non-sanitary latrines; 5.70% of households do not have latrine facilities.

Chapter Five

Environmental Impacts and Mitigations

5.1 General Considerations

In case for most industrial projects, potential negative impacts sometime could be far more numerous than beneficial impacts. The regional and national economic benefits associated with the implementation of any development project are considered to fall outside the scope of an EIA, and therefore not considered here. However, it is generally expected that these long-term benefits will ultimately trickle down to the local population and will make a contribution to an improvement in the quality of life.

Likewise, the indirect benefits of strengthening of technical capabilities of local persons through association with foreign experts and other training elements that may form part of a project have been considered to fall outside the scope of EIA.

5.2 Scoping of Impacts

The potential impacts due to implementation and production of the Project are identified by using simple checklists. This method is described below:

5.2.1 Checklist

Checklist is comprehensive lists of environmental effects and impacts indicator designed to stimulate the analysts to think broadly about possible consequences of contemplated actions. Table 31 represents the impact identification checklist developed for the project. In this checklist, actions, which may affect at the various stages of the project activities are listed, magnitude of the anticipated Environmental Impacts (EIs) and their probability of occurrence are shown. Impact identification is priorities according to the severity of the possible consequence and the probability of its occurrence refer to tables 29 and 30. In the checklist, only operational phases of the project are considered. As can be observed from the checklists, major environmental components, which will be adversely affected by activities of the project, are water quality and air quality. All these impacts will arise in operation phase of the project. It should be noted that identification indicated in the Checklist relates to the significant level of impact.

Table 29: Classification of Severity

	Health & Safety	Environment
Catastrophic	↓ Multiple deaths ↓ Destruction of protected wildlife or plants or their habitat	↓ Sever destruction of natural environment ↓ Very long-term effect on environment and nearby habitant ↓ Community complaint received with impact at National level

	Health & Safety	Environment
Major	↓ Severe impact on human health ↓ Prolong exposure may cause epidemic/death	↓ Destruction of flora, fauna or their habitat ↓ Long term environmental damage or pollution ↓ Contamination to large area of land/water body ↓ Severely affecting the health of a local community ↓ Community complaint received with impact at State/National government level
Significant	↓ Prolong exposure cause mental/physical instability or disease ↓ Long term health damage	↓ Severely affect wildlife or plants ↓ Emission/discharge exceeding legal standard and is reportable to a government authority ↓ Legally actionable activity ↓ Community complaint received with impact at local Council level
Moderate	↓ Damage work environment ↓ Prolong exposure cause nuisance/minor illness	↓ Minor level pollution which can be alleviated by simple mitigation measures ↓ Natural resource depletion ↓ Non-compliance with internal environmental target ↓ Concern by local community, environmental matter
Minor	↓ No impact on human health & safety	↓ No direct pollution to any environmental component ↓ No natural resources depletion ↓ No community complaints ↓ No breach of regulation or consent

Table 30: Classification of Probability

Almost Certain	Likely	Possible	Unlikely	Rare
The event is expected to occur in most occasions.	The event is expected to occur on many occasions.	The event is expected to occur on some occasions.	The event is expected to occur infrequently.	The event may occur in exceptional circumstances.
Frequency: Regularly	Frequency: weekly/at least once per month	Frequency: Monthly/at least once per 6 months	Frequency: At least once a year	Frequency: < once in 10 year/ not anticipated to occur

Table 31: Impact Identification Checklist for Project

Project Phase	Process/Activity	Environmental Aspects & Impacts																									Type	
		Aspect																	Impact										
		Air Emission	Solid Waste Generation	Sludge Generation	Dust/Particulate Generation	Wastewater Generation	VOC Emission/ Chemical Use	Domestic Wastewater Generation	Water Consumption	Compress Air	Hazardous Waste Generation	Energy/Electricity Use	Heat Generation	Fuel Use	Groundwater Use	Noise Generation	ODS emission	GHG Emission	Air Pollution	Soil Contamination	Water Pollution	Noise Pollution	Fossil fuel Depletion	Ground water depletion	Climate Change	Adverse	Beneficial
Operational Phase	Store		x		x							x							x	x			x			x	
	Cutting		x		x							x				x			x	x		x	x			x	
	Embroidery		x		x							x				x	x		x	x		x	x		x	x	
	Sewing		x		x							x				x			x	x		x	x			x	
	Washing		x		x	x	x		x	x	x	x	x		x	x	x		x	x	x	x	x	x	x	x	
	Finishing		x		x				x	x		x			x	x			x	x		x	x	x		x	
	Packing		x		x							x				x	x		x	x		x	x		x	x	
	F G Store				x							x							x				x			x	
	ETP		x	x	x	x	x		x	x	x	x			x	x			x	x	x	x	x	x		x	
	Lab		x			x	x	x	x	x	x	x	x		x	x	x		x	x	x	x	x	x	x	x	
	Others																											
	Spot Removing Room		x				x			x	x	x				x			x	x		x	x			x	
	Medical Room		x				x	x	x		x	x			x		x		x	x	x		x	x	x	x	
	Child Care Room		x					x	x			x			x	x				x	x	x	x			x	
	Chemical Store		x		x	x	x				x	x			x	x			x	x	x	x	x	x		x	
	Dining		x		x			x	x			x			x	x			x	x	x	x	x	x		x	
	Power generation (Generator)	x			x				x			x	x	x	x	x		x	x	x		x	x	x	x	x	

Project Phase	Process/Activity	Environmental Aspects & Impacts																								Type	
		Aspect																Impact									
		Air Emission	Solid Waste Generation	Sludge Generation	Dust/Particulate Generation	Wastewater Generation	VOC Emission/ Chemical Use	Domestic Wastewater Generation	Water Consumption	Compress Air	Hazardous Waste Generation	Energy/Electricity Use	Heat Generation	Fuel Use	Groundwater Use	Noise Generation	ODS emission	GHG Emission	Air Pollution	Soil Contamination	Water Pollution	Noise Pollution	Fossil fuel Depletion	Ground water depletion	Climate Change	Adverse	Beneficial
Operational Phase	Steam Generation	x			x	x			x			x	x	x	x	x		x	x		x	x	x	x	x	x	
	Air compressor									x		x				x						x	x			x	
	Office Activity		x						x			x			x		x			x	x		x	x	x	x	
	Maintenance Activity		x		x						x	x				x			x	x		x	x			x	
	Toilet							x	x			x			x						x		x	x		x	

5.3 Evaluation of Impact

5.3.1 Impact on Land Acquisition

Impact Origin

The project is situated in an area of rural setting. Different types of factories are situated around it. Due to the factory establishment, only barren land was reduced. Otherwise, there is no significant impact on the landscape of the area. The project didn't require any relocation of homestead and land acquisition was done by paying proper compensation to the landowners. The land was fallow, vacant and low. There are no homestead, agricultural land or protected forestland falls inside the proposed project site. There was no cultural, historical and aesthetic interest in the project land and no loss of sensible place. So, the aforementioned impacts are negligible.

Mitigation Measure

Loss of vegetation was replenished by tree plantation.

5.3.2 Impact due to Traffic

The factory is situated along the Dhaka-Tangail Highway (N4). Hence, no additional road was not required for the factory. Huge number of vehicles moves though the highway every day. So, no noticeable impact on the regular traffic would be caused by the factory vehicle movement though they run some vehicles for transportation of raw materials and finished products under the authority.

5.3.3 Impact due to Domestic Wastewater and Sanitation

Impact Origin

As there are a total of approximately 5938 employees working on the project across the factory, it requires significant amount of water for domestic purposes. This water is extracted from Ground Water sources. Wastewater generated from domestic purposes is disposed through the common sewer line.

Sanitation system is well equipped and monitored by the administration. All the human waste goes to the septic tank and treated there.

Mitigation Measures

The domestic liquid waste is currently disposed of Septic Tank. Capacity and robustness of septic tank should be monitored regularly by Authority, and mitigation measures needed to be taken in case of any failure or leak occurred. Besides, de-sludge frequency should be maintained regularly.

5.3.4 Impact on Accidents or Occupational Health Hazard

Impact Origin

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

Mitigation Measures

- Protective clothing, earplug, safety shoes, hand gloves, protective goggles and accessories should be provided to the workers and maintained properly.
- Adverse impact on worker's safety could be minimized through implementing a comprehensive occupational health and safety program.
- Regular medical checkup and wellness of health of employees and workers should be conducted.
- Safe drinking water and sufficient sanitation facility should be provided
- Sufficient training should be provided to the employees about safe chemical and waste handling, machine operation, firefighting etc.
- The workers should wear PPE (Personal Protective Equipment), use of needle guard, and other necessaries where necessary.

5.3.5 Impact Due to Solid Waste

Impact Origin

The factory produces a large amount of hazardous and non-hazardous solid waste like waste poly and paper, electrical waste, waste chemical poly, cartoon, empty drums, and many more. Wastes are segregated and stored in an organized way in the permanent waste storage area which is well ventilated and dry in condition.

Mitigation Measures

The solid waste storage area is well protected from weather and unauthorized access. In addition, it also has a segregated space with a portion for storage of hazardous and non-hazardous waste. Therefore, there is no scope for pollution from these wastages.

Some of these wastes like waste paper have tremendous secondary demand and are sold to the third party for reuse and recycling. Some of the empty chemical drums are being used as waste collection bins and garden pots. The rest of the wastages sell to the authorized third-party waste collector. The waste management policy of the factory is attached to **Annexure G**.

5.3.6 Impact on Air Quality

Impact Origin

Emission from five generators and four boilers stack affects the ambient air quality. The situation aggravates when gas contains high percentage of impurities like sulfur, hydrocarbon, oxides of nitrogen, particulate matter etc. The high temperature of flue gases also impacts the air quality in terms of thermal pollution. The combustion of fossil fuels for power generation inevitably results in emission of gaseous pollutants to the atmosphere. Each of these pollutants is examined below to ensure the compliance with the standard. Potentiality of Sulfur Di-oxide, Nitrogen Di-oxide, Particulate Matters, Carbon monoxide emission from generator and boiler have significant impact of ambient air quality.

Table 32: Standard of Air Emission

Relevant Standard Permissible limit for Generator air emission is shown below:

Reference of Relevant Standard			Standards for Stack Emission from Industries or Projects (Generator)		
			SPM (mg/Nm^3)	NO_x	SO_2
Air Pollution Control Rules-2022[6]	Diesel	New (Running after 2020)	50	200	200
		Existing (Running before 2020)	80	400	400
	Natural Gas	New (Running after 2020)	-	200	-
		Existing (Running before 2020)	-	400	-
	LPG, LNG etc.	-	50	200	400
IFC/World Bank1F[7] (mg/Nm^3)		Gas	*NYS*	200 (spark ignition) 400 (Dual Fuel) 1600 (Compressed ignition)	*NYS*
		Liquid	*NYS*	1460	*NYS*
		Solid	*NYS*	*NYS*	*NYS*

[NYS= Not Yet Set]

Relevant Standard Permissible limit for Boiler air emission is shown below:

Reference of Relevant Standard			Boiler of Industrial unit (Parameter Standard)		
			SPM (mg/Nm^3)	NOx (mg/Nm^3)	SO_2 (mg/Nm^3)
DoE (Air Pollution Control)[8] (mg/Nm^3)	Gas	-	150	250	
	Oil	200	300		
	Coal	250	400		
	Husk	250	400		

[6] Air Pollution Control Rules (2022), Schedule-05, Department of Environment, Govt. of Bangladesh
[7] IFC (2007), Environmental, Health and Safety Guidelines: Environmental Air Emissions and Ambient Air Quality, IFC/World Bank Group
[8] Air Pollution Control Rules (2022), Schedule-05, Department of Environment, Govt. of Bangladesh

IFC/World Bank[9] (mg/Nm³)	Gas	N/A	320	*NYS*
	Liquid	150	460	2000
	Solid	150	650	2000

[NYS= Not Yet Set; N/A= Not Applicable]

STeP-OEKO TEX STANDARD PERMISSIBLE LIMIT			
For Gas/ Diesel Generator >0.3MW			
Parameter	Minimum	Advanced	Excellent
(Carbon Monoxide) CO: (mg/Nm³)			
Gaseous Fuel	500	250	150
Diesel Fuel	500	250	150
(Nitrogen oxides) NO_X: (mg/Nm³)			
Gaseous Fuel	500	300	100
Diesel Fuel	1000	500	200
(Sulphur Dioxide) SO_2: (mg/Nm³)			
Gaseous Fuel	200	100	30
Diesel Fuel	900	400	60

Facility Operations - Equipment/Combustion. Parameters and Limit values for facilities - WHO and Globally Regulated Pollutants[10]:

ZDHC Air Emission Guidelines							
Sl. No.	**Parameter**	**Source**	**Fuel Type**	**Foundational**	**Progressive**	**Aspirational**	**Concentrations Unit**
1	**Facility Combustion**	**NOx**	Solid	650	300	200	mg/Nm³
2			Liquid	460	250	85	mg/Nm³
3			Gas	400	150	40	mg/Nm³
4		**CO**	Solid	800	500	100	mg/Nm³
5			Liquid	650	400	100	mg/Nm³
6			Gas	500	300	100	mg/Nm³
7		**SOx**	Solid	750	650	300	mg/Nm³
8			Liquid	600	450	300	mg/Nm³
9			Gas	400	300	100	mg/Nm³
10		**PM**	Solid	500	300	100	mg/Nm³
11			Liquid	300	100	50	mg/Nm³
12			Gas	100	50	20	mg/Nm³

[9] IFC (2007), Environmental, Health and Safety Guidelines: Environmental Air Emissions and Ambient Air Quality, IFC/World Bank Group
[10] ZDHC Air Emissions Position Paper (Version 1.0) _January 2021

IFC/World Bank[9] (mg/Nm³)	Gas	N/A	320	*NYS*
	Liquid	150	460	2000
	Solid	150	650	2000

[NYS= Not Yet Set; N/A= Not Applicable]

STeP-OEKO TEX STANDARD PERMISSIBLE LIMIT			
For Gas/ Diesel Generator >0.3MW			
Parameter	Minimum	Advanced	Excellent
(Carbon Monoxide) CO: (mg/Nm³)			
Gaseous Fuel	500	250	150
Diesel Fuel	500	250	150
(Nitrogen oxides) NO_X: (mg/Nm³)			
Gaseous Fuel	500	300	100
Diesel Fuel	1000	500	200
(Sulphur Dioxide) SO_2: (mg/Nm³)			
Gaseous Fuel	200	100	30
Diesel Fuel	900	400	60

Facility Operations - Equipment/Combustion. Parameters and Limit values for facilities - WHO and Globally Regulated Pollutants[10]:

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Sl. No.	Parameter	Source	Fuel Type	Foundational	Progressive	Aspirational	Concentrations Unit
1	Facility Combustion	NOx	Solid	650	300	200	mg/Nm³
2			Liquid	460	250	85	mg/Nm³
3			Gas	400	150	40	mg/Nm³
4		CO	Solid	800	500	100	mg/Nm³
5			Liquid	650	400	100	mg/Nm³
6			Gas	500	300	100	mg/Nm³
7		SOx	Solid	750	650	300	mg/Nm³
8			Liquid	600	450	300	mg/Nm³
9			Gas	400	300	100	mg/Nm³
10		PM	Solid	500	300	100	mg/Nm³
11			Liquid	300	100	50	mg/Nm³
12			Gas	100	50	20	mg/Nm³

[9] IFC (2007), Environmental, Health and Safety Guidelines: Environmental Air Emissions and Ambient Air Quality, IFC/World Bank Group
[10] ZDHC Air Emissions Position Paper (Version 1.0) _January 2021

In the table the stack air emission quality test result is shown:

Table 33: Stack Emission Inspection Result

SL. No	Obtained result from Utilities									
	SPM	$PM_{2.5}$	PM_{10}	O_2	CO	NO	NO_2	CO_2	NO_x	SO_2
	(mg/Nm^3)	(mg/Nm^3)	(mg/Nm^3)	(%)	(mg/Nm^3)	(mg/Nm^3)	(mg/Nm^3)	(%)	(mg/Nm^3)	(mg/Nm^3)
Generator-1	23.1	10.5	13.4	7.2	235.1	115.2	65.2	5.8	188.3	0
Generator-2	19.2	8.7	11.5	5.6	218.3	101.2	52.5	5.6	153.5	0
Generator-3	18.1	7.1	11.6	5.2	206.7	98.8	49.7	5.0	147.4	05
Generator-4	17.8	7.3	10.6	5.1	201.7	98.8	50.7	5.0	148.6	06
Generator-5	24.7	10.3	14.2	6.7	220.4	114.7	67.3	5.5	198.2	09
Boiler-1	17.3	7.9	10.7	5.7	182.1	67.3	39.2	4.5	106.2	05
Boiler-2	18.8	7.4	11.1	5.5	187.2	68.9	40.1	4.4	108.3	07
Boiler-3	14.5	5.1	9.4	4.1	131.4	54.1	26.9	4.1	80.2	0
Boiler-4	16.5	6.1	10.4	4.4	177.4	67.1	36.9	4.3	103.2	0

Source: Stack Air Emission Inspection conducted by Greenbud

Mitigation Measures

The stack test result stipulated above indicates that the emission from the utilities have considerably less impact on the environment as most of these parameters meet the national emission standard.

5.3.7 Noise and Vibration Impacts

Impact Origin

Noise level needs to be kept within 75 dB because working under a condition more than 75 dB is harmful for health in both short and long term. Primarily personnel working at the utility area is exposed to the high noise level for several hours. The consultant team measures the noise level in different area identified in the area of high noise generating sources.

Mitigation Measures

To reduce noise impact from machineries are installed in separate room enclosed with 300 mm thick wall which acts as noise barrier. The factory management will also increase greenery area near around the utility and factory premises as plantation acts as natural sound barrier. In case of the noise pollution near machines would be minimized by using ear protection by the worker adjacent to it. Noise due to mechanical friction and vibration would be reduced by baffling specific machine parts with noise absorbing coating.

5.3.8 Impact due to Greenhouse Gases (GHG)

Greenhouse gas refers to the compound that absorbs and emits radiation within thermal infrared range. This process is the fundamental cause of the greenhouse Effect. Earth's natural greenhouse Effect makes life as we know it possible. However, human activity since the industrial revolution has increased the amount of GHG in the atmosphere, (CO_2, methane, ozone, CFCs, etc.), with the resulting strengthening of the natural Greenhouse Effect, causing global warming.

Table 34: GHG Emissions Sources, Factors, and Activity Data

GHG Emissions Sources, Factors and Activity Data

GHG Emission: Purchased Electricity (January '24 - December '24)

Month	Purchased Electricity (kwh)	CO_2e (tons)
January-24	299,244	200.493
February-24	375,444	251.547
March-24	548,482	367.483
April-24	311,151	208.471
May-24	258,763	173.371
June-24	246,063	164.862
July-24	288,132	193.048
August-24	363,625	243.629
September-24	396,876	265.907
October-24	417,513	279.734
November-24	169,863	113.808
December-24	363,538	243.570
Total Emission from Purchased Electricity in CO_2e (tons):		**2705.925**

Source: Grid Emission Factor of Bangladesh, DoE[11]

GHG Emission from: Fuel Consumption from Generator (January '24 - December '24)

Month	Diesel Use from Generator (Liter)	CO_2e (tons)	Gas Use from Generator (m^3)	CO_2e (tons)
January-24	9,000	25.834	87,340	164.651
February-24	0	0.000	69,331	130.701
March-24	18,000	51.667	64,531	121.652
April-24	36,000	103.335	90,217	170.074
May-24	34,852	100.040	129,730	244.563
June-24	28,800	82.668	100,036	188.585
July-24	33,860	97.192	93,370	176.018
August-24	37,410	107.382	89,931	169.535
September-24	51,500	147.826	125,347	236.301
October-24	91,000	261.207	148,228	279.435
November-24	91,000	261.207	158,683	299.145
December-24	90,000	258.337	152,200	286.923

[11] http://www.doe.gov.bd/site/notices/059ddf35-53d3-49a7-8ce6-175320cd59f1/Grid-Emission-Factor(GEF)-of-Bangladesh

Month	Diesel Use from Generator (Liter)	CO_2e (tons)	Gas Use from Generator (m^3)	CO_2e (tons)
Total		1496.695		2467.583
Total Emission from Fuel Consumption from Generator in CO_2e (tons):		3,985.135		

Source: Greenhouse Gas Protocol for Emission from Stationary Combustion tool_(Version4-1)[12]

GHG Emission from: Fuel Consumption from Boiler (January '24 - December '24)

Month	CNG Use from Boiler (Liter)	CO_2e (tons)	Gas Use from Boiler (m^3)	CO_2e (tons)
January-24	2,230.86	4.206	204,290	385.122
February-24	3,344.06	6.304	222,814	420.042
March-24	4,064.44	7.662	179,754	338.867
April-24	4,461.37	8.410	213,401	402.297
May-24	5,204.81	9.812	200,866	378.667
June-24	0	0.000	181,632	342.407
July-24	0	0.000	215,902	407.012
August-24	0	0.000	218,402	411.725
September-24	0	0.000	267,180	503.680
October-24	0	0.000	196,163	369.801
November-24	0	0.000	150,620	283.944
December-24	0	0.000	190,791	359.674
Total		36.394		4603.239
Total Emission from Fuel Consumption from Boiler in CO_2e (tons):		4,639.633		

Source: Greenhouse Gas Protocol for Emission from Stationary Combustion tool_(Version4-1)[12]

GHG Emission: Paper Consumption (January '24 - December '24)

Month	Paper Used (Kg)	CO_2e (tons)
January-24	1782.5	2.387
February-24	1930	2.585
March-24	2275	3.047
April-24	22.5	0.030
May-24	3675	4.922
June-24	1887.5	2.528
July-24	1897.5	2.541
August-24	1882.5	2.521
September-24	1917.5	2.568
October-24	1967.5	2.635
November-24	2600	3.482
December-24	2380	3.188
Total Emission from Paper Consumption in CO_2e (tons):		32.435

Reference: DEFRA-Material Use factors for Paper[13]

[12] https://ghgprotocol.org/calculation-tools-and-guidance
[13] https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023

GHG Emission: Food Waste (January '24 - December '24)

Months	Total Monthly Food Waste (tons)	CO_2e (tons)
January-24	0.1538	0.108
February-24	0.1416	0.099
March-24	0.1792	0.125
April-24	0.1121	0.078
May-24	0.1553	0.109
June-24	0.1073	0.075
July-24	0.1383	0.097
August-24	0.161	0.113
September-24	0.1615	0.113
October-24	0.1582	0.111
November-24	0.1615	0.113
December-24	0.1935	0.135
Total Emission from Food Waste in CO_2e (tons):		**1.276**

Reference: DEFRA-Material Use factors for Food Waste[13]

GHG Emission: Fire Extinguishing (January '24 - December '24)

Months	CO_2e (tons)
January-24	0.035
February-24	0.09
March-24	0.02
April-24	0.025
May-24	0.025
June-24	0.05
July-24	0.01
August-24	0.025
September-24	0.03
October-24	0.03
November-24	0.025
December-24	0.01
Total Emission from Fire Extinguishing in CO_2e (tons):	**0.375**

GHG Emission: Fugitive Emission (January '24 - December '24)

Total Emission from Fugitive Emission in CO_2e (tons):	**110.41**

Reference: ODS Report of the Facility. The emission factors here are used from DEFRA- Refrigerant & other.[13]

Total GHG Emission

GHG emission from various sources of the project activity is shown below table. Calculation of GHG has been conducted for six sources and based on the provided consumption information for the last twelve months. To understand the contribution of different sources in the total emitted GHG, the obtained data is plotted in a pie diagram. The diagram indicates that the most significant source of GHG emission for this specific factory is **Utility Fuel,** which is 75% of the total emission of GHG.

Table 35: Overall Emission of GHG According to Activity (January '24 - December '24)

Month	Emission of CO_2e from different sources (Tons)					
	Purchased Electricity	Utility Fuel	Paper Use	Food Waste	Fire Extinguishing	Fugitive Emission
Jan-24	200.493	579.808	2.387	0.108	0.035	110.41
Feb-24	251.547	557.047	2.585	0.099	0.090	
Mar-24	367.483	519.841	3.047	0.125	0.020	
Apr-24	208.471	684.102	0.030	0.078	0.025	
May-24	173.371	733.067	4.922	0.109	0.025	
Jun-24	164.862	613.648	2.528	0.075	0.050	
Jul-24	193.048	680.209	2.541	0.097	0.010	
Aug-24	243.629	688.627	2.521	0.113	0.025	
Sep-24	265.907	887.786	2.568	0.113	0.030	
Oct-24	279.734	910.406	2.635	0.111	0.030	
Nov-24	113.808	844.259	3.482	0.113	0.025	
Dec-24	243.570	904.897	3.188	0.135	0.010	
Total	**2705.925**	**8603.697**	**32.435**	**1.276**	**0.375**	**110.41**

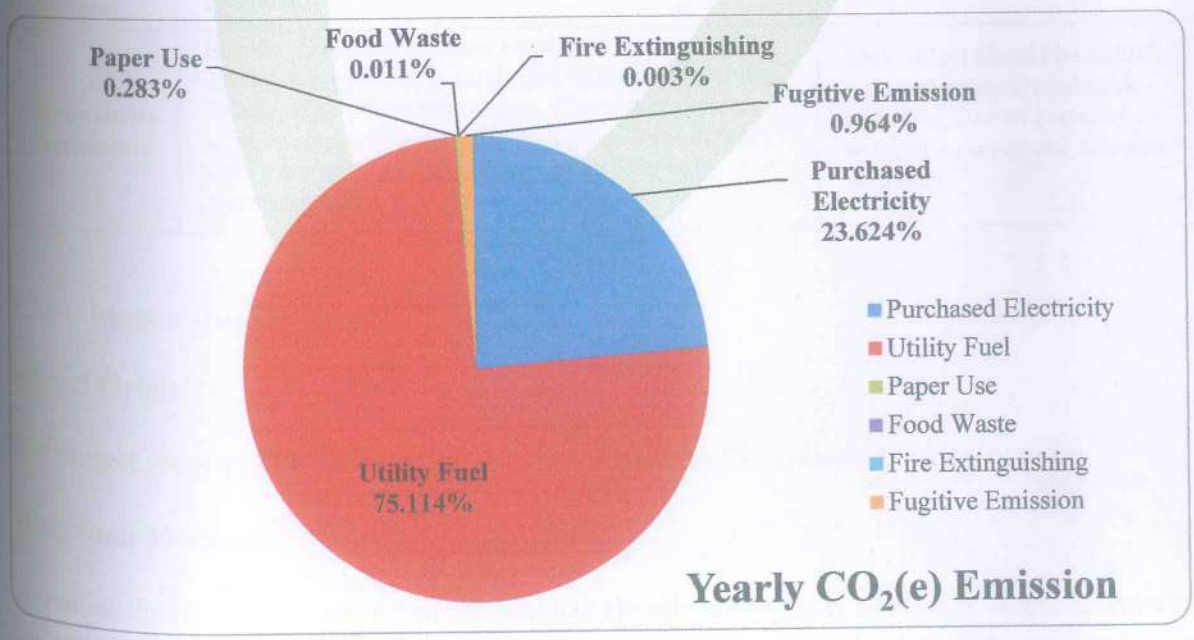

Figure 29: Percent of GHG Emission from Various Sectors

GHG Emission Control – Roles and Responsibilities

The following table outlines the roles and responsibilities that were assigned before estimating the greenhouse gas inventory. Note that multiple people or a group can be responsible for a single role and that a single person can be responsible for more than one role.

Table 36: GHG Role and Responsibility

Role	Responsibilities	Training Level
Data Collection Officer	This officer is responsible for collecting, managing and logging all data used to estimate greenhouse gas emission inventory. The officer is responsible for ensuring all data is reported to them and that the data adheres to the specified data collection standards and quality assurance procedures. Finally, the officer is responsible for ensuring that all data collection procedures in this document adhere to the relevant standard.	The officer should have a thorough understanding of relevant data collection procedure and standards
Modeling Officer	This officer is responsible for ensuring the emissions inventory model adheres to the methodologies described in **NKIL.** GHG emissions Inventory Handbook. The officer is also responsible for reviewing the methodologies described in this document to ensure they are current and adhere to the relevant standards. Finally, this officer is responsible for running the model and reporting the results of the emissions inventory to the Data collection Officer.	This officer should have a thorough understanding of the relevant standards and modeling methodologies. The officer needs to possess sufficient quantitative skills to understand and run the model.
Accounts Team	This officer is responsible for collecting and reporting activity data derived from accounting records to the data collection Officer.	This officer should be familiar with the accounting system and accounting practices at **NKIL**
Energy Assessment Responsible (Sustainability Team)	This officer is responsible for collecting and recording energy use (electrical and fuel) at all the **NKIL's** facilities and reporting this information to the Data Collection Officer. This officer may be an external contractor.	This officer should be familiar with energy systems and utility reporting processes.
Sustainability Responsible	In some cases, for example employee commuting, a survey may need to be conducted to estimate activity data or other model parameters. The survey officer shall be responsible for conducting and interpreting such a survey. This officer may be an external contractor.	This officer should be familiar with survey methodologies including how to correctly conduct a survey and interpret the result.

5.3.9 Impact Due to Groundwater Usage

Impact Origin

The project requires groundwater for domestic activities like toilets, drinking activity.

Mitigation Measures

To reduce the impact, the project proponent has already taken many necessary steps. Moreover, eighteen (18) water flow meters have been installed to track down the groundwater consumption. The facility also uses recycled water in various activities.

5.3.10 Impact due to Liquid Discharge

Being a dyeing-washing & garments factory, **Norp Knit Industries Ltd. (Unit-2)** primarily generates industrial waste water or effluent from its production process. In addition, a small amount of water is also used for occupational floor, equipment washing, and for domestic purposes. This wash water will not contain a significant amount of pollution, which may impact the surface water quality.

Mitigation Measures

The facility uses two Chemical-Biological Effluent Treatment Plant (ETP) with capacity of 80 m^3/hr. & 40 m^3/hr. and the wastewater is discharged through this unit. The quality of effluent fulfills the demand of the Department of Environment (DoE) of Bangladesh as well as the International Environmental Baseline Guideline. The management can reuse the treated effluent as process water.

5.3.11 Impact Due to Fossil Fuel Depletion

Impact Origin

The project uses a few amounts of diesel and gas to operate vehicles. Use of electricity is also responsible for the depletion of fossil fuel. Fossil fuel depletion will eventually lead to the greenhouse gas emission.

Mitigation Measures

To reduce the fossil fuel depletion, the project proponent has already implemented energy conservation strategy. Conventional electrical appliances can be replaced with energy saving appliances.

5.4 Risk Analysis

Risk criteria assist in clearly defining unacceptable and acceptable levels of risk and enables risks to be prioritized. Table 37 outlines the risk criteria applied.

Table 37: Risk Criteria

Risk criterion	Objective
Safety	Safety must be upheld at all times. No injuries or fatalities will be accepted.
Financial impact	Project costs should remain within the allocated budget.
Media exposure	The Project must ensure that the reputation of the business is protected from negative media exposure.
Timing	The Project must be completed within the contractual timeframe.
Staff management	The Project must utilize existing staff skills. Where a particular skill set is not available, sub-contracting may be considered.
Environment	The Project must operate within requirements of environmental legislation and be consistent with the environmental policy and commitment.

The level of risk was determined using the Risk Ranking Tool. Identified risks are ranked in priority according to the severity of the possible consequence and the likelihood of its occurrence, refer Tables 38 and 39. The Risk Matrix was used to evaluate and priorities the risk and refer Table 40.

Table 38: Consequence Severity Table

Severity	Health & Safety	Environment
Catastrophic	↓ Multiple deaths ↓ Destruction of protected wildlife or plants or their habitat	↓ Community complaint received with impact at National level.
Major	↓ Severe impact on human health (e.g., poisoning) ↓ Prolong exposure may cause epidemic/death	↓ Destruction of wildlife or plants or their habitat ↓ Long term environmental damage ↓ Devastation to large area of land/water body ↓ Severely affecting the health of a local community ↓ Community complaint received with impact at State/National government level
Significant	↓ Prolong exposure cause mental/physical instability or disease ↓ Long term health damage	↓ Severely affect wildlife or plants ↓ Emission/discharge exceeding legal standard and is reportable to a government authority ↓ Legally actionable activity ↓ Long term impact on environment and locality
Moderate	↓ Damage work environment ↓ Prolong exposure cause nuisance/minor illness	↓ Minor level pollution which can be alleviated by simple mitigation measures ↓ Non-compliance with internal environmental target ↓ Concern by local community, environmental matter
Minor	↓ No impact on human health & safety	↓ No direct pollution to any environmental component ↓ Depletion/degradation of natural resources ↓ No community complaints ↓ No breach of regulation or consent

Table 39: Likelihood Classifications

Almost Certain	Likely	Possible	Unlikely	Rare
The event is expected to occur in most occasions.	The event is expected to occur on many occasions.	The event is expected to occur on some occasions.	The event is expected to occur infrequently.	The event may occur in exceptional circumstances.
Frequency: Continuously	Frequency: Several times in a day	Frequency: At least once in a day	Frequency: At least Once in a week	Frequency: Yearly or Not occur

Table 40: Risk Matrix

QUANTITATIVE RISK RANKING MATRIX						
Likelihood		Consequences				
		Minor	Moderate	Significant	Major	Catastrophic
		1	2	3	4	5
Almost certain	5	5	10	15	20	25
Likely	4	4	8	12	16	20
Possible	3	3	6	9	12	15
Unlikely	2	2	4	6	8	10
Rare	1	1	2	3	4	5
1 – 4 Low Risk			5 – 12 Medium Risk		13 – 25 High Risk	

Reference: http://osh-isis.com/eaia

Table 41: Environmental Risk Status

Process/Activity	Aspect	Impact	Consequences	Likelihood	Risk/ Significance Score	Risk Status
Store	Dust/Particles Generation	Air Pollution	Moderate	Unlikely	4	Low
	Solid Waste Generation	Soil Contamination	Moderate	Possible	6	Medium
	Energy Use	Fossil Fuel Depletion	Moderate	Unlikely	4	Low
Cutting	Energy Use	Fossil Fuel Depletion	Moderate	Almost Certain	10	Medium
	Solid Waste Generation	Soil Contamination	Moderate	Almost Certain	10	Medium
	Dust/Particles Generation	Air Pollution	Moderate	Almost Certain	10	Medium
	Noise Generation	Noise Pollution	Moderate	Likely	8	Medium
Embroidery	Energy Use	Fossil Fuel Depletion	Moderate	Almost Certain	10	Medium
	Solid Waste Generation	Soil Contamination	Moderate	Possible	6	Medium
	Dust/Particles Generation	Air Pollution	Moderate	Possible	6	Medium
	Noise Generation	Noise Pollution	Moderate	Likely	8	Medium
	ODS Emission	Climate Change	Significant	Likely	12	Medium
Sewing	Solid Waste Generation	Soil Contamination	Moderate	Possible	6	Medium
	Dust/Particles Generation	Air Pollution	Moderate	Almost Certain	10	Medium
	Energy Use	Fossil Fuel Depletion	Moderate	Almost Certain	10	Medium
	Noise Generation	Noise Pollution	Moderate	Almost Certain	10	Medium
Washing	Dust/Particles Generation	Air Pollution	Moderate	Unlikely	4	Low
	Wastewater Generation	Water Pollution	Significant	Likely	12	Medium
	Solid Waste Generation	Soil Contamination	Moderate	Possible	6	Medium
	VOC Emission/Chemical Use	Air Pollution	Significant	Unlikely	6	Moderate
	Energy Use	Fossil Fuel Depletion	Moderate	Almost Certain	10	Medium
	Groundwater Use	Water Pollution	Significant	Likely	12	Medium
	Water Consumption					
	Hazardous Waste Generation	Soil Contamination	Significant	Possible	9	Medium
	Heat Generation	Climate Change	Significant	Possible	9	Medium
	ODS Emission	Climate Change	Significant	Likely	12	Medium
	Noise Generation	Noise Pollution	Moderate	Likely	8	Medium

Process/Activity	Aspect	Impact	Consequences	Likelihood	Risk/ Significance Score	Risk Status
Finishing	Energy Use	Fossil Fuel depletion	Moderate	Almost Certain	10	Medium
	Solid Waste Generation	Soil Contamination	Moderate	Possible	6	Medium
	Dust/Particles Generation	Air Pollution	Moderate	Possible	6	Medium
	Noise Generation	Noise Pollution	Moderate	Possible	6	Medium
	Groundwater Use	Water Pollution	Significant	Likely	12	Medium
	Water Consumption					
Packing	Solid Waste Generation	Soil Contamination	Moderate	Possible	6	Medium
	Dust/Particles Generation	Air Pollution	Moderate	Unlikely	4	Low
	Energy Use	Fossil Fuel Depletion	Moderate	Likely	8	Medium
	Noise Generation	Noise Pollution	Moderate	Unlikely	4	Low
	ODS Emission	Climate Change	Significant	Likely	10	Medium
Finished Goods Store	Dust/Particles Generation	Air Pollution	Moderate	Unlikely	4	Low
	Energy Use	Fossil Fuel Depletion	Moderate	Unlikely	4	Low
ETP	Noise Generation	Noise Pollution	Moderate	Likely	8	Medium
	Solid Waste Generation	Soil Contamination	Significant	Possible	9	Medium
	Wastewater Generation	Water Pollution	Significant	Likely	12	Medium
	Groundwater Use	Water Pollution	Significant	Likely	12	Medium
	Water Consumption					
	VOC Emission	Air Pollution	Moderate	Likely	8	Medium
	Dust/Particles Generation		Moderate	Possible	6	Medium
	Sludge Generation	Soil contamination	Significant	Likely	12	Medium
	Hazardous Waste Generation		Significant	Possible	9	Medium
		Water Pollution	Significant	Likely	12	Medium
	Energy Use	Fossil Fuel Depletion	Moderate	Almost Certain	10	Medium
Lab	Solid Waste Generation	Soil Contamination	Significant	Possible	9	Medium
	VOC Emission/ Chemical Use	Air Pollution	Significant	Possible	9	Medium
	Energy Use	Fossil Fuel Depletion	Moderate	Likely	8	Medium
	Wastewater Generation	Water Pollution	Moderate	Likely	8	Medium
	Groundwater Use	Water Pollution	Moderate	Likely	8	Medium
	Water Consumption					

Process/Activity	Aspect	Impact	Consequences	Likelihood	Risk/ Significance Score	Risk Status
	Hazardous Waste Generation	Soil Contamination	Significant	Possible	9	Medium
	Heat Generation	Climate Change	Moderate	Unlikely	4	Low
	ODS Emission	Climate Change	Significant	Likely	12	Medium
	Noise Generation	Noise Pollution	Moderate	Possible	6	Medium
Others						
Spot Removing Room	Energy Use	Fossil Fuel Depletion	Moderate	Possible	6	Medium
	Solid Waste Generation	Soil Contamination	Significant	Possible	9	Medium
	VOC Emission/Chemical Use	Air Pollution	Significant	Likely	12	Medium
	Hazardous Waste Generation	Soil Contamination	Significant	Possible	9	Medium
	Noise Generation	Noise Pollution	Moderate	Likely	8	Medium
Medical Room	VOC Emission/Chemical Use	Air Pollution	Moderate	Possible	6	Medium
	Solid Waste Generation	Soil Contamination	Moderate	Likely	4	Low
	Energy Use	Fossil Fuel Depletion	Moderate	Likely	4	Low
	ODS Emission	Climate Change	Moderate	Likely	4	Low
	Groundwater Use	Groundwater Depletion	Moderate	Likely	5	Low
	Water Consumption					
	Domestic Wastewater Generation	Water Pollution	Moderate	Likely	5	Low
	Hazardous Waste Generation	Soil Contamination	Significant	Possible	6	Medium
Child Care Room	Solid Waste Generation	Soil Contamination	Moderate	Possible	6	Medium
	Domestic Wastewater Generation	Water Pollution	Moderate	Likely	4	Low
	Energy Use	Fossil Fuel Depletion	Moderate	Likely	4	Low
	Groundwater Use	Water Pollution	Moderate	Unlikely	4	Low
	Water Consumption					
	Noise Generation	Noise Pollution	Moderate	Possible	6	Medium

Process/Activity	Aspect	Impact	Consequences	Likelihood	Risk/ Significance Score	Risk Status
Chemical Store	Energy Use	Fossil Fuel Depletion	Moderate	Rare	2	Low
	VOC Emission/Chemical Use	Air Pollution	Significant	Possible	9	Medium
	Dust/Particles Generation		Moderate	Likely	8	Medium
	Wastewater Generation	Water Pollution	Significant	Possible	9	Medium
	Hazardous Waste Generation	Soil Contamination	Moderate	Unlikely	4	Low
	Solid Waste Generation	Soil Contamination	Moderate	Unlikely	4	Low
	Groundwater Use	Groundwater Depletion	Moderate	Unlikely	4	Low
	Noise Generation	Noise Pollution	Minor	Rare	1	Low
Dining	Solid Waste Generation	Soil Contamination	Moderate	Likely	8	Medium
	Domestic Wastewater Generation	Water Pollution	Moderate	Unlikely	4	Low
	Water Consumption	Groundwater Depletion	Moderate	Possible	6	Medium
	Energy Use	Fossil Fuel Depletion	Moderate	Possible	6	Medium
	Groundwater Use	Groundwater Depletion	Moderate	Possible	6	Medium
	Noise Generation	Noise Pollution	Moderate	Possible	6	Medium
	Dust/Particles Generation	Air Pollution	Moderate	Unlikely	4	Low
Power Generation (Generator)	Air Emission	Air Pollution	Moderate	Almost Certain	10	Medium
	Dust/Particles Generation	Air Pollution	Moderate	Likely	8	Medium
	Fuel Use	Fossil Fuel Depletion	Moderate	Almost Certain	10	Medium
	Noise Generation	Noise Pollution	Moderate	Almost Certain	10	Medium
	GHG emission	Climate Change	Moderate	Almost Certain	10	Medium
	Heat Generation	Climate Change	Moderate	Almost Certain	10	Medium
	Groundwater Use	Water Pollution	Moderate	Unlikely	4	Low
	Water Consumption					
	Energy Use	Fossil Fuel Depletion	Moderate	Almost Certain	10	Medium
Steam Generation (Boiler)	Air Emission	Air Pollution	Significant	Likely	12	Medium
	Dust/Particles Generation		Moderate	Almost Certain	10	Medium
	Fuel Use	Fossil Fuel Depletion	Moderate	Almost Certain	10	Medium
	Energy Use	Fossil Fuel Depletion	Moderate	Almost Certain	10	Medium

Process/Activity	Aspect	Impact	Consequences	Likelihood	Risk/ Significance Score	Risk Status
	GHG emission	Climate Change	Moderate	Almost Certain	10	Medium
	Noise Generation	Noise Pollution	Moderate	Almost Certain	10	Medium
	Heat Generation	Climate Change	Moderate	Almost Certain	10	Medium
	Water Consumption	Groundwater Depletion	Significant	Likely	12	Medium
	Groundwater Use		Significant	Likely	12	Medium
Compressed Air generation	Energy Use	Fossil Fuel Depletion	Moderate	Almost Certain	10	Medium
	Noise Generation	Noise Pollution	Moderate	Likely	8	Medium
	Compress Air	Noise Pollution	Moderate	Likely	8	Medium
Office Activity	Solid Waste Generation	Soil contamination	Minor	Likely	4	Low
	Energy Use	Fossil Fuel Depletion	Minor	Almost Certain	5	Medium
	Water use	Ground water depletion	Moderate	Possible	6	Medium
	ODS emission	Climate Change	Major	Rare	4	Low
Maintenance Activity	Dust/Particulate generation	Air Pollution	Moderate	Possible	6	Medium
	Energy Use	Fossil Fuel Depletion	Minor	Almost Certain	5	Medium
	Hazardous Waste Generation	Soil Contamination	Moderate-	Unlikely	4	Low
	Solid Waste Generation	Soil contamination	Minor	Likely	4	Low
	Noise Generation	Noise Pollution	Moderate	Possible	6	Medium
Toilet & Wash basin	Water use	Ground water depletion	Minor	Likely	4	Low
	Domestic wastewater generation	Water Pollution	Moderate	Likely	8	Medium
	Energy Use	Fossil Fuel Depletion	Minor	Likely	4	Low

Chapter Six

Environmental Management Plan

6.1 General Considerations

The primary objective of the environmental management and monitoring is to record environmental impacts resulting from the project activities and to ensure implementation of the "mitigation measures" identified earlier in order to reduce adverse impacts and enhance positive impacts from specific project activities. Besides, it would also address any unexpected or unforeseen environmental impacts that may arise during operation phases of the project.

The EMP should clearly lay out:

a) the measures to be taken during operation phases of the project to eliminate or offset adverse environmental impacts, or reduce them to acceptable levels;
b) the actions needed to implement these measures; and

A monitoring plan to assess the effectiveness of the mitigation measures employed.

6.2 Environmental Policy

Environmental management strategy is a key tool that provides direction and principles regarding natural resource management and sustainable issues. It documents the circumstances, key challenges and opportunities of our environment, and identifies steps to release threatening processes, preserve and preserve our unique environment, and promote environmentally sustainable development.

Therefore, **Norp Knit Industries Ltd. (Unit-2)** is committed to reducing the environmental impact of its activities. To ensure a strong sustainable environment and sustainable business development, **Norp Knit Industries Ltd. (Unit-2)** has adopted a planning for the next few years. We work together to reduce the environmental impact of our manufacturing processes and products.

6.2.1 Purpose

This company focuses on environment friendly methods and promotes safe working conditions for the workers beside quality product. The Company is committed to protect the environment of the Earth. To minimize environmental impacts concerning our activities, products and services, We shall: -

- Comply with applicable legal requirements and other requirements to which the Company subscribes which relate to its environmental aspects.
- Take several improvement plans (such as Energy conservation, water conservation, chemical conservation, waste reduction, air emission reduction, treated waste water quality improvement etc.) to reduce the non-renewable natural resources depletion and maintain environmental balance.
- Design product & production related all activities with top priority of Preventing pollution, reducing waste and minimizing the consumption of non-renewable natural resources.
- Educate, train and motivate employees to carry out tasks in an environmentally responsible manner.

- Encourage environmental protection among suppliers and subcontractors.
- Play necessary role (where applicable) to improve environment in company surroundings.

The Company is committed to continual improvement of environmental performances. This Policy will be treated as foundation for any operation (related to environment & Chemical management) & any future operational changing within the company and will be communicated to all worker, staff, sub-contractors & suppliers, and be available for the public.

The referred environmental policy is attached in **Annexure F.**

6.3 Institution Arrangement

The authority of this factory is delineated an environmental committee by including representatives from all concern departments like admin, production & maintenance to make sure active & appropriate EMS. This committee check & implement all EMS related activities & process. Environmental committee sits together at certain interval (six months to one year interval) to follow up & discuss about the progress of environmental issues (like strategy, permit status, Regulation etc.)

The environment management organogram and responsibilities performed by the individual is depicted below.

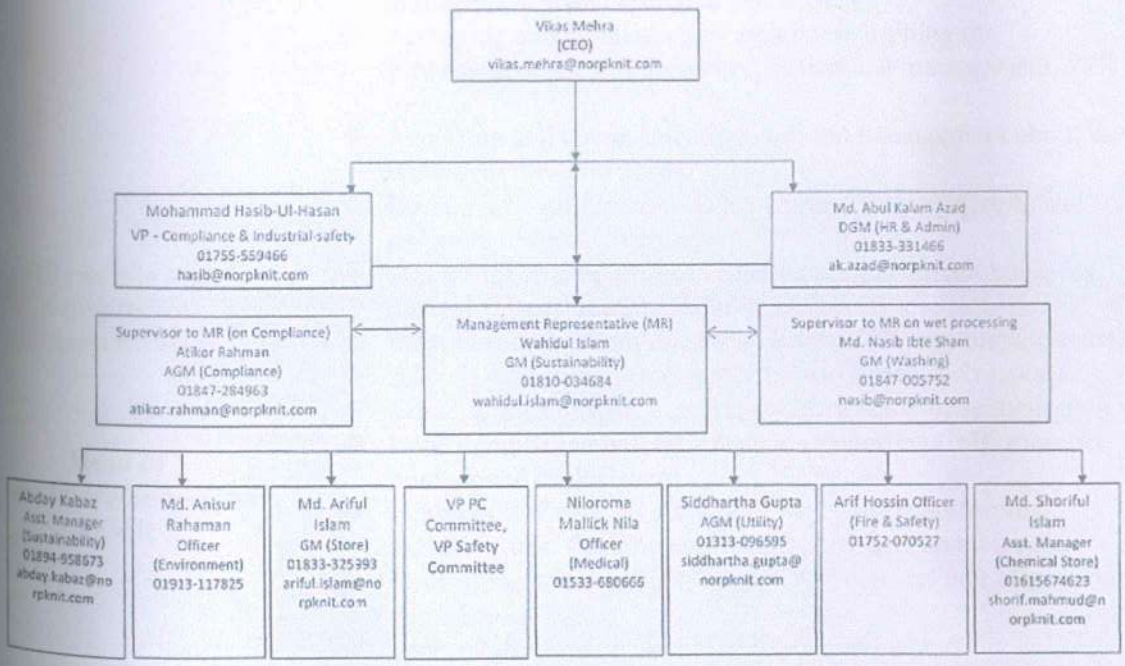

Figure 30: Environment Management Team

Table 42: Responsibilities of EMS Personnel

Designation	Responsibility
Top Management	❖ Articulate "Environmental Policy "to committee (EMC) to show strong commitment for effective environmental management. ❖ Ensuring "Environment policy' is aligned with business policy. ❖ Ensuring enough resource for environmental management. ❖ Promotions continual improvement through effective guidance & support.
Management Representative of EMS	❖ Working as MR to represent the Environmental Management System of the factory. ❖ Coordinating with the team members to implement the EMS. ❖ Monitoring the work for updating the Environmental legal and other requirements. ❖ Arranging review meeting with the top engagement to share of the activities of the environmental team to update the objective and strategies of the EMS. ❖ Facing the environmental related audits such as ISO 14001 audit, GOTS, GRS, Higg FEM, GTW, Regenagri etc. ❖ Working with the team member to implement the energy conservation, water conservation, waste management, chemical management, Air Emission, ❖ GHG by setting a reduction target. ❖ Conducting the internal audit on EMS and submitting to top management with corrective action plan. ❖ Arranging and conducting of awareness training on Environment, Health and Safety, Chemical management, PPE use. ❖ Reporting and communicating with top management about the EMS activities and needs.
HR, Admin and Compliance Responsible	❖ Updating Legal Licenses as per Compliance obligating and enforcing those to everyone. ❖ Supporting to prepare and achieve organizational objectives through proper training program. ❖ Playing role at communication between different departments. ❖ playing vital role in emergency preparedness and response. ❖ Communication with Top management for management review.
Head of Compliance/Supervisor to MR	❖ Head compliance will take decision regarding EMC member number and replacement. ❖ In absence of MR, all activity of MR will be performed. Regular work: Guiding and cooperating MR on all issues.
ETP & ECR Responsible (ECR)	❖ Controlling all documents in ETP & Chemical compliance and recording all data ❖ Working for organizational objective, target and implementation (related to EMS), ❖ Playing roles in Emergency preparedness. ❖ Recording data of Resource consumption, makes KP' sheet and informing those to MIR. ❖ Performing all works (instructed by MR) according to EMS manual ❖ Overall management of ETP (an instructed by MR) and Chemical compliance.

Designation	Responsibility
ETP & ECR Responsible (ETP)	❖ Overall responsible of ETP (wastewater, sludge etc) ❖ Water management & look after ❖
Fire and Safety responsible (Chemical Safety)	❖ Fire and safety responsible is dedicated to work of any corrective and preventive action regarding fire and safety issues related to chemical & others. ❖ Keeping the check list of the fire and safety equipment and doing maintenance. ❖ Taking safety measures in case of any environmental or chemical related emergencies.
Maintenance and Utility responsible	❖ The maintenance and Utility member of the organogram ensure work on the energy and water conservation plan to reduce the consumption by giving technical ❖ solution. ❖ Working to make sure the engineering control for the safe environment of the factory. ❖ Keeping record of the energy use so that we can calculate for the energy conservation. They also continue their proper maintenance to make sure the machine ❖ energy efficiency. ❖ Working to reduce loss percentage in Water balance diagram and to reduce water consumption (from utility plant) & Steam consumption. ❖ Taking necessary measures to set target and to implement necessary measures to reduce Air emission. ❖ Performing internal energy auditing: Water audit and taking necessary action (with discussion with top management).
Chemical Responsible	❖ Taking all necessary measures as instructed for MR and factory chemical compliance responsible (as per EMS manual and chemical
Material and Waste Responsible	❖ Waste management as per factory "Waste management procedure".
PC & SC Member	❖ PC & SC member will be responsible for awareness raising among the workers and to update to welfare officers on any environment management issue.
Medical waste responsible	❖ Ensuring proper management of medical waste with help of Admin department

6.4 Management Plan

Most of the environmental parameters will experience adverse effects during the operation phase. Efforts would be made to reduce these adverse impacts as well as enhance beneficial impacts. The environmental management during the operation phase is primarily focused on addressing the following issues:

a) Air Quality
b) Noise Level
c) Water Quality
d) Waste Generation

The tables below summarize the significant environmental impacts generated from facility operation, the measures needed to eliminate or offset adverse impacts and enhance positive impacts.

Table 43: Plan & Strategy to Reduce Noise Impact

Noise Pollution
Objective: Reduction of impact on human health from noise generation
Management Plan & Strategy: Monitoring & tracking sources and implementation of appropriate & feasible noise control measure
Resource: PPE, replacement equipment, noise test reports

S/I	Action Plan	Responsible Person	Timeline	Monitoring Frequency	Performance Indicator
01	Ensure proper use of ear plug in all noise generating area	AGM-Compliance	COMPLETE	Weekly	Purchase/issue document
02	Install canopy to the generator	AGM -Utility	2030	Annually	Noise test report
03	Servicing of the compressor according to manufacturer's recommendation	AGM -Utility	Continuous Process	Monthly	Noise test report
04	Servicing the process equipment according to manufacturer's recommendation	AGM -Utility	Continuous Process	Monthly	Noise test report
05	Indoor and ambient noise level testing	AGM -Utility	COMPLETE	Annually	Noise test report
06	Built 150mm thick wall in utility sections	AGM -Utility	COMPLETE	Annually	Purchase and Maintenance Record

Table 44: Plan & Strategy to Reduce Water Consumption

Water Use Reduction/Conservation
Objective: Reduction of ground water extraction from baseline consumption
Management Plan & Strategy: Source tracking and reduction of usages through implementing feasible plan and technology
Resource: water consumption inventory, water flow meters, water reuse plan, water efficient fixtures

S/I	Action Plan	Responsible Person	Timeline	Monitoring Frequency	Performance Indicator
01	Installation of water flow meter	AGM -Utility	COMPLETE	Daily	Purchase Record
02	Installation/maintenance of steam trap/G-trap	AGM -Utility	COMPLETE	Monthly	Maintenance Record
03	Installation of auto blow down controller	AGM -Utility	In Progress	Monthly	Installation Record
04	Replacement of normal water tap with water aerator tap	Civil Department	2030	Monthly	Water Consumption Record
05	Install low flow toilet flash	Civil Department	2030	Monthly	Water Consumption Record
06	Installation of water trigger nozzle & compressed air nozzle	AGM-Utility	COMPLETE	Quarterly	Purchase Record
07	Introduce and maintenance of rainwater harvesting system	Civil Department	2030	Monthly	Water Consumption Record
08	Maintenance of all plumbing fixture & pipeline to reduce water leakage	Civil Department	Continuous Process	Quarterly	Maintenance Record
09	Recycle water wherever possible i.e. production	AGM -Utility	COMPLETE	Monthly	Water Consumption Record
10	Maintenance of all plumbing fixture & pipeline to reduce water leakage	Civil Department	Continuous Process	Quarterly	Maintenance Record
11	Installation of trigger nozzles, conduct regular maintenance of leakage valves, and implementation of good housekeeping practices.	Civil Department	Continuous Process	Daily	Maintenance Record
12	Optimization of washing sequence and use of low liquor ratio chemicals	GM-Washing	Continuous Process	Monthly	Visual Inspection

S/I	Action Plan	Responsible Person	Timeline	Monitoring Frequency	Performance Indicator
13	Installation of low liquor ratio machine	GM-Washing	Continuous Process	Annual	Installation Record
14	Harvest rainwater from Building-1	Civil Department	2030	Annual	Water Consumption Record

Table 45: Plan & Strategy to Reduce Water Pollution

Waste Water Management
Objective: Sustain compliance status with standard for industrial and domestic discharge
Management Plan & Strategy: Monitoring of treatment technology, substituting chemical use with feasible eco-friendly alternative
Resource: Emergency response plan, ECR, BSR and ZDHC guideline, ZDP plan etc.

S/I	Action Plan	Responsible Person	Timeline	Monitoring Frequency	Performance Indicator
01	Installation of Sewage Treatment Plant (STP)	GM- Sustainability	2030	Annually	Sewage Test Report
02	Ensure usage of secondary container on fuel/machine oil use/unloading point.	Chemical Store Responsible	Continuous Process	Monthly	Visual Inspection
03	Installation of septic tank with soak pit system	Civil Department	Continuous Process	Monthly	Visual Inspection; Design & Drawing
04	Training and different awareness program on reduction of fresh water wastage and at all consumption	AGM-Compliance	Continuous Process	Monthly	Training Record
05	Recycling ETP outlet water	AGM -Utility	Continuous Process	Monthly	Water Consumption Record

Table 46: Plan & Strategy to Reduce Air Emission

Air emission
Objective: Reduction of emission from baseline value and sustain compliance status for emission
Management Plan & Strategy: Source tracking and reduce emission through implementing feasible technology
Resource: Emission test report, maintenance plan, air emission inventory

S/I	Action Plan	Responsible Person	Timeline	Monitoring Frequency	Performance Indicator
01	Regular maintenance of exhaust system of generator and boiler	AGM -Utility	Continuous Process	Monthly	Maintenance record
02	Improve ventilation system in utility and process area	AGM -Utility	Continuous Process	Monthly	Air quality test report
03	Install low NOx burner to the boilers	AGM -Utility	2030	Monthly	Stack test report
04	Control air-fuel mix ratio to the generators	AGM -Utility	Continuous Process	Monthly	Stack test report
05	Replacement of air filter of the generators	AGM -Utility	Continuous Process	Monthly	Maintenance record
06	Periodic stack air emission testing	AGM -Utility	Continuous Process	Annually	Stack emission test report
07	Periodic indoor and ambient air quality monitoring	AGM -Utility	Continuous Process	Annually	Air quality test report
08	Wet suppression (road watering) to reduce dust accumulation	AGM -Utility	Continuous Process	Monthly	Air quality test report
09	Develop and maintain air emission inventory	AGM -Utility	Continuous Process	Annually	Inventory record
10	To ensure dust collection bag to all applicable machineries e.g. thread sucking machines, overlock machines, sewing etc.	AGM -Utility	Continuous Process	Monthly	Visual Inspection

Table 47: Plan & Strategy to Non-Hazardous Waste Management

Non-hazardous Waste Management
Objective: Reduction of waste generation from baseline record and prevention of pollution through waste
Management Plan & Strategy: Source tracking and reduce waste generation through implementing 3R technique
Resource: Waste management plan, collection and storage facility, waste inventory

S/I	Action Plan	Responsible Person	Timeline	Monitoring Frequency	Performance Indicator
01	Introduce floor wise waste collection bin with proper labeling	DGM- HR & Admin	Continuous Process	Monthly	No. of Bin Issued
02	Ensure mask usage in appropriate sections	AGM-Compliance	Continuous Process	Daily	Issue Record
03	Maintain proper waste inventory	GM-Store	Continuous Process	Monthly	Inventory Record
04	Ensure separate collection, storage and disposal of non-hazardous waste	GM-Store	Continuous Process	Weekly	Inventory And Disposal Record
05	Reuse waste poly and cartoon in wherever feasible	AGM- Technical	Continuous Process	Weekly	Inventory Record
06	Implementation of 5R Policy	AGM- Technical	Continuous Process	Monthly	Inventory Record
07	Use fabric bag to keep product in production floor	AGM- Technical	Continuous Process	Daily	Visual Inspection
08	Awareness training cutting section for reducing extra cutting of jhut	AGM- Technical	Continuous Process	Annual	Training Record
09	Reusing paper	GM- Sustainability	GM-Sustainability	Weekly	Inventory Record

Table 48: Plan & Strategy to Hazardous Waste Management

Hazardous Waste Management
Objective: Reduction of waste generation from baseline record and prevention of pollution through waste
Management Plan & Strategy: Source tracking and minimizing waste generation and pollution through proper waste management
Resource: Waste management plan, collection and storage facility, waste inventory

S/I	Action Plan	Responsible Person	Timeline	Monitoring Frequency	Performance Indicator
01	Introduce floor wise separate waste collection bin for hazardous waste with labeling	AGM-Compliance	Continuous Process	Monthly	No. of Bin Issued
02	Ensure appropriate PPE use in production area	AGM-Compliance	Continuous Process	Weekly	Issue Record
03	Maintain proper waste inventory	Sustainability Department	Continuous Process	Monthly	Inventory Record
04	Ensure separate storage and disposal of hazardous waste	Chemical Store Responsible	Continuous Process	Weekly	Inventory And Disposal Record
05	Use secondary container at all chemical/fuel use, storage & distribution point	Chemical Store Responsible	Continuous Process	Weekly	No./Pcs Used
06	Spill handling kit must be available on site	Chemical Store Responsible	Continuous Process	Weekly	No./Pcs of Kit Issued
07	Reuse empty chemical drum/container	Chemical Store Responsible	Continuous Process	Monthly	No./Pcs Reused
08	Introduce separate waste collection bin for hazardous waste with labeling in medical room	Medical Officer	Continuous Process	Monthly	Number Of Bin Issued
09	Ensuring vendors do not dispose of waste in landfills	AGM-Compliance	Continuous Process	Weekly	Visual Inspection

Table 49: Plan & Strategy to Reduce GHG & Energy Consumption

GHG & Energy Consumption
Objective: Reduction of energy consumption and GHG emission from baseline value
Management Plan & Strategy: Source tracking and reduction of energy usage and GHG emission through implementing feasible technology
Resource: GHG inventory, energy efficient fixtures, energy & fuel consumption inventory

S/I	Action Plan	Responsible Person	Timeline	Monitoring Frequency	Performance Indicator
01	Replacement of fluorescent lights with energy efficient LED light	AGM- Utility	COMPLETE	Annually	Electricity Consumption Record
02	Replace existing clutch motor with servo motor	AGM- Utility	2030	Annually	Electricity Consumption Record
03	Insulation of all hot surface (i.e., steam line)	AGM- Utility	COMPLETE	Monthly	Maintenance Record
04	Introduce renewable energy sources (i.e., solar)	AGM- Utility	COMPLETE	Annually	Kw/Unit Production Electricity Generation
05	Practicing day light using to reduce electricity consumption	AGM- Utility	COMPLETE	Monthly	Electricity Consumption Record
06	Reduction of paper usage by reusing used paper and practicing digital documentation	GM- Sustainability	Continuous Process	Monthly	Paper Consumption Record
07	Maintain GHG emission inventory	AGM- Utility	Continuous Process	Yearly	Tons/Unit Production CO2e Emission
08	Regular maintenance of all company vehicles	DGM- HR & Admin	Continuous Process	Monthly	Maintenance Record
09	Maintain fuel consumption inventory	AGM- Utility	Continuous Process	Monthly	Inventory Record
10	Installation of Economizer to the boiler to recover heat from flue gases to pre-heat boiler feed water	AGM- Utility	2030	Monthly	Fuel Consumption Record
11	Ensure change of lights, machine renovation and maintenance of Machine and lights	AGM- Utility	Continuous Process	Annually	Electricity Consumption Record
12	Switch to energy-efficient lighting and install an economizer to optimize energy usage	AGM- Utility	Continuous Process	Annually	Electricity Consumption Record

S/I	Action Plan	Responsible Person	Timeline	Monitoring Frequency	Performance Indicator
13	Replace the existing boiler with a more energy-efficient model	AGM- Utility	2030	Annually	Fuel Consumption Record
14	Replace motors to highly energy-efficient models	AGM- Utility	Continuous Process	Annually	Electricity Consumption Record
15	Installation of an economizer and replace motors with energy-efficient models	AGM- Utility	2030	Annually	Electricity Consumption Record
16	Upgrade to energy-efficient lights, renovate machines for better efficiency and implement regular maintenance schedules	AGM- Utility	Continuous Process	Monthly	Electricity Consumption Record

Table 50: Plan & Strategy to Reduce ODS

ODS
Objective: Reduction of ODS emission to decrease the impact on global warming and climate change
Management Plan & Strategy: Source tracking and substituting the existing ODS vulnerable appliances with feasible eco-friendly appliances
Resource: Maintenance plan, Eco-friendly alternative sourcing & procurement plan and budget

S/I	Action Plan	Responsible Person	Timeline	Monitoring Frequency	Performance Indicator
01	Maintenance & replacement AC and Refrigerator	AGM- Utility	Continuous Process	Half Yearly	Maintenance Record
02	Leak test for AC and Refrigerator	AGM- Utility	Continuous Process	Annually	Test Report
03	Maintain ODS inventory	AGM- Utility	Continuous Process	Annually	Inventory Record
04	Replacement Of Refrigerant R-22 with R410A, R 32	AGM- Utility	Continuous Process	Annually	Inventory Record

S/I	Action Plan	Responsible Person	Timeline	Monitoring Frequency	Performance Indicator
05	Implement a rigorous leak detection and repair (LDAR) program for all equipment containing ODS.	AGM- Utility	Continuous Process		Inventory Record
06	Provide training programs for all employees on ODS handling, risks, and alternatives, including proper maintenance and emergency response.	AGM- Utility	Continuous Process		Training Calendar

Table 51: Plan & Strategy for Occupational Health and Safety Management

Occupational Health and Safety Management
Objective: Sustain occupational safety & health and avoid occupational accident and disease
Management Plan & Strategy: Identification of risk sources and elimination through feasible mitigation and training & awareness
Resource: PPE, training materials, signage and posters, risk register etc.

S/I	Action Plan	Responsible Person	Timeline	Monitoring Frequency	Performance Indicator
01	Conduct occupational and health & safety risk assessment with appropriate prevention/mitigation plan	AGM-Compliance	Continuous Process	Monthly	Assessment Record
02	Provide training on Occupational health & safety and its risk prevention/mitigation measures	AGM-Compliance	Continuous Process	Monthly	Training Record
03	Maintain accident and OHS risk register	AGM-Compliance	Continuous Process	Weekly	Register
04	Provide training on safe chemical handling, transport and disposal	AGM-Compliance	Continuous Process	Monthly	Training Record
05	Provide training on PPE (identification, necessity and usage)	AGM-Compliance	Continuous Process	Monthly	Training Record

S/I	Action Plan	Responsible Person	Timeline	Monitoring Frequency	Performance Indicator
06	Install proper safety and awareness signage, poster in local language	AGM-Compliance	Continuous Process	Monthly	Visual Inspection
07	Conduct regular emergency drill (fire, Environmental Emergency, Chemical spill etc.)	AGM-Compliance	Continuous Process	Monthly	Drill Register
08	Conduct and prepare Audit plan and monitor for EMS and OHSAS	AGM-Compliance	Continuous Process	Monthly	Audit Report
09	Installation and implementation of all safety measures to all applicable work places and processes	AGM-Compliance	Continuous Process	Monthly	Audit Report
10	To ensure proper barrier and insulation of all hot surfaces existing in the premises.	AGM-Compliance	Continuous Process	Monthly	Audit Report & Visible appearance
11	Monitor Traffic Movement	Security Officer	Continuous Process	Daily	Vehicle Log Book

Table 52: Plan & Strategy for Chemical Management

Chemical Management
Objective: Reduction of risks and hazards from chemical use by the factory
Management Plan & Strategy: Source tracking and maintaining preventive measures properly
Resource: Chemical management plan, collection, use and storage facility, Chemical inventory

S/I	Action Plan	Responsible Person	Timeline	Monitoring Frequency	Performance Indicator
01	Ensure no restricted chemicals are use in the process	GM-Washing	Continuous Process	Monthly	No of Bin Issued
02	Ensure proper labeling and avail MSDS for all chemicals used in the facility	Chemical Store Responsible	Continuous Process	Monthly	Site Inspection Report
03	Prepare a detailed Chemical Management Plan for the facility.	Chemical Store Responsible	Continuous Process	Annually	CMP Report
04	Ensure appropriate PPE use in chemical store, sub store and lab	AGM-Compliance	Continuous Process	Weekly	Issue Record
05	Maintain proper Chemical inventory and disposal record	Chemical Store Responsible	Continuous Process	Monthly	Inventory Record
06	Ensure separate storage according their hazard bands	Chemical Store Responsible	Continuous Process	Weekly	Inventory And Disposal Record
07	Use secondary container at all chemical/fuel use, storage & distribution point	Chemical Store Responsible	Continuous Process	Weekly	No/Pcs Used
08	Preserve spill handing kit in all chemical/fuel use and storage area	Chemical Store Responsible	Continuous Process	Weekly	Spill/Chemical Incident Register
09	Reuse empty chemical drum/container (i.e., gardening, waste collection bin)	Chemical Store Responsible	Continuous Process	Monthly	No/Pcs Reused
10	Schedule and conduct chemical management training for the responsible persons	AGM-Compliance	Continuous Process	Annually	Training Records
11	Engaging in ZDHC program	GM-Sustainability	Continuous Process	Annually	Training Records

S/I	Action Plan	Responsible Person	Timeline	Monitoring Frequency	Performance Indicator
12	Use 100% transparent and compliant chemicals	GM-Washing	Continuous Process	Weekly	Inventory Record

6.5 Environmental Monitoring

6.5.1 Monitoring Requirement

Environmental monitoring is an essential tool in relation to environmental management as it provides the basic information for rational management decisions. The prime objectives of monitoring are-

- To check on whether mitigation and benefit enhancement measures are actually being adopted and are providing effective in practice
- To provide a means whereby impacts which were subject to uncertainty at the time of preparation of EMP, or which were unforeseen, can be identified, and steps to be taken to adopt appropriate control measures.
- To provide information on the actual nature and extent of key impacts and the effectiveness of the mitigation measures which, through a feedback mechanism, can be taken into account in the planning and execution of similar projects in future.

There are two basic forms of monitoring:

- Visual observation or checking, coupled with inquiries
- Physical measurement of selected parameters

In the case projects in general, monitoring is done by physical measurement of some selected parameters like air, water, noise etc. 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 project does not create adverse environmental changes in the area and providing a database of operations and maintenance, which can be utilized if unwarranted complaints are made. The project will require that regular monitoring of possible change in environmental parameters to be undertaken during the operational life of the project.

6.5.2 Monitoring Indicators

Environmental monitoring requires a set of indictors that could be conveniently measured, assessed and evaluated periodically to establish trends of impacts. The indicators may be independent or may be functionally related. The physio-chemical, ecological and human interest including socio-economic indicators should be well understood. The monitoring program, in view of the possible impacts as assessed earlier, should consider the indicators for the impact assessment related to following issues is presented in the following page. There are two types of environmental monitoring activities associated with the project, during construction and during operation of the project. Each of the components is to be dealt with according to the requirement of suggested measures.

6.5.3 Monitoring for Operational Phase

6.5.3.1 Meteorological Measurement

Meteorological monitoring should be conducted to monitor the wind direction and speed, temperature, humidity and precipitation.

6.5.3.2 Ambient Air Quality Monitoring

Continuous and/or periodic measurement of the air quality indicators e.g., NOx, PM_{10}, $PM_{2.5}$, and temperature needs to be carried out.

6.5.3.3 Groundwater Monitoring

The groundwater level along with the selected drinking water quality parameters (e.g., pH, Color, Turbidity, TDS, Ammonia, Nitrate, Phosphate, As, Fe, Mn and Coli forms) may be monitored.

6.5.3.4 Noise Level Monitoring

Indoor noise levels in the generator, boiler and compressor facilities along with the outdoor need to be monitored regularly.

6.5.3.5 Incoming and Outgoing Chemicals

A logbook will be kept and maintained for all incoming and outgoing hazardous chemicals. The logbook will be reviewed regularly to check the chemicals consumption. An inventory of material data sheets for all chemicals at the project site will also be maintained. Any new chemical proposed for purchase for the first time must be approved by chemical responsible officer prior to such purchase.

6.5.3.6 Workplace Monitoring

Records of all workplace accidents will be documented and archived. Routine employee medical check-up results, carried out periodically shall be documented. A baseline checkup of all employees (before they commence work) should be carried out.

Table 53: Monitoring Plan during Operational Phase of the Factory

Issue	Parameters	Location	Monitoring Frequency
Stack Emissions	NOx, SPM, CO, CO_2, SO_2, O_2, Temperature,	Exhaust Outlet	Annually
Ambient Air Quality	CO, NOx, SPM, PM_{10}, $PM_{2.5}$, CO_2, SO_2, etc.	Around The Project Site	Annually
Ambient Noise Level	Noise Pressure Level (dB)	Around The Project Site	Annually
Indoor Noise Level	Noise Pressure Level (dB)	All Production & Utility Area	Annually
Indoor Air Quality	CO, SPM, PM_{10}, $PM_{2.5}$, CO_2, SO_2, VOC, Formaldehyde etc.	All Production & Utility Area	Annually

Issue	Parameters	Location	Monitoring Frequency
Ground Water Quality	pH, TDS, Chloride, Alkalinity, Hardness, Phosphate, As, Fe, Mn and Coliforms	At Ground Water Extraction Point	Annually

6.5.4 Cost of Monitoring

The following are the cost of monitoring for the environmental parameters during operation period of the project respectively:

Table 54: Estimated Cost for Environmental Monitoring During Operational Phase

Item	Parameter	Unit Cost (Taka)	Unit Per Year	Total Cost Per Year (Taka)
Stack Emissions	NOx, SPM, CO, CO_2, SO_2, O_2, Temperature,	40000.00	01	40,000.00
Ambient Air Quality	CO, NOx, SPM, PM_{10}, $PM_{2.5}$, CO_2, SO_2 etc.	25000.00	01	25,000.00
Ambient Noise Level	Noise Pressure Level (dB)	10000.00	01	10,000.00
Indoor Air Quality	CO, SPM, PM_{10}, $PM_{2.5}$, CO_2, SO_2, VOC, Formaldehyde etc.	20000.00	01	10,000.00
Ground Water Quality	pH, TDS, Chloride, Alkalinity, Hardness, Phosphate, As, Fe, Mn and Coliforms	25000.00	01	25,000.00
Indoor Noise Level	Noise Pressure Level (dB)	10000.00	01	10,000.00
Total Cost				**1,20,000.00**

6.5.5 Monitoring For Future Construction Phase

In the early phases (operation startup), the environmental monitoring program will cover all regulated parameters. Subsequently the list of parameters could be reassessed according to their significance to the Plant and to the specific site conditions.

6.5.5.1 Visual Inspection of Specific locations / activities:

Certain locations/ activities will require visual inspection to ensure that construction activities proceed in an environmentally sound manner. These include:

- Waste collection locations and wastewater storage area
- Waste segregation system
- Sanitation system
- Drainage system and final disposal point

6.5.5.2 Groundwater Monitoring

Weather conditions as well as sampling methodology usually influence sampling and analysis results. Samples taken by different methods or under different conditions may differ considerably, so that the analysis results are not comparable. In order to obtain reliable results, the samples will be taken under the same or very similar conditions and even if this requirement cannot be met, the conditions at the time of sampling shall be carefully recorded.

During the construction phase, ongoing visual inspection will be conducted at all storage areas, workshops, water collection and wastewater storage tanks, etc., to identify any accident and/or leak that could reach the groundwater. All analysis results shall be compared to baseline values, respectively to limits set by relevant legislation.

6.5.5.3 Potable Water

Potable water will be regularly monitored prior to the point of supply to the Plant's potable water supply network to ensure compliance with health standards. Quarterly monitoring shall take place during construction.

6.5.5.4 Air Emissions

During the construction phase, ambient air quality will be monitored quarterly by active sampling and measurements for PM_{10}, SO_2, CO, NOx and ammonia. For the purpose of comparison with baseline values, ammonia, SO_2 and NO_2 should also be measured by massive sampling once during construction activities. The measured concentrations shall comply with relevant legislation

6.5.5.5 Noise Monitoring

Noise levels at the facility site during construction must comply with relevant legislation. At locations with ongoing pile driving activities, noise levels will be checked regularly at least weekly. In areas with direct contact to equipment usage, noise levels will to be checked regularly at least quarterly. Ambient noise will be monitored twice a year at the facility boundaries and also at two locations the near closest habitation. At these locations the noise level should be recorded by 24-hour noise measurement instruments using Type I sound level meter (Precision Grade) at least once per year.

6.5.5.6 Solids and Hazardous Waste Monitoring

A logbook will be kept and maintained to record the quantities of any excavated material wastes exported from the Project site, transportation routes and final reuse/disposal. During the construction phase, waste should be handled in accordance with the waste management plan outlined mentioned. Monitoring is required to ensure proper implementation of the management plan. Solid and hazardous waste quantities and destination must be documented.

6.6 Safety [illegible]t Plan

6.6.1 Safety Management [illegible]

Safety is an integral part of the company's [illegible] part of the company's operations and there to protect employees, clients, property, the envir[illegible]d the public. There are many costs to accidents and unsafe work practices. The greatest co[illegible]an cost. Protecting employees also protects their friends, families, fellow workers, manage[illegible]ublic and the environment from the far-reaching effects of serious accidents. In addition t[illegible] lives, a safety program contributes to employee morale and pride because employe[illegible] participate in identifying safety needs and developing safe work procedures.

Visitors to the worksite may also face legal action if they knowingly disobey safety rules. In addition, the company may face legal action and fines for violations of regulatory requirements. Those individuals who do not fulfill their safety responsibilities will become accountable for any problems their negligence creates and may be liable under the law. Everyone employed by a company is responsible for maintaining the safety program. Managers and supervisors are responsible for identifying safety needs, communicating safety hazards, investigating hazardous conditions and accidents, providing training, supply or wearing appropriate safety and personal protective equipment, and ensuring all equipment is properly maintained and meets legislated safety standards. Their role is supported by input from all employees.

All company employees are responsible for obeying all safety rules, following recommended safe work procedures, wearing and using personal protective equipment when required, participating in safety training programs and informing supervisors of any unsafe work conditions. Everyone has the right and responsibility to refuse to do work when unsafe conditions exist. By fulfilling safety responsibilities, workers will share the benefits of a safety place.

The company must have its own safety management and mitigation plan and policy. Listed below are the important features that need proper attention of company management.

6.6.2 Occupational Health and Safety Policy

"Norp Knit Industries Ltd. Unit-2" is a one-stop solution in the apparel accessory maker market, enlarging its business by ensuring the Occupational Health & Safety of employees and workers. For this, we commit to establishing and maintaining an effective Occupational Health & Safety Management System (OHSMS) as per ISO 45001:2018 Standard and improve continually through eliminating hazards and minimizing OH&S risks, taking advantage of OH&S opportunities, and addressing OH&S Management System nonconformities associated with its activities.

Top management of "Norp Knit Industries Ltd. Unit-2" establishes this OH&S Policy that:

a) Ensures commitment to provide a Healthy & Safe Working condition within "Norp Knit Industries Ltd. Unit-2" factory premises, guaranteeing the prevention of Health-related

injury and ill health considering the size of the organization and the nature of the damage to reduce risks & utilize opportunities.

b) Establishes a procedure for OH&S Objectives to improve OH&S performance.

c) Ensures conducting assessments to eliminate hazards & reducing OH&S risks.

d) Commits to comply with legal requirements and other requirements associated with "Norp Knit Industries Ltd. Unit-2" business.

e) Improves continually by conducting HIRA, various OH&S training activities, and awareness among all the personnel of "Norp Knit Industries Ltd. Unit-2".

f) Commits to establish a Safety Committee where consultation & participation of workers is ensured as the committee comprises as per labor law.

While minimizing the OH&S risks, "Norp Knit Industries Ltd. Unit-2" considers the needs and expectations of workers and other interested parties based on its organizational context. The OHSMS enables "Norp Knit Industries Ltd. Unit-2", through its OH&S Management System, to integrate other health and safety aspects, such as worker wellness/wellbeing.

This Policy applies to all the activities, operations, and maintenance of "Norp Knit Industries Ltd. Unit-2"and must be implemented by all employees and its' contractors in "Norp Knit Industries Ltd. Unit-2".

6.6.3 Safety Responsibilities

All personnel should have safety responsibilities assigned to them. The documented responsibility should be included in the program manual. Compliance with the responsibilities should be monitored and if these are not carried out for some good reason, corrective measures should be taken.

6.6.4 General Requirements

In Bangladesh the main law related to occupational health and safety is Labor Law 2006. The law has provisions on occupational hygiene, occupational diseases, industrial accidents, protection of women and young persons in dangerous occupation. The salient features of the general requirements for the workers' health and safety stated in this law is presented in the below table:

Table 55: General Requirements for Workers' Health and Safety

Issues	Requirements
Health and Hygiene	❖ Cleanliness ❖ Ventilation and temperature ❖ Disposal of wastes and effluents ❖ Latrines and urinals ❖ Spittoons and dustbins

Issues	Requirements
Safety	❖ Safety for building and equipment ❖ Precautions in case of fire ❖ Floor, stair and passage way ❖ Work on or near machinery in motion ❖ Carrying of excessive weights
Compensation for accidents at work	❖ Owner's responsibility for compensation ❖ Amount of compensation ❖ Report on fatal accident and treatment ❖ Compensation on contract and contract registration ❖ Appeal
Latrines and urinals	❖ Sufficient latrines and urinals shall be provided ❖ Shall be maintained in clean and sanitary condition ❖ Shall be adequately lighted and ventilated
Precautions in case of fire	❖ Shall be provided with means of escape in case of fire ❖ Effective measures shall be taken to ensure that all the workers are familiar with the means of escape ❖ Firefighting apparatus should be provided and maintained
First aid	❖ Provided and maintained first aid facility ❖ One for every one hundred and fifty workers ❖ Shall be kept with a responsible trained person who shall be available during the working hours ❖ In every facility where five hundred or more workers are employed, a dispensary shall be provided and maintained
Disposal of wastes and effluents	❖ Provide with proper disposal system for solid waste and effluents. ❖ In case of a factory where no public sewerage system exists, prior approval of the arrangements should be made for the disposal of wastes and effluents
Compensation	❖ If personal injury is caused to workmen by accident arising in the course of employment, employer shall be liable to pay compensation ❖ 36 occupational diseases for compensation payable ❖ Monthly payment as compensation for temporary disablement are: 1. Compensation should be paid for the period of disablement or for one-year whichever period is shorter 2. Such compensation shall be paid at the rate of full monthly wages for the first two months 3. Two thirds of the monthly wages for the next two months and at the rate of the half of the monthly wages for the subsequent months 4. In case of chronic occupational diseases, half of the monthly wages during the period of disablement for a maximum period of two years shall be paid

6.6.5 Management Communication

The management should decide how it communicates periodically with the personnel regarding safety. A site schedule for conducting site tasks should be developed; this should be included in the safety program manual. Documentation of site tours should be retained for verification.

6.6.6 Inspections

A list of all work sheets, equipment, vehicles and work practices requiring inspection should be developed. Checklists and schedules should be developed as part of the inspection program. A system for correcting deficiencies noted during the inspection process must be developed. The system should prioritize deficiencies noted so that serious hazards are dealt with immediately.

6.6.7 Personnel Protective Equipment (PPE)

The work place should be assessed to determine what personal protective and safety equipment is needed and the equipment must be available. A maintenance schedule would be developed for PPE and records for maintenance retained on file. Employees must be trained in fitting, care, maintenance and use of PPE. Detailed rules and procedures identifying company and legislative requirements and expectations must be communicated to all employees and contractors. They serve as a reference and describe the minimum standard by which business is conducted. Most important rules and procedures ensure consistency in the performance of tasks by all employees. The current rules should be reviewed and assessed as to whether they are appropriate for the operation / facility / employees. The formulated rules must be communicated to the workers effectively, and workers must ensure that they understand the rules and have no difficulty to comply with the rules.

6.6.8 Standard Work Procedure

The intent of standard work procedures is to ensure consistency in the performance of hazardous work and it must form the minimum standards by which specific tasks are performed. Workers must have clear understanding of the procedures they are required to follow. A system for periodic review of procedures must be developed. The employees involved in the work will be given an opportunity to suggest steps that would provide for continuous improvement to the procedures. The work procedures shall also ensure that all hazardous tasks have been accounted for. Procedures and codes of practice have to be developed for hazardous work. To determine compliance with safety and hazard issues while performing a task by a worker, efforts should be made to ensure the following:

- Confirm that employees affected by these tasks participate in the development of safe work procedures,
- Confirm that the employees are involved in the maintenance of safe work procedures,
- Interview workers to determine if they know what tasks have work procedures, where these procedures are located and generally what makes up to content,
- Review records to ensure that employees receive training on hazardous work procedures and codes and practices,

- Where practical, observe employees performing critical tasks to confirm use of standard work procedures and codes of standards.

Training

g is an integral part of a preventive strategy. The target groups requiring training should agers, supervisors, and technicians and related staff who may be exposed to risk at work. lowing issues should be addressed in training of the managers, staff and workers:

- Workers should be trained to use the engineering controls to necessary places
- Arrange workplace consultation on noise control
- Workers should participate in training and contribute to the noise management strategy
- Employee representatives should represent the views of workers to management about occupational health and safety and report to workers about management policy
- Persons likely to be exposed to risks should be provided with information and instruction in safety procedures associated with the plant at the work place.
- Information on emergency procedures relating to the plant should be displayed in a manner that can be readily observed by persons who may be affected by the operation of the factory.
- Training should be provided to use firefighting equipment when necessary.
- Facility staff needs to be trained in the safety procedures that are to be implemented during unloading, transfer and storage of hazardous materials.

6.0 10 Record Keeping and Reporting

Record ke orting is one of the re system and essentially of a good management ed records of construction, installation, training, equipment maintenance, operation, fault detection and remedy can help in reducing risks of accidents, legal costs and thereby overall cost of operation of a plant.

Records also help in identifying causes of any accident and elimination of the same accident in future. Records may be maintained for the proposed plant as follows.

Chapter Seven

Risk Assessment and Management

7.1 Emergency Response and Disaster Ma ement Plan

The initial response to an incident is a critical step e overall emergency response. Like all other industries, **Norp Knit Industries Ltd. (Un** must have adequate steps against accidents or incidents to meet the emergency. The purpos having an Emergency Response Plan (ERP) is to:

- Assist personnel in determining the appropriate response ergencies.
- Provide personnel with established procedures and guidelines.
- Notify the appropriate Emergency Response Team personnel an ory/ Govt. agencies.
- Manage public and media relations.
- Notify the next-to-kin of accident victims.
- Promote inter-departmental communications to ensure a "Companywide" Co-ordinated emergency response.
- Minimize the effects that disruptive events can have on company operations by reducing recovery times and costs.
- Respond to immediate requirements to safeguard the subtending environment and community.

Generally, the initial response is guided by three priorities ranked in importance these priorities are:

1. People
2. Property
3. Environment

Emergency Response Procedures will identify who does what and when in the event of an emergency. Responsibility for who is in charge and their coordination of emergency actions shall be identified. Nature of Emergency & Hazardous Situations may be of any or all of the following categories:

I. Emergency

- Fire
- Explosion
- Medical emergency
- Fuel spill
- Failure of sewerage system
- Power Outrages
- Major Mechanical System Failure
- Major Collection System Failure
- Automated Control Failure
- Job Actions (i.e., strikes, walkouts, etc.)
- Terrorism
- Construction Accident

II. **Natural Disasters**

- Flood
- Earthquake
- Storm and
- Cloud burst lightning.

III. **External Factors**

- Food poisoning/water poisoning
- Sabotage and
- War.

7.1.1 Six Steps in Emergency Response

Step-1

a) Determine the potential hazards associated with the incident, substance or circumstances and take appropriate action, identify the type and qualities of dangerous goods involved and any known associated hazards.
b) Determine potential hazards stemming from local conditions such as inclement weather and water bodies etc. and ensure that the initial response team is aware of these conditions.

Step-2 Determine the source/ cause of the event resulting to the emergency and prevent further losses.

Step-3 Conducts an assessment of the incident site for any further information on hazards or remedies.

Step-4 Initiate redresses procedures.

Step-5 Report the incidence, its nature, cause, impact applied redresses procedures and any further assistance required etc. to the appropriate company, government and/or land owner.

Step-6 Take appropriate steps with respect to hazards to wildlife, other resources and addressing public and media concerns and issues, as applicable. Response priorities are to protect human lives, property and the environment.

7.1.2 Reporting Incidents and Accidents

All accidents and near-miss incidents shall be investigated to determine what caused the problem and what action is required to prevent a recurrence. Employees required to perform investigations shall be trained in accident investigation techniques. The incident/accident

investigation should be a fact-finding exercise rather than faultfinding. The investigations will focus on collection of evidence to find out the "root cause" of the incident. The recommendations of the investigation report are implemented in phases.

7.1.3 Approaches to Emergency Response

For this project, emergency response systems should be in place to deal with dangerous goods uncontrolled releases of dust, natural calamities fires burn and injuries. There are to be trained emergency response teams, specific contingency plans and incidence specific equipment packages in place to cope with these types' emergency. In case of an emergency incident occur, immediate action must be taken to mitigate the impacts.

In order to minimize the possibility of injury to the responders and others it is important that emergency responders follow a specific sequence of actions as stepped out in the preceding paragraphs

7.1.4 Emergency Response Team

An emergency response team has been established to strategically coordinate the response to any emergency in a timely manner following the emergency response steps mentioned above. The Emergency Response Team, communication flow and the responsibilities are described below:

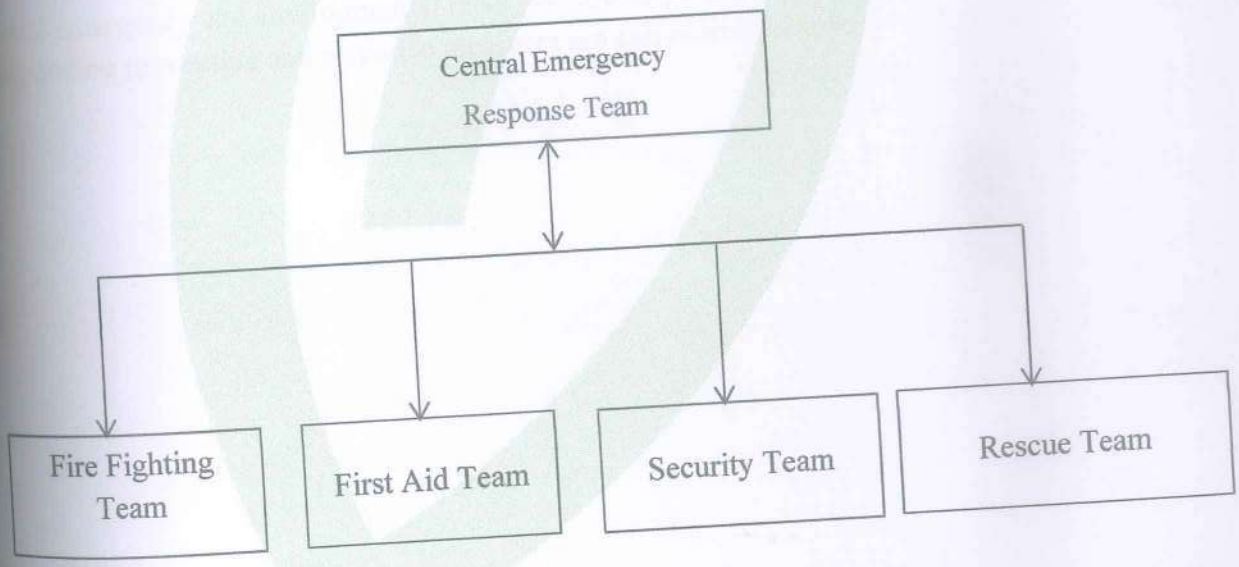

Table 56: Responsibilities of the Emergency Response Team

Team	Responsibilities
Central Emergency Response Team	Overall lead and coordination of the emergency response and liaising with officers from government agencies like fire service, DoE etc.
Fire Fighting Team	❖ Prompt response during fire emergency to extinguish fire ❖ Maintain communication to the local fire service office ❖ Regular inspection of firefighting equipment ❖ Conduct regular fire drill

Team	Responsibilities
	❖ Support training department to conduct training on fire emergency
First Aid Team	❖ Provide first aid within the facility to all persons when required ❖ Undertake quarterly checks of first aid kit including disposing of expired items in a safely manner ❖ Response along with firefighting and rescue team during emergency ❖ Assist with any incident investigations and unresolved issues related to health and safety ❖ Maintain liaison with nearby hospital
Rescue Team	❖ Rescuing and protecting people in the event of emergencies ❖ Conduct regular drill on rescue activity ❖ Support training department to provide general rescue knowledge on the employee
Security Team	❖ Ensure all personnel understand individual and collective responsibilities for safety and security. ❖ Liaise with the local security authority ❖ Monitor the operational environment with respect to increased level of threat and advise the management. ❖ Ensure all interested personnel are kept advised of changes and threats to the security of project staff, assets and operations.

7.1.5 Summary of Potential Risk

Potential emergency and environmental risks that can be poised from the project activity and corresponding preventive and response measures are summarize below:

Table 37: Potential Emergency & Environmental Risk Situation Identification

S/L	Potential Emergency Situation	Significant Impact	Preventive Measures	Responding Measures
1	Fire	Property damage, injuries, loss of life	Fire drills, fire extinguishers, sprinkler systems, proper electrical wiring	Immediate evacuation, fire brigade notification, use of fire extinguishers
2	Explosion	Fatal injuries, structural damage, toxic gas release	Safe handling of chemicals, proper storage, periodic inspections	Emergency evacuation, medical aid, fire control
3	Medical Emergency	Health hazards, loss of productivity	First aid training, on-site medical personnel, safety gear	First aid response, transport to hospital, medical assistance
4	Fuel Spill	Soil & water contamination, fire risk	Proper storage, leak detection systems, spill response kits	Containment, absorption materials, environmental impact assessment
5	Failure of Sewerage System	Water contamination, foul odor, worker health impact	Regular maintenance, proper waste disposal	Quick repairs, temporary alternative drainage
6	Power Outages	Disruption of production, worker safety issues	Backup generators, UPS systems	Use of backup power, controlled shutdown of machinery
7	Major Mechanical System Failure	Production loss, safety risks	Regular maintenance, monitoring of machinery	Emergency maintenance team response, alternative production plan
8	Major Collection System Failure	Water pollution, increased chemical exposure	Regular monitoring, proper waste segregation	Immediate repair, notification to environmental authorities
9	Automated Control Failure	Uncontrolled chemical release, operational hazards	Backup manual operation, system diagnostics	Manual intervention, repair of control systems
10	Job Actions (Strikes, Walkouts)	Operational shutdown, economic loss	Employee engagement programs, fair policies	Management discussion, resolution meetings
11	Terrorism	Threat to life, factory damage	Security checks, surveillance, restricted access	Immediate lockdown, coordination with law enforcement
12	Construction Accident	Worker injuries, project delays	Safety training, PPE usage, site inspections	First aid response, reporting to authorities

7.2 Disaster Management Plan

In normal operation of the project, when all environmental protection equipment works according to design specification, then there would be no environmental problems for the present project. Disaster (to certain degree) may occur if the environmental protection equipment fails to work at normal condition. This situation may arise for any of the following causes-

- If anytime project runs at abnormal situation e.g., if the engines give unwanted noise than normal level
- If liquid waste over flows and pollutes the surroundings

Therefore, appropriate management plan should have to be taken by the project proponent to prevent any unwanted disaster in the project. In this regard there would be a provision to stop the whole facility immediately during any process failure as discussed above.

The disaster management plan would consist of preventive measures including, among others, the following.

- Formulation and strict implementation of safety codes and measures;
- Preventive maintenance;
- Aware the workers about electric shock
- Declaring the project area as a "no smoking zone"
- Mock drills by the fire-fighting cells/ groups
- Provision and inspection of firefighting equipment and fire hydrant system in all the sections;
- Proper training of the employees about the importance of codes;
- Training the employees and the residents of the surrounding about the actions to be taken during an accident, disaster etc.

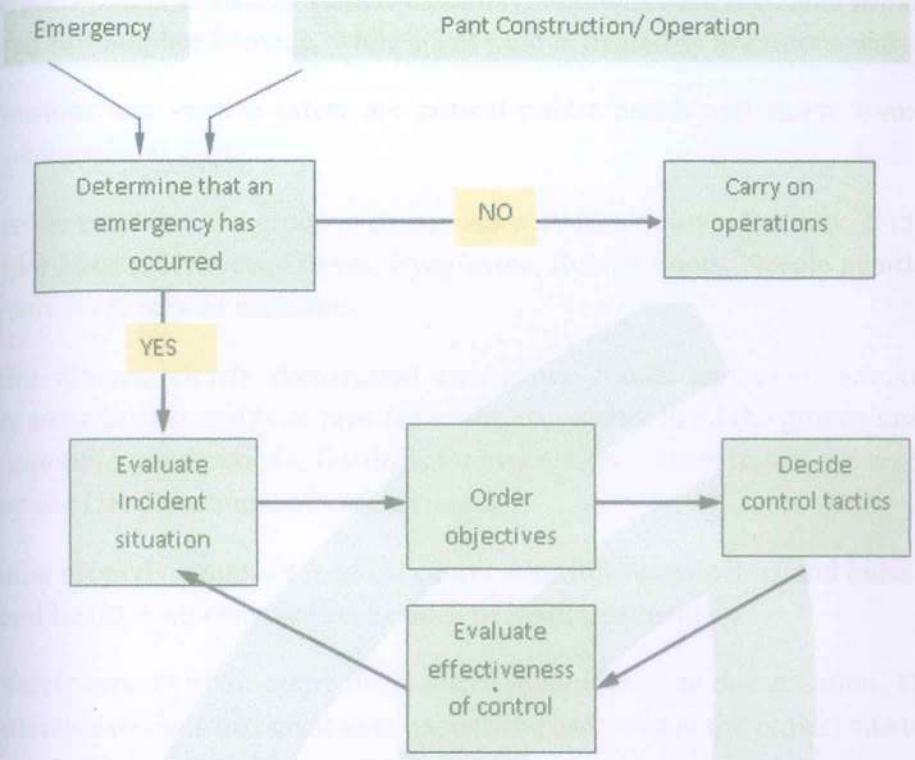

Figure 31: Illustration of an Example System Approach to Project Operations & Construction

It is imperative to develop entire facility environment policy and display necessary documentation for ease in accessing information. Some of these documents include:

- ✓ Emergency contacts;
- ✓ Emergency response procedures for fires

The facilities operations and monitoring are carried out under the management and help from both the employees and relevant government lead agencies. In order to take care of any hazards the following control should be adopted:

- ➢ All safety precautions and provisions covering the general cleanliness of the entire facility down to, ventilation, lighting, sanitary, waste collection, first aid box provision, adequate fire extinguishers and site security by fencing.

7.2.1 Environment, Health and Safety (EHS)

To secure mental and physical well-being of workers the company provides them with a good work environment. Sufficient lighting and ventilation are provided with the use of overhead reflectors and forced duct ventilation system. Adequate and properly placed outlets of safe drinking water and hygienic lavatories are maintained and periodically upgraded in a conscious effort to ensure the welfare of the workforce.

Environmental regulation aimed at stationary sources in the auto industry principally addresses volatile organic compounds from spray painting and other surface coatings. Pressure to reduce solvent content of paints has actually changed the nature of the coatings used. These rules affect

supplier and parts plants as well as vehicle assembly. Foundries are regulated for air emissions of particulates and Sulphur Dioxide, while spent sand is treated as hazardous waste.

Vehicle emissions and vehicle safety are critical public health and safety issues regulated outside the occupational arena.

As a responsible employer the group is concerned with its employee's safety. Usage of safety equipment like Masks, Helmets, Gloves, Eyeglasses, Rubber boots, Needle guards and Metal gloves prevents work related accidents.

There are fire alarms, clearly demarcated emergency routes and exits, smoke detectors, adequate fire extinguisher and hose pipe for emergency water in all the groups units. Training to use these equipment and periodic fire drills for evacuation without hassle and are periodically conducted by the HR department of various units.

In every unit, a properly equipped medical center with full-time doctors and nurses operate to extend general health-care consultation besides first-aid treatment

Health and safety aspects of the entire the industry should be given due attention. The authority provides protective devices that must continuously be used within the project site to ensure the safety of the natural resources is guaranteed.

Production processes are not unique to the industry, but often the scale of production and the high degree of integration combine to present special hazards to employees. Hazards to employees in this complex industry must be arrayed in three dimensions: process type, job classification group and adverse outcome.

Adverse outcomes with distinct cause and prevention methods can be distinguished as: fatal and severe acute injuries; injuries generally; repeated trauma disorders; short-onset chemical effects; occupational disease from long-term chemical exposure; service sector hazards (including infectious disease and client- or customer-initiated violence); and work environment hazards such as psychosocial stress.

An Environment, Health and Safety register is essential for monitoring of performance of the entire facility community in relation to the environment. The management will use this as a self-auditing tool. This register should include:

- Fire extinguisher servicing records
- EHS meeting schedules and training records
- Electrical installations
- Waste disposal records
- Inventory records (paints, cleaning agent)
- Emergency response procedure.

Chapter Eight

8 *Conclusion*

8.1 Conclusion

Norp Knit Industries Ltd. (Unit-2) is a 100% export-oriented dyeing-washing & garments factory which is founded at Shi-152/2 (Old), B-01/1 (New), Islampur, Kodda Nandun, Bason, Gazipur.

An Environmental Impact Assessment (EIA) has been carried out for this existing project according to the requirement of DoE for necessary environmental clearances. The report has been prepared through identifying the impacts, assessing them, recommending feasible mitigating, and enhancing measures for negative and positive impacts respectively.

Noise pollution from operational activities, climate change due to GHG emission, and air pollution was predicted as major impacts. Mitigation measures have been suggested to minimize these impacts. Atmospheric emission will be minimized by controlling the air-fuel mixing ratio, installing onsite abatement measures (wet scrubber), and wet suppression by road watering. All other impacts like groundwater depletion, fossil fuel depletion, soil contamination due to solid waste generation, etc. will be reduced through implementing necessary mitigation measures. By implementing all necessary protection and regulatory measures as suggested herein EIA, the project is expected to meet the National Environmental Quality Standards.

It can be concluded that the location and infrastructure setup of **Norp Knit Industries Ltd. (Unit-2)** is environmentally acceptable and it is expected that the project proponent will follow all environmentally compatible steps through the project lifetime by which it sets a positive example as an environmentally friendly industrial facility.

8.2 Recommendations

Recommendations made for the project development based on the EIA study are given below:

- The environment management plan should be implemented strictly.
- The provision of green belt development and segregated storm water drainage should have been adhered to.
- A waste management system should be developed by implementing a national 3R strategy.
- Proper training in maintaining the environment, health, and safety should be given to the project management unit in both the construction and operation phases.
- The project manager needs to put in place corporate social responsibility projects such as supporting primary and secondary education in the nearby location.
- The Environmental Health and Safety system should be upgraded continuously with further production expansion to maintain sustainable development.
- Traffic management should be monitored and proper mitigation measures should be taken accordingly.
- Install energy-efficient heating, ventilation, and air conditioning (HVAC) systems with programmable thermostats and zoning options.

- Consider solar-powered HVAC systems to reduce energy consumption.
- Regular road watering/spraying should be done and ensured by the EHS head to reduce the dust emission as much as possible.
- Monthly health inspections and training as per the training calendar should be conducted and maintained by the facility.
- Proper use of PPEs (helmet, safety shoe, mask, etc.) and their implementation should be made sure.
- VFD control system for exhaust fans could be introduced.
- Air conditions should be under maintenance after every three months. The dust in the inlet and outlet of AC enforces the compressor to work harder to complete the operation and draw more energy than necessity.
- Smart thermostats and humidistats could be installed in places so that fans operate according to the desired environmental conditions.
- Turn the compressor of whenever possible. Turning compressors off during the evenings, weekends or when production and shift fluctuations allow could reduce energy bills up to 10%.
- Raw materials should be covered during the transportation and import of it.
- An On-site, emergency response team should be present.
- Install spotlight in all sewing machines to reduce the number of overhead lights.
- Use LED lighting fixtures to reduce energy consumption and extend the lifespan of bulbs.
- Implement daylight harvesting systems that adjust artificial lighting based on natural light levels.

References

1. Peavy& Rowe (1985), "Environmental Engineering", McGraw-Hill Inc., Singapore.
2. BBS (2006), "The Statistical Yearbook of Bangladesh." Bangladesh Bureau of Statistics, July 2007, Gazipur Sadar Upazila, Bangladesh.
3. DOE (2023) "Environmental Conservation Rules", Department of Environment, Govt. of Bangladesh.
4. DOE (1995) "Environmental Conservation Act", Department of Environment, Govt. of Bangladesh.
5. DOE (2002) "A Compilation of Environmental Laws", Department of Environment, October, 2002, Govt. of Bangladesh.
6. GOB, (1992), "Bangladesh Environmental Policy".
7. GOB, (1995), "National Environmental Management Action Plan (NEMAP)".
8. GOB (2023), EA Guidelines for Industries, Department of Environment, Ministry of Environment and Forest, Government of the People's Republic of Bangladesh, June 1998.
9. GOB (2005), SRO No. 220-Rule/2005, Revision of the Environment Conservation Rules 2023, Ministry of Environment and Forest, Government of the People's Republic of Bangladesh.
10. IFC (2002), Occupational Health and Safety Guidelines, International Finance Corporation, World Bank Group.