



Final Report

Environmental and Social Impact Assessment (ESIA)

City Edible Oil Captive Power Plant Ltd.

City Economic Zone, Rupganj, Narayanganj

Prepared By

Environmental Study & Research Division

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Acknowledgment

The report has been prepared by Water Technology BD Limited for the regulatory requirement of Department of Environment (DoE), Ministry of Environment Forests and Climate Change, The Government of People's Republic of Bangladesh. Water Technology BD Ltd. has undertaken a detailed environmental survey and has developed a comprehensive Environmental and Social Impact Assessment (ESIA) for the **City Edible Oil Captive Power Plant Limited**. Any third party should obtain prior consent of WTBL before copying or reproducing, in whole or in part, the contents of this report. WTBL disclaims any responsibility for any loss or damage suffered by any third party by taking reliance of this report. Furthermore, WTBL will not be bound to discuss, explain or reply to queries raised by any agency other than the intended recipients of this report. All information in the report is intellectual property of the **City Edible Oil Captive Power Plant Limited**.

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List of Abbreviation

%	Percentage
°C	Degree Celsius
µg/m ³	microgram per cubic meter
AEZ	Agro Economic Zone
As	Arsenic
AIDS	Acquired Immune Deficiency Syndrome
ANSI	American National Standard Institute
ASME	American Society of Mechanical Engineers
BBS	Bangladesh Bureau of Statistics
BDT	Bangladesh Taka
BEPZA	Bangladesh Economic Processing Zone Authority
BEZA	Bangladesh Economic Zone Authority
BMD	Bangladesh Meteorological Department
BOD	Biochemical Oxygen Demand
BS	British Standard
BWDB	Bangladesh Water Development Board
CaCO ₃	Calcium Carbonate
Ca	Calcium
CCL	Cash Compensation under Law
CDSP	Char Development and Settlement Project
CETP	Common Effluent Treatment Plant
CEZ	City Economic Zone
cm	Centimetre
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
Cr	Chromium
CSR	Corporate Social Responsibility
Cum	Cubic meter
DC	Deputy Commissioner
DDM	Department of Disaster Management
DG	Diesel Generator
DMB	Disaster Management Bureau
DO	Dissolve Oxygen
DoEB	Department of Environment Bangladesh
DPHE	Department of Public Health and Engineering
DTA	Domestic Tariff Area
EC	Electrical Conductivity
ECA	Environment Conservation Act
ECC	Environment Clearance Certificate
ECR	Environment Conservation Rules
EIA	Environment Impact Assessment
ESIA	Environment & Social Impact Assessment
EMF	Environmental Management Framework
EMP	Environmental Management Plan
ESMP	Environmental & Social Management Plan

EPZ	Economic Processing Zone
ERP	Emergency Response Plan
ETP	Effluent Treatment Plant
EZ	Economic Zone
FAO	Food & Agriculture Organization
FDI	Foreign Direct Investment
FDIPP	Foreign Direct Investment Promotion Project
FGDs	Focus Group Discussions
Ft.	Feet
g	Gram
GDP	Gross Domestic Product
GHGs	Green House Gases
GIS	Geographic Information System
gm/cc	gram per cubic centimetre
GoB	Government of Bangladesh
GSB	Geological Survey of Bangladesh
Ha	Hectares
HHs	Households
HIV	Human immunodeficiency virus
HSMP	Health and Safety Management Plan
HYV	High Yielding Variety
ICT	Inland Container Terminal
EMP	Initial Environment Examination
IFC	International Finance Corporation
IRRI	International Rice Research Institute
IUCN	International Union for Conservation of Nature
Kg	Kilogram
Kg/day	Kilogram Per Day
KLD	Kilo Litres Per Day
Km	Kilometer
Km/h	Kilometer per Hour
KV	Kilo Volts
LAP	Land Acquisition Plan
LAO	Land Acquisition Officer
Leq	Equivalent Noise Level
LPG	Liquefied Petroleum Gas
LRP	Land Resettlement Plan
M	Meter
m/s	meter / second
m/yr	meter / year
max.	Maximum
mg/l	microgram per litre
min.	Minimum
mm	Millimetre
Mm/day	Millimetre per Day
Mm/hr	Millimetre per hour

MOL	Ministry of Lands
msl	Mean Sea Level
Mn	Manganese
MT	Million Tonnes
MVA	MVA
MW	Mega Watt
NAAQS	National Ambient Air Quality Standard
NaCl	Sodium Chloride
NEMAP	National Environmental Management Action Plan
NGO	Non-governmental organization
NOC	No Objection Certificate
NOx	Oxides of Nitrogen
No.	Number
O.P.	Operational Policy
OHS	Occupational Health and Safety
OSS	One-stop-services
PA	Protected area
PAHs	Project Affected Households
PAPs	Project Affected Persons
PBS	Polli Bidyut Shamity
PCMs	Public Consultation Meetings
PDMs	Public Disclosure Meetings
PF	Protected Forest
PH	Power House
PM2.5	Particulate matter less than 2.5 micron size
PMC	Project Management Consultant
PPE	Personal Protective Equipment
PPP	Public Private Partnership
PVC	Polyvinyl chloride
RAP	Resettlement Action Plan
RC	Retention Canal
RP	Retention Pond
RMG	Readymade garments
PROJECT	City Edible Oil Captive Power Plant Limited
ROW	Right of Way
RV	Replacement Value
SE	Socio Economic
SES	Socio Economic Survey
SEP	Stakeholder Engagement Plan
STI	Sexually transmitted infections
STP	Sewage Treatment Plant
SIA	Social Impact Assessment
SO2	Sulphur Dioxide
SPC	Special Purpose Company
SRDI	Soil Resource Development Institute
Sq Ft	Square Feet

sq.km	Square kilometre
sq.m.	Square Meter
SQ	Soil Quality
SW	Surface Water
TDS	Total Dissolve Solid
ToR	Terms of Reference
TSS	Total Suspended Solids
UNDP	United Nations Development Programme
US\$	United States Dollars
WS	Wildlife Sanctuary
WTP	Water Treatment Plant

Executive Summary

City Edible Oil Captive Power Plant Limited. is a 17.6 MW power generation company, is located on the eastern bank of Shitalakshya River, and to the east of Dhaka, and west of Narayanganj. The project is located in City Economic Zone, Uttar Rupshi, Rupganj, Narayanganj within Latitude 23°44'45.04" North and Longitude 90°30'55.59" East. The entire project is completely enclosed and is owned by the **City Group**. The project is also under the **City Economic Zone** which area is 77.96 Acres. **The project** is utilizing the standard as guideline to monitor and control all the activities related to Production, Quality Control and Quality Assurance with a clear focus on Customer Requirements & Satisfaction.

City Edible Oil Captive Power Plant Limited is a running project. and it continue its production since 2018. The proponent has taken NOC from BEZA, REB, Fire Service and Local Authority and Department of Environment. The proponent is now in the process of taking a loan from Asian Development Bank (ADB). The basic data of the project has been shown in the following Table.

Table: Basic Information of City Edible Oil Captive Power Plant Limited

Name of the project:	City Edible Oil Captive Power Plant Limited
Project Proponent:	Fazlur Rahman (Managing Director)
Project Location:	Block: B, Plot No: 17, at Uttar Rupshi, Rupgonj, Narayanganj.
Office Address:	City House, Plot # NW (J) 06, Road # 51, Gulshan - 02, Dhaka-1212, Bangladesh.
No. of Employees:	20 persons
Employees Engaged in Environmental Management	01
Total area of land of Economic Zone:	77.96 Acre
Project Area:	1780 m ²
Type of Industry:	Red
Status of Operation	Running
Present use of land:	Covered with industrial activities.
Final Product (Name & Amount) :	Gas Engine Based Power
Production Capacity	17.6 MW
Power Plant Capacity & Co-Generation:	Power Plant: 4 x 4.4 MW GEJ Jenbacher Gas Engine Based Power Plant (Total: 17.6 MW) 4 Nos Gas Generator Additional: 3 Exhaust Gas Boiler (APROVIS, Germany) as Co-Generation {(2 x 4) + (1 x 2) = 10 Ton/Hour Steam @ 18bar (3 Nos Exhaust Gas Boiler)

	Additional: 2 Absorption Chiller (Broad, China) as Co-Generation (2 x 466 = 932 RT) 2 Nos Chiller
Boiler Plant:	3x 55 Ton/Hour (Total: 165 Ton Per Hour Net Steam @ 18 Bar Pressure) 3 Nos Water Tube Boiler
Daily Water Requirements:	500 m ³ /day
Source:	River & Deep Tube Well.
Power Requirements:	50 KW/H
Gas Requirements:	4400 m ³ /hr.
Possible Air Pollutants Escaped:	Through stack
Stack	4 nos.
Stack Height	39 m or 128 feet

Location of the project

The Project is located at City Economic Zone, North Rupshi, Rupganj, Narayanganj and is easily accessible by all kinds of transports. The project site is about 1.78 km away from Rupshi Bus Stand, Narayanganj and just eastern bank of Shitalakha River.

Bangladesh Edible Oil, Navana Health Care and Navana Pharmaceutical Ltd, Gazi Auto Tires Factory, Rony Knit Composite, Mir Cement etc. project are surrounding 2 km project from the project area. Location map of the project has been shown in Figure 3-1 in chapter-3.

Environment & Social Study:

Baseline data on environment is important to understand physical, biological, cultural, economic and social environmental characteristics of the project study area. This information forms the basis to analyze the probable impacts of the project activities. Details discussion about social and Environmental study of the project have been described in chapter-4 & 5.

Public Consultation and Disclosure

A public consultation meeting was carried out during site visit, a team of local people and responsible person were present. face to face interview session was hold and a focus group discussion had been arranged by factory authority within factory area with some of them. In chapter -6 details of public consultation has described.

Identification and Analysis of Key Environmental Issues

In chapter-7, a short and details key environmental issues are identified and describes some of them. In this chapter environmental sensitivity investigation was carried, also added environmental assets, likely benefit, community recommendation, alternative

analysis, and end of the chapter some social and environmental impacts are identified by check list matrix.

Environmental & Social Management Plan

Environmental & Social Management Plan (ESMP) for construction and operation phase is required to ensure that mitigation of adverse impacts and strengthening of positive impact resulting from the **project**. The objective of ESMP is to identify the project specific environmental actions that will need to be undertaken, not only to mitigate impacts but also improve environmental aesthetics for the proposed plant.

In chapter-9, a details environment and social management plan has given with proper monitoring and mitigation plan.

Cost Estimation for Environment Mitigation Measures and Monitoring

Most of the mitigation measures require contractor's / project authorities to accept good practices, which should be part of the usual procedures, so the cost of compliance is unlikely to be high. Relaxation, which is the **Project's** and the contractor's responsibility, given as part of the management of the project. Chapter-11 contains the environmental monitoring and mitigation cost of the project.

Emergency Response plan

The project authority has adopted an emergency response plan for their proposed project. In chapter-12 an emergency response plan for **project** has added.

Conclusion & Recommendation

Pollution of water from production & domestic activities and noise pollution was predicted as major impacts. However, monitoring of water quality and noise quality was conducted at existing facility and it was found that the project is not creating any adverse impact to its surrounding environment. The CSTP & CETP facilities are sufficient to reduce environmental impact. In addition, by implementing all necessary protection and regulatory measures as suggested here in ESIA, the proposed plant is expected to meet the National Environmental Quality Standards.

1 Introduction

1.1 Overview

A captive power plant, also called auto producer or embedded generation, is an electricity generation facility used and managed by an industrial or commercial energy user for their own energy consumption. It is basically a facility that provides a localized source of power to an energy user.

These are typically industrial facilities, large offices or data centers. Captive power plants can operate off-grid or they can be connected to the electric grid to exchange excess generation.

Bangladesh is a developing country. Power generation in this country is not robust and poorly managed. Over the last decade, disastrous power crisis led large industries, commercial and urban residential zones to produce power independently in order to achieve uninterrupted, reliable and economic power supply. Now a day's independent power producers are encouraged because of the inefficiency of expired public sector power generation units and mismanagement of governing authority. Presently, around 4000 MW is generated in private sector including CPPs, Rental Power Plant (RPPs), Small Power Plant (SPPs), and Independent Power Plant (IPPs) in Bangladesh.

In CPPs, mostly latest open cycle gas turbine generators are installed using pipe line natural gas. The average heat rate is very high and more energy is required to produce electricity; which results in poor overall efficiency. Modern technology allows producing 1 Kilo-Watt hour (kWh) of electricity utilizing less than 7 cubic feet (CFT) of natural gas, but in CPPs, normally 10-16 CFT of natural gas is needed to produce 1kWh of power. As days passed by, the heat rate keeps on improving. New generation Combined Cycle Gas Turbine (CCGT) power plants are producing electricity at average heat rate of 6,600 kWh, where in these CPPs electricity is produced at heat rate always above 10,000kWh.

As of now, Bangladesh Power Development Board (BPDB) power plants of derated capacity of 4357 MW utilizes the energy of gas to produce electricity, that makes natural gas the primary energy source (78.26%) of Bangladesh. The forecasted peak demand of Bangladesh in fiscal year 2030 would be 33,708 MW, which is around four times to the current peak demand. This energy crisis paves the way of CPPs to flourish up.

On this backdrop **City Edible Oil Captive Power Plant Limited**, has been taken this initiative to established a Power Plant industry within City Economic Zone.

1.2 Purpose of the study

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

The specific objectives include:

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

1.3 Scope of the ESIA study

This ESIA report has been prepared keeping in view the Term of Reference (ToR) as provided by the Client. The scope of the present ESIA report describes the following most important features:

- A review of the environmental legislative, regulatory and policy guidelines and considerations relating to the implementation of the project;
- A general description of the project and existing physical, biological and socio-economic conditions;
- Consultation with the locals/stakeholder involving concerned people in order to identify and act on any undocumented or perceived environmental issues;
- Identification and assessment of the potential impacts on the natural and human environment in the project area, from the construction of the AC mini-grid power plant;

- Identification of mitigation measures and monitoring actions in the form of an Environmental Management Plan (EMP); and
- Recommendations and conclusions in order to operate the project works in an environmentally safe and sound manner.

1.4 Extent of the Study

This ESIA is carried out based on proposed development. The influence of impact has been defined as 1 Km radius of the project location. Geographical Information System (GIS) techniques have also been used based on recent satellite imageries of the project area for above purposes. Assessment is carried out on the following environment components: terrestrial and aquatic ecology, soil, water, air, noise, and socio-economic aspects. The impacts on ecologically sensitive areas (e.g. wildlife sanctuaries, biosphere reserve, and protected places) within 1 Km of the project areas have also been assessed.

1.5 ESIA Content

The report fulfills the requirements of ESIA under ECR, 1997 and has been prepared in accordance with the TOR. This ESIA report is also consistent with the Government of Bangladesh guidelines, Equator Principles Financial institution ('EPFI') Guidelines for Confirmation of Environmental and Social Considerations, and World Bank OP 4.01 (Environmental Assessment) guidelines. The report contains twelve chapters and the chapter details are discussed below:

- **Chapter 1** describes the introduction containing background, purpose of the ESIA study, scope of the study, and approach methodology of ESIA study.
- **Chapter 2** is on policy, legal and administrative framework describing the relevant policy and legal frameworks for the ESIA process.
- **Chapter 3** contains detailed project description including the all the aspects of the proposed project.
- **Chapter 4** describes environmental baseline condition with details on physical environment, land resources, agricultural resources, fisheries, ecosystem condition and social characteristics of the area.
- **Chapter 5** describes social baseline condition including socio-economic condition and social characteristics of the area.

- **Chapter 6** describes public consultation discussion with local stakeholders with their ideas, views about the project through knowledge sharing
- **Chapter 7** describes the key impacts of the project during pre-construction, construction and operation phase.
- **Chapter 8** presents the impacts of project during pre-construction; construction and post-construction phase and describes mitigations measures for minimizing the effect of the negative impacts and enhancement measures for increasing the benefits of the positive impacts.
- **Chapter 9** describes the Environmental and Social Management Plan (ESMP) and monitoring plan along with the costing of the mitigation measures and monitoring plan.
- **Chapter 10** describes the occupational and health safety policy has been taken for the proposed project.
- **Chapter 11** describes the costing of environmental and social management and monitoring purpose.
- **Chapter 12** describes the emergency response and disaster management plan of the proposed project.
- **Chapter 13** concluding the ESIA report along with the recommendations.

1.6 Approach & Methodology

1.6.1 Approach

The study is based on both primary and secondary data and information. The primary data includes data collected from field observations and secondary data includes review of the Bangladesh statistical and relevant information from Government Departments. Discussions were held with stakeholders including community representatives and Land owner. The main purpose of this approach was to obtain a fair impression on the people's perceptions of the project and its environmental impacts. The study has been conducted in accordance with Environment Conservation Rules, 1997, Government of Bangladesh (GoB) EIA Guidelines, 1997, Safeguard Policy Statement (SPS), 2009 of ADB, Equator Principles Financial institution ('EPFI') Guidelines and World Bank OP 4.01 (Environmental Assessment) guidelines. The route map of this ESIA preparation is given in Figure 1.1.

1.6.2 Methodology

The following methodology was adopted for carrying out the ESIA of the proposed project:

a) Orientation

Meetings and discussions were held among the members of the ESIA Team. This activity was aimed at achieving a common ground of understanding of various issues of the study.

b) Data Collection Planning

Subsequent to the concept clarification and understanding obtained in the preceding step, a detailed data acquisition plan was developed for the internal use of the ESIA Team. The plan included identification of specific data requirements and their sources; determined time schedules and responsibilities for their collection; and indicated the logistics and other supporting needs for the execution of the data acquisition plan.

c) Data Collection

In this step, primary and secondary data were collected through field observations, environmental monitoring in the field, concerned departments and published materials to establish baseline profile for physical, biological and socioeconomic environmental conditions. A map in Figure 1.2 presents the sampling locations of several environmental features in the project area. Following activities were performed for data collection:

- Site Reconnaissance
- Analysis of Maps and Plans
- Literature Review
- Desk Research
- Field Observations and Studies
- Public Consultations
- Laboratory Analysis

Information was collected on the existing physical environment, particularly as related to geology, topography, soils, hydrology and drainage, water quality, air quality and noise. The primary sample collection map for the environmental issues has been given Figure 1.2.

Geology, Topography, Soils

Data related to geology, topography and soil was collected to establish the baseline of the project area and further to find out the impacts of the Project during the construction and operational phases.

Hydrology and Drainage

Data related to hydrology and drainage was collected to identify the elements of the hydrological cycle that are likely to have impacts on the project and the possible impacts that the project could have on the hydrological regime. Field assessments included a determination and verification of all the existing inflows into the drain, assessment of drainage issues, interviews with local community members.

Air Quality

Ambient air quality measurements are essential to provide a description of the existing conditions, to provide a baseline against which changes can be measured and to assist in the determination of potential impacts of the proposed construction on air quality conditions. The following parameters are carbon monoxide (CO), sulphur dioxide (SO₂), NO_x, particulate matter (PM₁₀), particulate matter (PM_{2.5}), and suspended particulate matter (SPM) have been included for ambient air quality monitoring.

Noise

The noise monitoring was performed by a trained specialist, using a calibrated Sound Level Meter set to A-weighting, fast response and statistical analysis settings. The Sound Level Meter (SLM) was mounted on a tripod at a height of approximately 1.5m, facing in the direction of the apparent predominant noise source. The SLM was programmed to record statistical noise levels for 15 minutes at each location and was calibrated before and after the survey; no significant drift was detected.

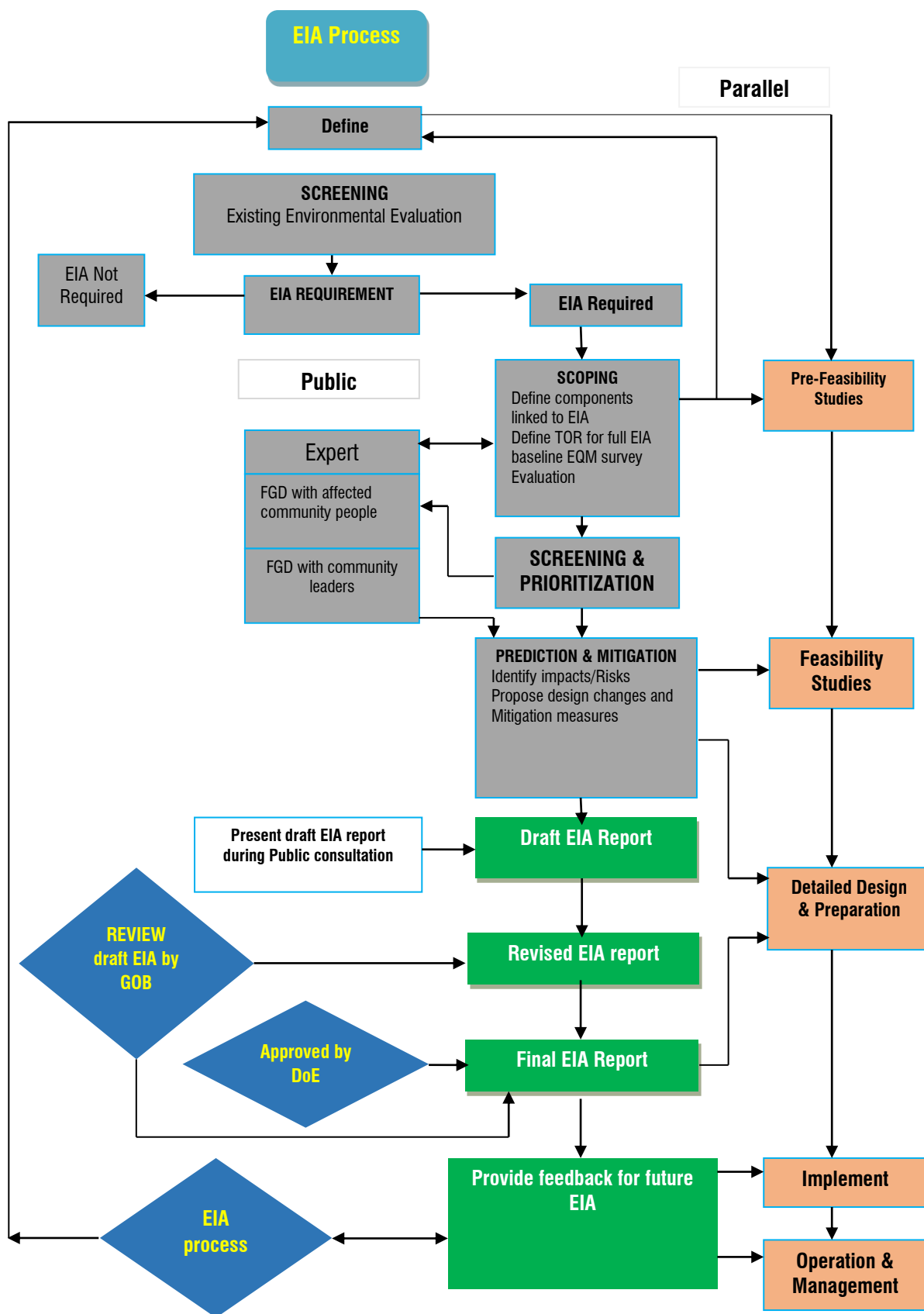


Figure 1-1: Flow diagram of methods of Environmental and Social Impact Assessment and parallel studies

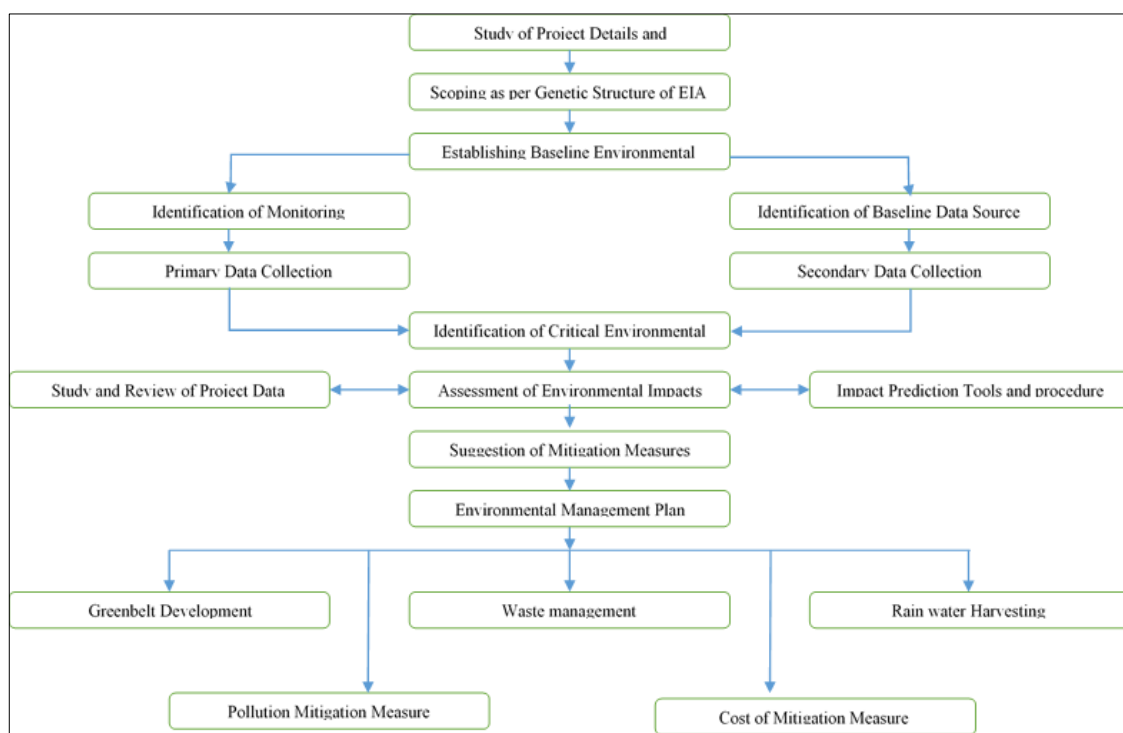


Figure 1-2: Route Map of Environmental and Social Impact Assessment

Ground /Drinking Water Quality

Sampling and analysis of ground/drinking water has been carried for the following parameters: pH, Chloride (Cl^-), Total Dissolved Solids (TDS), Iron (Fe), Arsenic (As), and Alkalinity.

Surface Water Quality

Sampling and analysis of surface water quality has been carried out for the following parameters: pH, Total Dissolved Solids (TDS), Dissolved Oxygen (DO), Chemical Oxygen Demand (COD) and Biochemical Oxygen Demand (BOD_5).

Biological Environment

The status of the flora and fauna of the project area were determined by an ecological survey, review of literature relevant to the area, and an assessment of terrestrial environment.

Flora

Flora is the plant life occurring in a particular region or time, generally the naturally occurring or indigenous—native plant life. The vegetative communities were identified and classified into community types. Identification was carried out of dominant tree

species, assessment of stage of growth (mature or sapling) and assessment of canopy cover.

Fauna

Fauna is all of the animal life of any particular region or time. Information on fauna was gathered from existing literature on reported species as well as observations in the field.

Socio-Cultural Environment

The Consultants utilized a combination of desk research, field investigations, census data, structured interviews, maps, reports to generate the data required for description of the existing social environment and assessment of the potential impacts due to the construction of the project. Data was collected on the following aspects given below:

- Land use
- Transportation and access Roads
- Demographics
- Livelihoods
- Education
- Health
- Community facilities
- Recreational activities
- Archaeological and cultural heritage

d) Public Consultation

Public consultation is an important component of the ESIA preparation activities. Local knowledge about the ecosystem and problems associated with the project activities were carefully recorded and used in impact assessment and developing mitigation plan. Formal public consultation, in tandem with opportunistic informal ones involving local villagers, and people whose livelihood depends on these project areas, were executed. Detailed description of public consultation has been presented at **Chapter 7**.

e) Impact assessment and mitigation

Impact Assessment and Mitigations were undertaken in accordance with the ESIA objectives presented earlier. The general process includes:

- **Impact assessment:** Identification and assessment of potential environmental and social impacts with reference to applicable country and international regulations, standards and guidelines. Impact assessment also includes

identifying opportunities to enhance beneficial impacts of the Project and to improve social development opportunities.

- **Mitigation measures:** Mitigation measures have been developed with consideration of baseline conditions; identified constraints; concerns and suggestions raised by the community; GoB, ADB, WB, IFC and other relevant requirements, and the level of design information available at the time of preparation of this ESIA. Mitigation may include:
 - Environmental controls (e.g. measures for minimizing harmful noise, air, water and waste emissions);
 - Design optimization (e.g. relocation of dam walls to avoid graveyard);
 - Procedural measures (e.g. setting up catchment management committee);
 - Avoidance/reduction (e.g. waste minimization process management to conserve water);
 - Compensatory measures (e.g. biodiversity offsets); and
 - Timing measures (e.g. no construction at night).
- **Risk assessment:** Risk assessment has been undertaken to gauge the level of 'Residual' impact after mitigation and acceptability against international criteria and sustainability principles. Further opportunities for reducing identified 'high' risk residual impacts are then canvassed.

1.7 Limitation of the Study

The study statement was made by analysis of data obtained by both primary (measuring parameters in the collected samples, public consultation and site observation through field visits) and secondary (data from Department of Public Health and Engineering (DPHE), Bangladesh Meteorological Department (BMD), Department of Environment (DoE) and published journals and books) sources for the study. The environmental and social assessment is based on the information collected from the various agencies, community consultations and observations. Professional judgment and subjective interpretation of facts and observations has been applied for the preparation of the ESIA Report. Additionally, offsite facilities, sources and alignments are not fixed till date, thus assessment is made on the basis of preliminary information available from BEZA and for all the options which could be explored. The onsite (industrial area detailed planning will be carried out by prospective private developer) information availability is limited to feasibility assessment.

1.7.1 ESIA Team

A multidisciplinary team of professionals having experience of conducting Environment & Social Impact Assessment Studies for Industrial Parks, Industrial Areas, Special Economic Zones, DTA, Economic Zones, Area development, Industrial Corridors etc. were involved in carrying out ESIA study for this project. Details of the professionals are given in the following table.

Table 1-1: ESIA Team

SN	Name of Professional	Area of Expertise	Position Assigned
1.	Mr. Abdullah Al Mahmud MSc in Environment Science NSTU	Geo-spatial and Remote sensing	Environmental and Social specialist, GIS Expert
2.	Engr. Mr. Enamul Habib BSc in Chemical Engineering SUST	Waste and/or Wastewater Management	Environmental specialist and Waste Management Expert
3.	Engr. Mr. Kamrul Hasan BSc in Civil & Environment SUST	Land Use, Water Resource, production Process and Architecture	Urban Planner, Process Expert
4.	Mr. Sovel Ahsan Chowdhury MSc in Environment Science NSTU	Agriculture and Fisheries	Agro-Fisheries Expert
5.	Md Nazrul Islam Msc in Environmental Science NSTU	Soil, and water	Soil, water testing expert
6.	Md Zakaria Diploma in Environmental Engineering Bsc in Civil Engineering	Waste Water Treatment, Laboratory	ETP operation and Lab expert

2 Legislative, Regulation and Policy consideration

2.1 Policy, Legal and Administrative Framework

This chapter provides a description of the regulatory framework applicable for **City Edible Oil Captive Power Plant Limited**. It highlights environmental, health & safety and social regulations with applicable permits and standards in association with the Project. It broadly focuses on the:

- Legal Enforcement Agencies at National Level;
- Applicable national and local Environmental and Social Laws, Regulations and Policies;
- Applicable ADB Guideline and Category
- Applicable Equator Principle Guideline
- International & National Environment Standards/ Guidelines; and

2.2 Legal Enforcement Agencies

The responsibility of formulation, implementation and modification of national level environmental laws in Bangladesh lies with the Ministry of Environment Forests and Climate Change (MoEFCC). The Department of Environment (DoE) established under the Environmental Pollution Control Ordinance, 1977 which functions under the MoEFCC. It is responsible for carrying out the purposes and provisions of the Environment Conservation Act, 1995 as amended till 2010 (hereinafter referred as ECA) which is the umbrella legislation regulating environmental issues in the country. A brief description of the relevant legal relevant enforcement agencies has been described in the following table.

Table 2-1: Relevant legal enforcement agencies and their functions.

S. No.	Agency	Functions
1.	Ministry of Environment Forests, and Climate Change (MoEFCC)	The MoEFCC is the nodal agency in the administrative structure of the Central Government, for the planning, promotion, co-ordination and overseeing the implementation of environmental and forestry programmes. It oversees all environmental matters in the country and is a permanent member of the Executive Committee of the National Economic Council. It plays a pivotal role as a participant of the United Nations Environment Programme (UNEP). Its principal activities include:

S. No.	Agency	Functions
		• Conservation & survey of flora, fauna, forests and wildlife; • Prevention and control of pollution; and • Forestation & regeneration of degraded areas and protection of environment in the frame work of legislations.
2.	Department of Environment (DoE)	An Environment Pollution Control Board was setup under the Environment Pollution Control Ordinance, 1977. It underwent a series of subsequent restructuring and was finally renamed as Department of Environment in 1989. It is headed by a Director General appointed by the Government. The DoE through its head, divisional and district level offices conducts the following principal activities: • Advising the Government to avoid such manufacturing processes, commodities and substances which are likely to cause environmental pollution; • Advisory and issuing directions to the concerned person regarding the environmentally sound use, storage, transportation, import and export of a hazardous substance or its components; • Conducting inquiries and research activities on conservation, improvement and pollution of the environment and rendering assistance to any other authority/organization regarding the same; • Collection and publication of information about environmental pollution; • Conducting programs for observation of drinking water quality and issuing directives if necessary for adherence to drinking water quality standards; • Formulation of environmental guidelines; • Prescribing and modifying environmental quality standards pertaining to air, water, noise, vehicular emissions etc.; • Issuing Location Clearance and Environmental Clearance Certificates to Projects; and • Implementation of provisions of ECA and rules made there under.
3.	Bangladesh Forest Department (BFD)	It was established under the MoEFCC and is responsible for identifying and declaring of certain areas as reserved or protected or private forest lands. It implements the provisions of Forest Act, 1927 and National Forestry Policy, 1994. It's also

S. No.	Agency	Functions
		responsible for wildlife preservation and protection through implementation of Wildlife (Preservation & Security) Act, 2012.
4.	Water Resources and Planning Organization (WARPO)	It was established under the Water Resources Planning Act, 1992. Its core functions include: • Monitoring the implementation of National Water Management Plan (NWMP); • Upkeep of water resource assessments; • Maintenance, updating and dissemination of the National Water Resources Database (NWRD) and MIS; • Secretariat to the National Water Resources Council (NWRC) and the Executive Committee of the National Water Resources Council (ECNWRC); • Responding to the NWRC/ECNWRC requests for information and advice; • Periodic update of the NWMP; • Assisting other agencies in planning, monitoring, studies and investigations; • Adhoc advice on policy, strategy, institutional and legal issues; • Laying down effluent discharge standards into river in consultation with DoE; and • Special studies and research as required.
5.	Ministry of Shipping (MOS)	The Ministry of Shipping encompasses within its fold shipping and port sectors which also oversee the safety and environmental matters and the regulatory aspects of maritime shipping. It is responsible for: • Development and maintenance of waterways, inland water transport, ports, ocean shipping, development and expansion of physical infrastructural facilities etc. • Managing and maintaining inland, island and inter island ferry-boat and shipping services; • Formulation and implementation of act, rules and policies regarding the aforementioned issues.
6.	Bangladesh Inland Water Transport Authority	It was setup in 1958 under the provisions of East Pakistan Inland Water Transport Authority Ordinance 1958. Its specific functions include: • Carry out river conservancy works;

S. No.	Agency	Functions
	(BIWTA)	• Disseminate navigational and meteorological information including publication of river charts; • Draw up programmers of dredging requirements and priorities for efficient maintenance of existing navigable waterways and for resuscitation of dead or dying rivers, channels, or canals, including development of new channels and canals for navigation; and • Develop, maintain and operate inland river ports, landing/ferry ghats and terminal facilities in such ports or ghats.
7.	Ministry of Fisheries and Livestock (MOFL)	The main functions of the MOFL include: • Preservation of fisheries resources; • Fulfilling the requirement of animal protein through proper management and planned development; • Increasing socio-economic conditions of fishermen; • Creating employment opportunities for rural unemployed and landless people; • Expanding foreign exchange earnings by exporting fish and fishery products; • Developing innovative technologies through research for fisheries development and preservation; and • Protection of fishes through implementation of Protection and Conservation of Fish Act, 1950 as amended till date.
8.	Bangladesh Power Development Board (BPDB)	It is a statutory body created in May 1, 1972 and is responsible for major portion of generation and distribution of electricity mainly in urban areas except Dhaka and West Zone of the country. It has undertaken a massive capacity expansion plan to add about 10500 MW generation capacities in next 5 years to achieve 24000 MW Capacity according to Power System Master Plan (PSMP) 2021.
9.	Bangladesh Energy Regulatory Commission (BERC)	It was established under the Bangladesh Energy Regulatory Commission Act, 2003. Some of its key functions include: • Issue, cancel, amend and determine conditions of licenses, exemption of licenses and determine the conditions to be followed by such exempted persons; • Regulation of generation, storage, supply, and transmission of energy;

S. No.	Agency	Functions
		• Determine tariff for electricity distribution etc.; • Ensure control of environmental standard of energy under existing laws; • Extend co-operation and advice to the Government, if necessary, regarding electricity generation, transmission, marketing, supply, distribution and storage of energy.
10.	Ministry of Labour and Employment (MOLE)	It was established with following objectives: • Creation of employment opportunity; • Creation of semi-skilled and skilled manpower; • Enhancement of productivity of factories by creating friendly working environment between workers & employers; • Ensuring welfare of workers in different industrial areas; • Implementation of labour laws; • Fixing up minimum wages of labour; and • Ensuring justice through Labour Court. It has been divided into four departments, viz: • Directorate of Labour • Chief Inspector of Factory and Establishment • Minimum Wages Board • Labour Appeal Tribunal
11.	Ministry of Law and Parliamentary Affairs	This ministry is divided in to the Law and Justice Division and the Parliamentary Affairs Division for functional purposes. The Law and Justice Division of the Ministry of Law, Justice and Parliamentary Affairs has the responsibility of providing legal advisory services to other ministries, divisions, departments, and organizations of the Government. The parliamentary affairs division is assisted by the law commission and the human rights commission and its main function lies in formulating, scrutinizing and preparing legislations. When needed, it provides legal opinions and translations for other ministries.
12.	Ministry of Land	The ministry of land is in charge of land administration, management and development for the overall growth of the nation. The Ministry manages Government owned lands, vested properties and abandoned properties. It is responsible for the

S. No.	Agency	Functions
		collection of land development tax, land surveying and record keeping and updating. Land Acquisition and requisition fall under the responsibilities of this ministry.
13.	Board of Investment (BOI), Bangladesh	The Board of Investment was established in 1989 by the Investment Board Act. The specific functions of board are: • Implementation of all provisions as lay down under The Investment Board Act, 1989. • To promote domestic and foreign investment as well to enhance international competitiveness of Bangladesh; • To identify the hindrance of investment and provide necessary facilities and assistance in the establishment of industries.
14.	Union Parishad	Union Parishad (UP) currently is the only elected statutory local government body for the rural Bangladesh. A UP consists of a chairman and twelve members. They are elected on the basis of adult franchise. Each UP has a full-time Secretary, appointed by the Deputy Commissioner (DC). The functions of UP are: • Maintenance of law and order and conduction of censuses of all kinds. • Registration of births, deaths, blind people, beggars and destitute. • Planning and implementation of development schemes in the field of agriculture, forestry, fisheries, livestock, education, health, small and micro enterprises, communications, irrigation and flood control. • Protection and maintenance of public property such as roads, bridges, canals, embankments, markets, telephones and electricity lines.

2.3 Regulatory Requirements for the Proposed Project

The Government of Bangladesh has framed various laws and regulation for protection and conservation of natural environment. These legislations with applicability to this project are summarized below in the table.

Table 2-2: National Acts.

Summary of Applicable legislation/ Policy	Agency Responsible	Applicable Permit and Requirements
National Environment Policy, 1992 and Action Plan It sets out the framework for establishment of legislations related to 15 sectors including environment, water, agriculture, water resources development, forest & wildlife, fisheries etc. The key provisions of the policy are: • Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) of all new public and private sector industrial Projects is mandatory • Adoption of corrective measures by polluting industries in phases. • Prevention of land erosion, and environmentally sound management of newly accreted land. • Conservation of wildlife, bio-diversity, forest, fisheries and livestock.	Ministry of Environment Forests, and Climate Change (MoEFCC) Department of Environment, Bangladesh	The project should ensure that Project activities comply with the provisions made under the policy and the legislations made there under for implementing the same.
The Environment Conservation Act, 1995 as amended till October 5, 2010 (hereinafter referred as ECA) The Environment Conservation Rules, 1997 as amended till February 16, 2002 (hereinafter referred as ECR) The salient features of the Act are as follows: • A Department of Environment (DoE) to be established subsidiary to the	Ministry of Environment Forests, and Climate Change (MoEFCC)	The proposed Project located within an Economic Zone which will facilitate falls under the Orange-B category according to ECR, 97. But the project has individual Captive power plant which capacity is 17.6 MW. So that the project turns into Red category as classified under Schedule- I of the ECR. And According of BEZA one stop service and DoE guideline, if any project

Summary of Applicable legislation/ Policy	Agency Responsible	Applicable Permit and Requirements
MoEFCC to exercise the provisions of the Act. - The Government of Bangladesh (GoB) will declare Ecologically Critical Areas (ECA) and specify the activities or processes that cannot be initiated or continued in an ECA. - An industrial unit/Project cannot be established without obtaining an Environmental Clearance Certificate (ECC) from the Director General of DoE. - Publication of environmental guidelines related to environmental pollution control and mitigation, conservation and improvement of the environment. - Prescription of rules for implementing the provisions of the Act. The provisions under the ECR are summarized as follows: □ The industries for the purpose of obtaining ECC have been classified into the following 4 categories based on their site and impact on the environment: - Green - Orange –A - Orange – B - Red <i>The list of industries falling under each category has been annexed in the Schedule – I to the ECR.</i>	Department of Environment, Bangladesh	falls under Orange-B and have Captive Power plant than the project authority should take their ECC through an ESIA and Captive Power Plant license by an individual application. <i>Reportedly, The Project Authority already received Environmental Clearance Certificate (ECC) from Department of Environment.</i> <i>The project authority also received the ECC of Captive Power Plant after getting ECC for Individual Project.</i> The shall ensure that pollutant emissions/discharges from various sources etc. during Project activities are well within the standards prescribed in the Schedules 2-12 of the ECR 1997. Some of the standards have been revised by the DoE viz. - Ambient Air Quality standard - Vehicular Emission standards - Ambient Noise Standards <i>The various applicable</i>

Summary of Applicable legislation/ Policy	Agency Responsible	Applicable Permit and Requirements
- For proposed industries falling under the Orange A&B and Red categories, a Location Clearance Certificate (LCC) needs to be obtained from DoE prior to the issuance of ECC. - The Project entrepreneur shall apply for ECC in Form 3 along with prescribed documents and application fees. - ECC (for Red category) will be valid for 1 year from the issuance date and shall be renewed at least 30 days prior to expiry. - Various environmental quality standards pertaining to air, water, sound, odor etc. have been laid down in the schedules attached to the Act. - Emissions and waste discharge standards have been laid down in Schedules 9-11. The person in charge of facility/unit shall notify the Director General, DoE in case of pollutant emission/ discharge in excess of prescribed standards or where there is a possibility of the same.		<i>standards have been provided in subsequent sections. Compliance to such standards shall be ensured by the Project.</i>
National Industrial Policy, 2010 The policy aims to ensure the industrialization process is compliant with internationally agreed environment, health, and safety and labour standards.	Ministries of Industries	The Project shall ensure that the Project is registered as prescribed by the Act.

Summary of Applicable legislation/ Policy	Agency Responsible	Applicable Permit and Requirements
The government will ensure assistance for creating alternative employment, keeping the socio-economic backdrop in mind, for any privatization proposal.		
Investment Board Act (1989) Board of Investment, established under this act, is the principal private investment promotion and facilitation agency of Bangladesh which is responsible for implementation of provisions of above said policy. Under the provision of this act as per Schedule 11, All industries established in non-governmental sectors licensed by the Board shall be registered in the prescribed manner. As per Schedule 15 of this act, any industrial undertaking licensed transgresses any provision of this Act or of any rule made there under or breaks any condition relating to the license, the Board may, in such manner as may be prescribed, cancel the license of the industrial undertaking.	Board of Investment (BOI), Bangladesh	The Project shall ensure that the proposed Project is registered as prescribed by the Act.
National Water Management Plan, 2001 (Approved in 2004) - The objectives of the Plan are listed below: - To operationalize directives given in National Water Policy and to do in accordance with the Government approved Development Strategy.	Water Resource Planning Organization (WARPO)	The Project should ensure implementation of Flood Protection programme with provision of embankment of adjacent Shitalakshya River, proper maintenance of existing river dykes, drainage sluices, etc.

Summary of Applicable legislation/ Policy	Agency Responsible	Applicable Permit and Requirements
- To address issues related to harnessing and development of all forms of surface and ground water and management of these resources in an efficient and equitable manner. - Consultation and participation with the direct beneficiaries in the hand over and development of water schemes.		
Bangladesh Water Act, 2013 The key features of the Act are: - A National Water Resources Council (NWRC) to be established for implementing the provisions of the Act - A National Water Policy shall be adopted by the Council addressing the following issues: - Purpose and sectors of water use - Affordability of water users - Actual cost of water abstraction and distribution - Financial ability and backwardness of water users of any group thereof - Water demand and supply - Any other issues considered relevant by GoB - An Executive Committee of the Council shall be established or ensuring efficient performance of the Council. - The GoB can declare certain areas as Water Stress Areas for the protection of water sources or aquifers.	Water Resource Planning Organization (WARPO)	This Act was implemented in 2013 and the NWRC and Executive Committee are yet to be formulated. Upon formation of the aforementioned bodies, water stress areas and related provisions may be prescribed. <i>The Project shall ensure compliance with legal requirements under such provisions if applicable.</i>

Summary of Applicable legislation/ Policy	Agency Responsible	Applicable Permit and Requirements
• Water zone demarcation (industrial, agricultural, brackish water aquaculture and hatchery water zones) through gazette notification and issuance of protection order for efficient water management in such zones • Declaration of flood control zone and its management. • Restriction on abstraction of total water from any water source.		
Ground Water Management Ordinance, 1985 As per the provisions as per schedule 5 of this act, no tube well shall be installed in any place without a license granted by the Union Parishad. Also, no application shall be entertained by the Union Parishad unless it is accompanied by such fee as may be prescribed under the requirements of this ordinance.	Ministry of Environment Forests, and Climate Change (MoEFCC)	The project should ensure that no tube-well shall be installed in any place without a license granted by the Union Parishad. The should furnish the following information: • the aquifer condition of the soil where the tube-well is to be installed; • The distance of the nearest existing tube-well; • The area likely to be benefited by the tube-well; • The likely effect on the existing tube-wells including tube wells used for domestic purpose; • The suitability of the site for installation of the tube-well; and • The conditions on which a license, if any, may be granted.
The National Fisheries Policy, 1999 The objectives of the fisheries policy	Ministry of Fisheries and	The Project shall ensure that during Project operation, no untreated effluent is disposed

City Edible Oil Captive Power Plant Ltd

Summary of Applicable legislation/ Policy	Agency Responsible	Applicable Permit and Requirements
Conservation of Fish Act. It provides the regulations for prohibition of fishing during certain periods, licenses for catching fishes, prevention of fish destruction due to explosives and industrial effluent disposal etc.	(MoEFCC) Department of Fisheries	stipulated under the ECR.
The Building and Construction Act, 1952 - As per Section 3A of this act, no owner or occupier of a building shall, without obtaining previous permission from the Authorized Officer or the Committee use the building for the purpose other than that mentioned in the sanction. - All the construction, re-construction works to be undertaken as per terms or conditions prescribed.	Authorized Officer or Committee	The Project shall ensure that no building or tank shall be constructed without prior permission from the Authorized Officer or Committee of the area.
The Vehicle Act, 1927 - As per section 4 of this act, no owner or person in charge of a vehicle shall allow any person under the age of eighteen years to drive the same in any public place. - As per section 7, no person shall drive a vehicle in a public place unless he is licensed in the prescribed manner. - Every vehicle must possess a valid registration certificate as per section 11 of this act.	Bangladesh Road Transport Authority	The Project shall ensure that every vehicle possess a certification of registration as required under this act.
The Motor Vehicle Ordinance Act, 1983 <i>(as modified on November,</i>	Bangladesh Road Transport	The Project shall ensure that no person shall drive a motor vehicle in any public place

Summary of Applicable legislation/ Policy	Agency Responsible	Applicable Permit and Requirements
1990) - As per section 3 of the ordinance, no person shall drive a motor vehicle in any public place unless he holds an effective driving license. - No person under the age of eighteen years shall drive a motor vehicle in any public place.	Authority	unless he holds an effective driving license issued to himself authorizing him to drive the vehicle.
Fatal Accidents Act, 1855 This Act was promulgated to provide compensation to families for loss occasioned by the death of a person caused by actionable wrong. The company will be liable to pay compensation in case of death of any worker/employee or damages in case death has not ensued but such circumstances could have resulted in death.	Ministry of Labour and Employment	The Project shall ensure compliance to the Rules.
Bangladesh Labour Act, 2006 (as amended through July 22, 2013) The provisions prescribed under chapters pertaining to occupational health and safety, and compensations due to accidents are entailed below. Chapter V: Health and Hygiene The chapter deals with provisions regarding cleanliness of the any facility, drinking water supply, ventilation, lighting, dust bean and spittoons, etc. Chapter VI: Safety This chapter addresses the issues regarding safety of building and machinery, precautions in case of	Ministry of Labour and Employment	The Project shall ensure that all conditions provided in chapters V, VI, VII and VIII of the Act, pertaining to Health, hygiene safety and welfare are met in accordance with the amended act. During the construction and operation phases of the proposed Project shall ensure the facilitation of the following provisions: Management of workers under service rules as approved by the Chief Inspector.

Summary of Applicable legislation/ Policy	Agency Responsible	Applicable Permit and Requirements
fire, fencing of machinery, work on or near machinery in motion, hoists and lifts protection of eyes, explosive or inflammable dust/gas, etc. Chapter VII: Special Provisions related to Health, Hygiene and Safety This chapter deals with provisions to be taken in case of hazardous operations, notice to be given in accidents, notice of certain dangerous occurrences and diseases etc. Chapter VIII: Welfare This chapter prescribes the provisions to be facilitated in the facility regarding first-aid appliances, safety record books, washing facilities, canteens, shelters, rooms for children, etc. This Act consolidates and amends the laws relating to employment of labour, relations between workers and employers, determination of minimum wages, payment of wages and compensation for injuries to workers, formation of trade unions, raising and settlement of industrial disputes, health, safety, welfare and working conditions of workers, apprenticeship and matters connected therewith. The provisions prescribed under chapters pertaining to labour benefits and entitlements are as follows: • Conditions of Service and Employment • Employment of Adolescent		• Provision of Letter of Appointment and ID card (with photograph) for each and every worker. • Maintenance of Service Book with the requisite details. • Retrenchment Policy and conditions of re-employment of retrenched workers, termination of employment etc. • Provisions regarding gratuity, provident fund and other payments at the time of retirement of workers. • Any adolescent employed in any dangerous operation shall be in possession of Certificate of Fitness issued by a registered medical practitioner. • Maternity benefits shall be paid as stipulated in the Act. • Cleanliness of the facility through washing, painting and varnishing etc. for ensuring hygiene. • Ventilation and removal dusts and fumes through adequate number of exhaust systems. • Adequate number of drinking water facilities equipped with cooling systems at convenient places in the unit. All such places shall be legibly

Summary of Applicable legislation/ Policy	Agency Responsible	Applicable Permit and Requirements
• Maternity Benefit • Working Hours and Leave • Wages and Payment • Workmen's Compensation for Injury by Accidents • Trade Unions and Industrial Relations Regulation of Employment and Safety of Dock Workers		marked 'Drinking water' in Bangla. • Separate and adequate number of latrines and urinals for men and women. They shall be maintained in a clean and sanitary condition at all times with suitable detergents and disinfectants. • Leave Policy stating the working hours and the number of leaves the workers are entitled to under the provisions of the Act. • Compensation/wages shall be stated in the Letter of Appointment given to the workers/employees. • Project shall ensure that there is no policy restricting the association of workers'/trade unions. • Workmen's Compensation Policy stating the compensation to be meted out in case of injury due to accidents. Safety of EZ workers engaged in loading and unloading of industries as per prescribed provisions.
Bangladesh Factories Act, 1965 As per section 6 of the Act, the occupier shall furnish some information to Chief Inspector at least fifteen days before he begins to	Chief Inspector of the Area	The Project shall ensure that approval for plan and specifications has been procured from Chief Inspector of area.

Summary of Applicable legislation/ Policy	Agency Responsible	Applicable Permit and Requirements
occupy or use any premises as a factory. As per Section 8, the plans and specifications must be approved by Chief Inspector. Provisions for cleanliness, disposal of effluents, ventilation, lightning, latrines and urinals have been described in Chapter II of the Act. Chapter IV and V prescribe provisions for safety and welfare of the workers.		The Project ensures that provisions as prescribed in chapters II, III and IV are complied with.
National Child Labor Elimination Policy, 2010 The National Child Labor Elimination Policy 2010 has been adopted to provide a framework towards eradicating all forms of child labor by 2015. The policy defines and lays guidelines for underage workers, regulation of their working hours, wages, nutrition needs, mental health, education and overall work environment. As per the policy, a child is a person under the age of 14. A person between the ages of 14 and 18 is an adolescent, and should be granted special amendments, if compelled to work due to poor economic status. The policy also entails that a child may not be employed as a regular employee, not be made to work in hazardous settings, provided breaks more frequent than those for regular employees and have enough time left for study.	Ministry of Labor and Employment Ministry of Women and Child Welfare	During all stages concerning employment of labor, Project should take the policy as a guidance document for following ethical practices at workplace, in dealing with adolescent workers, if at all.

Summary of Applicable legislation/ Policy	Agency Responsible	Applicable Permit and Requirements
Children's Act, 2013 (Act No. 24 of 2013). The Act implements the Nation's ratification to the UN Convention on the Rights of the Child (CRC), and replaces The Children's Act of 1974. The main components of the act are as follows: • The Act changes the legal definition of a child from being a person under the age of 14 to one under the age of 18. • It enforces the national authorities to establish Child Welfare Boards in each district, besides one at the national level. • It criminalizes any kind of cruelty inflicted on children while they are working in both the formal and informal sectors. • The Act further prescribes stricter punishments for using or exploiting children in begging, in brothels, and in carrying drugs, arms, or other illegal commodities.	Ministry of Law, Justice and Parliamentary Affairs. District commissioner's Office.	The Project must ensure that at through all stages of construction and operation, no juvenile (children between ages 14 and 18) are engaged on site.
The Acquisition and Requisition of Immovable Property Ordinance, 1982 The ordinance consolidates and amends the laws relating to acquisition and requisition of immovable property by the government. It lays down the procedures and conditions for acquisition of land and other immovable properties such as common property resources (wells,	Ministry of Land, Bangladesh	City Edible Oil Limited is located within City Economic Zone and The EZ authority purchase the land from proper owner of the land on a willing buyer – willing seller basis. City Economic Zone authority have developed the land and received the final license from Bangladesh Economic Zone Authority

Summary of Applicable legislation/ Policy	Agency Responsible	Applicable Permit and Requirements
places of worship, burial grounds, etc.). As per Section 8 of this ordinance, the amount of compensation to be determined taking into consideration market value and decision of Deputy Commissioner.		(BEZA). The project authority has leased the land from b. So, no land acquisition is required to establish the project.
The Bangladesh Inland Water Transport Corporation Order, 1972 (President's Order) This ordinance has been established for the provision of a Corporation for the purpose of operation, promotion and development of coastal and inland shipping and water transport services.	Bangladesh Inland Water Transportation Authority (BITWA)	The project should ensure the compliance with provisions of the orders.
Gas Safety Rules 1991 (amended 2003) S.R.O. No- 228/Law/2003- The Government, in exercise of the powers conferred by section 65 of the Bangladesh Energy Regulatory Commission Act, 2003, is pleased to publish the following English translation of the Act, to be called the Authentic English Text of the Act, and it shall be effective from the date on which the Act comes into force under sub-section (2) of section 1 of the Act. WHEREAS it is expedient to make provisions for the establishment of an independent and impartial regulatory commission to create an atmosphere conducive to private investment in the generation of electricity, and transmission, transportation and	Applicable	Project Authority Will use Gas and build a gas transportation line within factory area, they are going to produce power by using gas engine. The project authority is bound to obey this mentioned rules and they will strictly follow it.

Summary of Applicable legislation/ Policy	Agency Responsible	Applicable Permit and Requirements
marketing of gas resources and petroleum products, to ensure transparency in the management, operation and tariff determination in these sectors; to protect consumers' interest and to promote the creation of a competitive market;		
Bangladesh Gas Act 2010 The entire territory of Bangladesh, territorial waters and its economic zone for the purpose of circulation, distribution, marketing, supply and storage of natural gas and its natural liquefied hydrocarbons, as well as to ensure their proper and fair use, etc. It is advisable and necessary to take measures for circulation, distribution, marketing, supply and storage of natural gas and its inherent liquid hydrocarbons in its economic zone and ensure their proper and fair use; And since it is advisable and necessary to provide for effective control over the sale of unaccounted gas, natural gas and its inherent liquid hydrocarbons, as well as ensure the timely collection of revenues from gas sales and the creation of a competitive market through the participation of the private sector and individuals.	Applicable	The project will use Natural Gas to produce power.
The Right to Information Act, 2009 Bangladesh The Act was notified in the Bangladesh Gazette on Monday, 6 April, 2009. It received the President's assent on 5 April 2009.	Applicable	The project Authority will follow the Act.

Summary of Applicable legislation/ Policy	Agency Responsible	Applicable Permit and Requirements
The Act makes provisions for ensuring free flow of information and people's right to information. The freedom of thought, conscience and speech is recognized in the Constitution as a fundamental right and the right to information is an alienable part of it. Since all powers of the Republic belong to the people, it is necessary to ensure right to information for their empowerment. The right to information shall ensure that transparency and accountability in all public, autonomous and statutory organizations and in private organizations run on government or foreign funding shall increase, corruption shall decrease and good governance shall be established. It is expedient and necessary to make provisions for ensuring transparency and accountability.		

2.4 Asian Development Bank (ADB) Safeguard Principles and Policies

2.4.1 Safeguard Policy Statement (SPS), 2009

Built upon the three previous safeguard policies on the Involuntary Resettlement Policy (1995), the Policy on Indigenous Peoples (1998) and the Environment Policy (2002), the Safeguard Policy Statement was approved in 2009. The safeguard policies are operational policies that seek to avoid, minimize or mitigate adverse environmental and social impacts including protecting the rights of those likely to be affected or marginalized by the developmental process. ADB's safeguard policy framework consists of three operational policies on the environment, indigenous peoples and involuntary resettlement. A brief detail of all three operational policies have been mentioned below:

Environmental Safeguard: This safeguard is meant to ensure the environmental soundness and sustainability of Projects and to support the integration of environmental considerations into the Project decision making process.

Applicability to Environmental Safeguards

*The proposed Project is an **Edible Oil industry and Captive Power Plant** is likely to have significant environmental impacts during construction and very low chance operation phase. The impacts and risks associated with the generation, use, storage, release, and/or disposal of pollutants has been assessed as part of this ESIA and appropriate mitigation measures have been proposed. Practices like minimal release of waste/emissions, safe disposal of waste, waste water management etc. shall be considered prior to each Project phase. The Environmental Safeguard is thus applicable to the proposed Project.*

Involuntary Resettlement Safeguard: This safeguard has been placed in order to avoid involuntary resettlement whenever possible; to minimize involuntary resettlement by exploring Project and design alternatives; to enhance, or at least restore, the livelihoods of all displaced persons in real terms relative to pre- Project levels; and to improve the standards of living of the displaced poor and other vulnerable groups.

Applicability to Involuntary Resettlement Safeguards

*The sale of land has been undertaken directly on a 'willing buyer willing seller' basis by City Economic Zone with the landowners and **City Edible Oil Captive Power Plant Limited**. has leased the land from the EZ authority. Hence, as no physical and economic displacement in terms of involuntary acquisition of land and involuntary restrictions on land use is triggered, the Involuntary Resettlement Safeguard is not applicable for the proposed Project.*

Indigenous Peoples Safeguard: This safeguard looks at designing and implementing Projects in a way that fosters full respect for Indigenous Peoples' identity, dignity, human rights, livelihood systems and cultural uniqueness as defined by the Indigenous Peoples themselves so that they receive culturally appropriate social and economic benefits; do not suffer adverse impacts as a result of Projects; and participate actively in Projects that affect them.

Applicability to Indigenous Peoples Safeguards

The proposed Project area does not report any indigenous tribes, minorities or aboriginals. Hence the Indigenous Peoples Safeguard and the requirements there under are not applicable for this Project.

Information, Consultation and Disclosure: Consultation and participation are essential in achieving the safeguard policy objectives. This implies that there is a need for prior and informed consultation with affected persons and communities in the context of safeguard planning and for continued consultation during Project implementation to identify and help address safeguard issues that may arise. The consultation process begins early in the Project preparation stage and is carried out on an ongoing basis throughout the Project cycle. It provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people and is undertaken in an atmosphere free of intimidation or coercion. In addition, it is gender inclusive and responsive and tailored to the needs of disadvantaged and vulnerable groups and enables the incorporation of all relevant views of affected people and other stakeholders into decision making.

ADB requires the borrowers/clients to engage with communities, groups or people affected by proposed Projects and with civil society through information disclosure, consultation and informed participation in a manner commensurate with the risks to and impacts on affected communities. For Projects with significant adverse environmental, involuntary resettlement or Indigenous Peoples impacts, ADB Project teams will participate in consultation activities to understand the concerns of affected people and ensure that such concerns are addressed in Project design and safeguard plans.

A series of consultations were carried out with the land sellers, community and other (direct and indirect) stakeholders involved in the proposed Project by **City Edible Oil Captive Power Plant Limited** and **Environmental Study & Research Division (ESRD)**. Details pertaining to the consultation process are provided in relevant section of this report.

2.4.1.1 Scope of Application

The SPS (Safeguard Policy Statement) applies to all ADB-financed and/or ADB-administered sovereign and no sovereign projects, and their components regardless of the source of financing, including investment projects funded by a loan; and/or a grant; and/or other means, such as equity and/or guarantees (hereafter broadly referred to as projects).

2.4.2 Social Protection Strategy, 2001

ADB has designed a set of policies and programs for social protection in 2001, that is, to reduce poverty and vulnerability by promoting efficient labor markets, diminishing

people's exposure to risks, and enhancing their capacity to protect themselves against hazards and interruption/loss of income. The basic aim of the Social Protection Strategy (SPS) is to assist individuals to break the cycle of poverty and enhance the quality of growth through adequate and developed social protection systems in the member countries of ADB. The type of risks covered through the SPS may be economic, environment or social/governance related.

The proposed Project shall ensure that the requirements of the ADB's SPS are complied with. Priority shall be given to any identified vulnerable groups. Based on the gender analysis and status of women in the Project area, measures for ensuring their overall development shall be taken up by the Project Proponent. **City Edible Oil Captive Power Plant Limited**, shall comply with applicable labor laws in relation to the Project. **City Edible Oil Captive Power Plant Limited** shall also take the following measures to comply with the core labor standards for the ADB financed portion of the Project;

- a. Carry out its activities consistent with the intent of ensuring legally permissible equal opportunity, fair treatment and non-discrimination in relation to recruitment and hiring, compensation, working conditions and terms of employment for its workers (including prohibiting any form of discrimination against women during hiring and providing equal work for equal pay for men and women engaged by the Borrower);
- b. Not restrict its workers from developing a legally permissible means of expressing their grievances and protecting their rights regarding working conditions and terms of employment;
- c. Engage contractors and other providers of goods and services:
 - who do not employ child labor or forced labor;
 - who have appropriate management systems that will allow them to operate in a manner which is consistent with the intent of (A) ensuring legally permissible equal opportunity and fair treatment and non-discrimination for their workers, and (B) not restricting their workers from developing a legally permissible means of expressing their grievances and protecting their rights regarding working conditions and terms of employment; and
 - Whose subcontracts contain provisions which are consistent with paragraphs (i) and (ii) above.

2.4.3 Public Communications Policy 2011

The Public Communications Policy (PCP) of ADB, originally formulated in 2005 and revised in 2011, is aimed at promoting improved access to information about ADB's operations related to fund Projects. It endorses greater transparency and accountability to stakeholders involved in a Project. The PCP establishes the disclosure requirements for documents and information related to Projects. It mandates Project-related documents normally produced during the Project cycle to be posted on the web.

2.4.4 Categorization of Projects

As part of its review of a Project's expected social and environmental impacts, ADB uses a classification system. This classification is used to reflect the significance of potential environmental impacts understood as a result of the client's impact assessment and to establish ADB's safeguard requirements. The categories used by ADB are:

- Category A Projects: Projects which are likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented.
- Category B Projects: Projects with potential adverse environmental impacts that are less in number, generally site-specific, mostly reversible and readily addressed through mitigation measures;
- Category C Projects: Projects with minimal or no adverse environmental impacts;
- Category FI Projects: Projects which involve investment of ADB funds to or through a financial investment.

Box 13: Applicability for ADB Project Categorization

Since the proposed Project is an Edible Oil industry which will have impacts both in its construction and operation phase, the Project is classified as a 'Category B' Project as per the Bank's categorization system based on Environmental Safeguards. Categorization of the Project as per Involuntary Resettlement and Indigenous Peoples is 'Category C'.

2.5 IFC EHS Guidelines

The Environmental, Health, and Safety (EHS) General Guidelines (April 30, 2007) will be applicable for this Project. In addition to that, IFC's Sector specific EHS Guidelines for Thermal Power Plants (December 19, 2008) will also apply.

2.5.1 Applicable EHS Standards

The Project shall have to comply with Bangladesh environmental, health and safety laws and World Bank Group Guidelines with special attention to comply with the Bangladesh

(GOB Environmental Conservation Rule 1997) and World Bank Group requirements regarding air emissions (December 2008).

Therefore, the EHS standards as stipulated in ECR 1997 and amendments thereof as well as in the IFC EHS guidelines (General and Thermal Power Plant specific) for air quality, surface and ground water quality, ambient noise levels, emissions and effluent discharge will be applicable. Further, from transmission lines, electro-magnetic field and corona noise effects may have some impacts, which will be used by the proposed project as well.

The ADB SPS policy Statement 2009 (SPS) states, "During the design, construction, and operation of the project the borrower/client will apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety Guidelines. These standards contain performance levels and measures that are normally acceptable and applicable to projects." For this purpose IFC EHS guidelines are recommended.

2.6 Obtaining Environmental Clearance from DoE within EZ

The coexistence of economic growth and environmental protection is fundamental in today's world for sustainable development. In accordance with this basic policy, the unit investor who aims to enter the Economic Zone (EZ) should obtain Environmental Clearance Certificate (ECC) based on Environmental Conservation Rules, 1997 (ECR'97). For the purpose of issuance of Environmental Clearance Certificate, the industrial units and projects are, in consideration of their site and impact on the environment, classified into the following four categories:

- Green
- Orange-A
- Orange-B
- Red

On the procedure of ECC for unit investor of the project in EZ, special processes which listed below are applied.

- Preparation and submission of Pollution Control Management (PCM) (for Green and Orange-A Category Projects/Industries) or Environmental Management Plan (EMP) (for Orange-B Category Projects/Industries) is required to ensure the conservation of environment around the EZ. In case of Red Category

Industry/Project, EMP is a fundamental part of the Environmental Impact Assessment (EIA) report.

- In case of EIA study for Red Category Projects, unit investor can use environmental baseline data used in EIA report of the corresponding Economic Zone or Environmental Monitoring data of nearby industries within the same EZ. It is apparent that the Industrial Activities within an Economic Zone cause degradation of Air Quality and depletion of Groundwater due to excessive use by the industries. In accordance with that, the validity period of these baseline data of Economic Zones has been considered to be 5 years.
- A unit investor of a Red Category Project can conduct temporary works after the issuance of ToR approval. But, it is required to obtain an EIA approval before the construction of main building.

2.6.1 Steps for Completing Environmental Clearance Procedure for Green, Orange-A & Orange-B Category Projects

Necessary procedures for obtaining ECC for Green, Orange-A and Orange-B Category Projects are summarized as follows;

Step 1 - Online Submission of the required documents to the One Stop Service (OSS) along with a PCM (for Green and Orange-A Category) or EMP (for Orange-B Category) of the proposed project. The required documents include:

- a. Letter of Investment Registration from BEZA
- b. Location Map and Layout Plan
- c. Land Lease Agreement or Land Ownership Document or Land Allotment Letter
- d. NOC from relevant government authority
- e. ECC Application Fee + 15% VAT
- f. Pollution Control Management (PCM) [Applicable for Green and Orange-A Category Project/Industries] or Environmental Management Plan (EMP) [Applicable only for Orange-B Category Projects]

Step 2 - Forwarding of the required documents before the beginning of construction phase to DoE via Online by OSS for an Environmental Clearance Certificate

Step 3 - Site inspection by DoE

Step 4 - Issuance of ECC by DoE through Online (Digital Certificate).

Step 5 - Upon receiving the ECC

Step 6 - Start of Construction phase. Regular monitoring will be required to be conducted by a third-party consultant appointed by the Investor.

Step 7 - Issued ECC will be subjected to renewal (for Green Category Projects/Industries, renewal after each Three-year period and for Orange-A and Orange-B Projects/Industries, renewal after each One-year period)

Step 8 - End of Construction Phase and beginning of Operation Phase

Procedure for issuance environmental clearance certificate for EZ unit investors for Green, Orange-A and Orange-B

Table 2-3: Procedure for Obtaining Environmental Clearance Certificate for GREEN, ORANGE-A and ORANGE-B Category Projects

Green	Orange-A	Orange-B
Required documents for Online Application: • Approval of Investment Registration from BEZA • Location Map and Layout Plan • Land Lease Agreement or Land Ownership Document • NOC from relevant government authority • ECC Application Fee + 15% VAT • Pollution Control Management (PCM) - o General information/ Project Profile - o Details of the Production Process with Process Flow Diagram - o Details of ETP/STP/WTP or any other waste management system	Required documents for Online Application: • Approval of Investment Registration from BEZA • Location Map and Layout Plan • Land Lease Agreement or Land Ownership Document • NOC from relevant government authority • ECC Application Fee + 15% VAT • Pollution Control Management (PCM) - o General information/ Project Profile - o Details of the Production Process with Process Flow Diagram - o Details of ETP/STP/WTP or any other waste management system	Required documents for Online Application: • General information/ Project Profile/ Feasibility Study • Approval of Investment Registration from BEZA • Location Map and Layout Plan • Details of the Production Process with Flow Diagram • Land Lease Agreement or Land Ownership Document • NOC from relevant government authority • ECC Application Fee + 15% VAT • Environmental Management Plan (EMP)
Forwarding of Application for ECC to the DoE with all required Documents		
Site Inspection by DoE		
Obtaining ECC through Online (Digital Certificate)		
Investment Clearance by BEZA		
Construction of the Project		
End of Construction Phase		
Beginning of Operation Phase		

Environmental Clearance Renewal after each three- year period	Environmental Clearance Renewal after each one-year period
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2.7 International and National Environment Standards/ Guidelines

Bangladesh and World Bank environmental standards and guidelines relevant to the construction and operation of the “**City Edible Oil Captive Power Plant Limited.**” cover the following issues:

- Atmospheric emissions and ambient air quality;
- Water Quality;
- Liquid effluent discharges to the marine environment;
- Noise emissions and ambient noise levels.

2.8 Ambient Air quality standards

As per the provisions of Rules 12 and 13 of the ECR 1997, the MoEFCC is responsible for laying down environmental quality standards (pertaining to air, water, sound, odor and other components) and standards for discharge and emission of waste. Ambient air quality standards have been stipulated in Schedule 2 (Standards for Air) of the Rules. However, these standards were revised by MoEFCC in 2005. The revised standards have been illustrated in the following table.

Table 2-4: Air quality Standards of Bangladesh.

Pollutant	Averaging Time	Concentration
Carbon Monoxide (CO) (mg/m ³)	8 hours	10 (9 ppm)
	1 hour	40 (35 ppm)
Lead (Pb) (µg/m ³)	Annual	0.5
Oxides of Nitrogen (NO _x) (µg/m ³)	Annual	100 (0.053 ppm)
Sulphur dioxide (SO₂) (µg/m ³)	Annual	80 (0.03 ppm)
	24 hours	365 (0.14 ppm)
Suspended Particulate Matter (SPM) (µg/m ³)	8 hours	200
Coarse Particulates (PM ₁₀) (µg/m ³)	Annual	50
	24 hours	150
Fine Particulates (PM _{2.5}) (µg/m ³)	Annual	15
	24 hours	65
Ozone (O₃)	8 hours	157

(µg/m ³)		(0.08 ppm)
	1 hour	235 (0.12 ppm)

Source: Air Quality Standards, 2005

2.9 Water quality standards

As per Schedule 12 of the ECR 1997, designated best use classification has been prescribed for inland surface water as given in table below.

Table 2-5: Standards for Industrial water.

SN	Best Practice based classification	Parameter			
		pH	BOD mg/l	DO mg/l	Total Coliform number/100
a.	Source of drinking water for supply only after disinfecting	6.5-8.5	2 or less	6 or above	50 or less
b.	Water usable for recreational activity	6.5-8.5	3 or less	5 or more	200 or less
c.	Source of drinking water for supply after conventional treatment	6.5-8.5	6 or less	6 or more	5000 or less
d.	Water usable by fisheries	6.5-8.5	6 or less	5 or more	---
e.	Water usable by various process and cooling industries	6.5-8.5	10 or less	5 or more	5000 or less
f.	Water usable for irrigation	6.5-8.5	10 or less	5 or more	1000 or less

Notes:

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

The standards for drinking water have been presented in following Table as per Schedule 12 of ECR-1997.

Table 2-6: Standards for Drinking water.

S. N.	Parameters	DoE Standards (Drinking Water Standards)
1.	pH	6.5 – 8.5
2.	Temperature (in ° C)	20-30° C
3.	Turbidity (in NTU)	10
4.	Color	15 Hazen
5.	TDS (in mg/l)	1000 mg/l
6.	TSS (in mg/l)	10 mg/l
7.	Oil and Grease (in mg/l)	0.01 mg/l
8.	Chlorides (in mg/l)	150-600 mg/l
9.	Total Hardness (in mg/l)	200-500 mg/l
10.	Calcium (in mg/l)	75 mg/l
11.	Magnesium (in mg/l)	30-35 mg/l

12.	Sulphate (in mg/l)	400 mg/l
13.	Fluorides (in mg/l)	1.0 mg/l
14.	Nitrate (in mg/l)	10 mg/l
15.	Iron (in mg/l)	0.3-1.0 mg/l
16.	COD (in mg/l)	4 mg/l
17.	BOD (in mg/l)	0.2 mg/l
18.	Ammonia (in mg/l)	0.5 mg/l
19.	Phosphate (in mg/l)	6 mg/l
20.	Copper (in mg/l)	1 mg/l
21.	Mercury (in mg/l)	0.001 mg/l
22.	Balium (in mg/l)	0.01 mg/l
23.	Cadmium (in mg/l)	0.005 mg/l
24.	Arsenic (in mg/l)	0.05 mg/l
25.	Lead (in mg/l)	0.05 mg/l
26.	Zinc (in mg/l)	5 mg/l
27.	Chromium (in mg/l)	0.05 mg/l
28.	Manganese (in mg/l)	0.1 mg/l
29.	Total Coliform (in n/100 ml)	0
30.	Faecal Coliform (in n/100 ml)	0
31.	Chlorophyll (in mg/l)	--
32.	Aluminium (in mg/l)	0.2
33.	Benzene(in mg/l)	0.01 mg/l
34.	Boron (in mg/l)	0.2 mg/l
35.	Chlorinated alkanes Carbontetrachloride (in mg/l) Dichloroethylene (in mg/l) 1,2 dichloroethylene (in mg/l) Tetrachloroethylene (in mg/l) trichloroethylene(in mg/l)	0.01 mg/l 0.001 mg/l 0.03 mg/l 0.03 mg/l 0.09 mg/l
36.	Chlorinated phenols - pentachlorophenol (in mg/l) trichlorophenol (in mg/l)	0.03 mg/l 0.03 mg/l
37.	Chlorine (residual) (in mg/l)	0.2 mg/l
38.	Chloroform	0.09 mg/l
39.	Cyanide	0.1 mg/l
40.	Detergents	0.2 mg/l
41.	DO	6 mg/l
42.	Kjeldahl Nitrogen (total)	1 mg/l
43.	Nickel	0.1 mg/l
44.	Nitrite	<1 mg/l
45.	Odor	Odorless
46.	Phenolic Compounds	0.002 mg/l
47.	Silver	0.02 mg/l
48.	Sodium	200 mg/l
49.	Suspended particulate matters	10 mg/l
50.	Sulfide	400 mg/l

51.	Tin	2 mg/l
52.	Selenium	0.01 mg/l
53.	Potassium	12 mg/l
54.	Radioactive materials (gross alpha activity)	0.01 Bq/l
55.	Radioactive materials (gross beta activity)	0.1 Bq/l

2.10 Liquid Effluent Discharges

As per Schedule 10 of ECR 1997, standards for Waste from Industrial Units or Project Waste have been described. The same has been detailed in table below:

Table 2-7: Standards for Liquid Effluent Discharge.

S. No.	Parameter	Unit	Places for determination of standards		
			Inland Surface Water	Public Sewerage System connected to treatment at second stage	Irrigated Land
1.	Ammonical Nitrogen (as elementary N)	mg/l	50	75	75
2.	Ammonia (as free ammonia)	mg/l	5	5	15
3.	Arsenic (as)	mg/l	0.2	0.05	0.2
4.	BOD 5 at 20°C	mg/l	50	250	100
5.	Boron	mg/l	2	2	2
6.	Cadmium (as Cd)	mg/l	0.5	0.05	0.05
7.	Chloride	mg/l	600	600	600
8.	Chromium (as total Cr)	mg/l	0.5	1.0	1.0
9.	COD	mg/l	200	400	400
10.	Chromium (as hexavalent Cr)	mg/l	0.1	1.0	1.0
11.	Copper (as Cu)	mg/l	0.5	3.0	3.0
12.	Dissolved Oxygen (DO)	mg/l	4.5-8	4.5-8	4.5
13.	Electro-conductivity (EC)	micro mho/cm	1200	1200	1200
14.	Total Dissolved Solids	mg/l	2100	2100	2100
15.	Fluoride (as F)	mg/l	2	15	10
16.	Sulfide (as S)	mg/l	1	2	2
17.	Iron (as Fe)	mg/l	2	2	2
18.	Total Kjeldahl Nitrogen (as	mg/l	100	100	100

S. No.	Parameter	Unit	Places for determination of standards		
			Inland Surface Water	Public Sewerage System connected to treatment at second stage	Irrigated Land
	N)				
19.	Lead (as Pb)	mg/l	0.1	1.0	0.1
20.	Manganese (as Mn)	mg/l	5	5	5
21.	Mercury (as Hg)	mg/l	0.01	0.01	0.01
22.	Nickel (as Ni)	mg/l	1.0	2.0	1.0
23.	Nitrate (as elementary N)	mg/l	10	Not yet Fixed	10
24.	Oil and Grease	mg/l	10	20	10
25.	Phenolic Compounds (as C ₆ H ₅ OH)	mg/l	1.0	5	1.0
26.	Dissolved Phosphorus (as P)	mg/l	8	8	15
27.	Radioactive substance	To be specified by Bangladesh Atomic Energy Commission			
28.	pH	-	6-9	6-9	6-9
29.	Selenium (as Se)	mg/l	0.05	0.05	0.05
30.	Zinc (as Zn)	mg/l	5	10	10
31.	Total Dissolved Solids	mg/l	2100	2100	2100
32.	Temperature	° C	40	40	40-Summer
			45	45	45-Winter
33.	Suspended Solids (SS)	mg/l	150	500	200
34.	Cyanide (as Cn)	mg/l	0.1	2.0	0.2

Notes:

(1) These standards shall be applicable to all industries or Projects other than those specified under the heading “Standards for sector-wise industrial effluent or emission.”

(2) Compliance with these standards shall be ensured from the moment an industrial unit starts trial production, and in other cases, from the moment a Project starts operation.

(3) These standards shall be inviolable even in case of any sample collected instantly at any point of time. These standards may be enforced in a more stringent manner if considered necessary in view of the environmental conditions of a particular situation.

(4) Inland Surface Water means drains/ponds/tanks/water bodies/ditches, canals, rivers, springs and estuaries.

(5) Public sewerage system means treatment facilities of the first and second stage and also the combined and complete treatment facilities.

(6) Irrigable land means such land area which is sufficiently irrigated by waste water taking into consideration the quantity and quality of such water for cultivation of selected crops on that land.

2.11 Ambient Noise Standards

The MoEFCC under the provisions of ECR, 1997 is responsible for laying down ambient noise standards. Noise Pollution (Control) Rules, 2006 were laid down by the Ministry through a Gazette notification dated September 7, 2006. Ambient noise standards established as per the provisions Rule 5(2) of the aforementioned Rules have been furnished in the following table:

Table 2-8: Ambient Noise Standards as per DoE.

S. No.	Type of Area	Limits in dB(A) L_{eq}	
		Day	Night
1.	Silent Zone	50	40
2.	Residential area	55	45
3.	Mixed area	60	50
4.	Commercial area	70	60
5.	Industrial area	75	70

Note:

1. dB(A) L_{eq} represents time-weighted average noise level on the Decibel-A scale
2. Day time is from 6am to 9pm, Night time is from 9pm to 6 am
3. Mixed area is mainly residential area, and also simultaneously used for commercial and industrial purposes
4. Area up to a radius of 100 m around hospitals/educational institutions/special institutions/establishments identified/to be identified by the Government is designated as Silent Zones where use of horns of vehicles or other audio signals, and loudspeakers are prohibited.

3 Description of the Project

3.1 Project Definition

City Edible Oil Captive Power Plant Limited is a 17.6 MW power generation company, is located on the eastern bank of Shitalakshya River, and to the east of Dhaka, and west of Narayanganj. The project is located in City Economic Zone, Uttar Rupshi, Rupganj, Narayanganj within Latitude 23°44'45.04" North and Longitude 90°30'55.59" East. The entire project is completely enclosed and is owned by the **City Group**. The project is also under the **City Economic Zone** which area is 77.96 Acres. **The project** is utilizing the standard as guideline to monitor and control all the activities related to Production, Quality Control and Quality Assurance.

3.2 Location of the project

The Project is located at City Economic Zone, North Rupshi, Rupganj, Narayanganj and is easily accessible by all kinds of transports. The project site is about 1.78 km away from Rupshi Bus Stand, Narayanganj and just eastern bank of Shitalakha River.

Bangladesh Edible Oil, Navana Health Care and Navana Pharmaceutical Ltd, Gazi Auto Tires Factory, Rony Knit Composite, Mir Cement etc. project are surrounding 2 km project from the project area. Location map of the project has been shown in Figure 3-1 following figures.

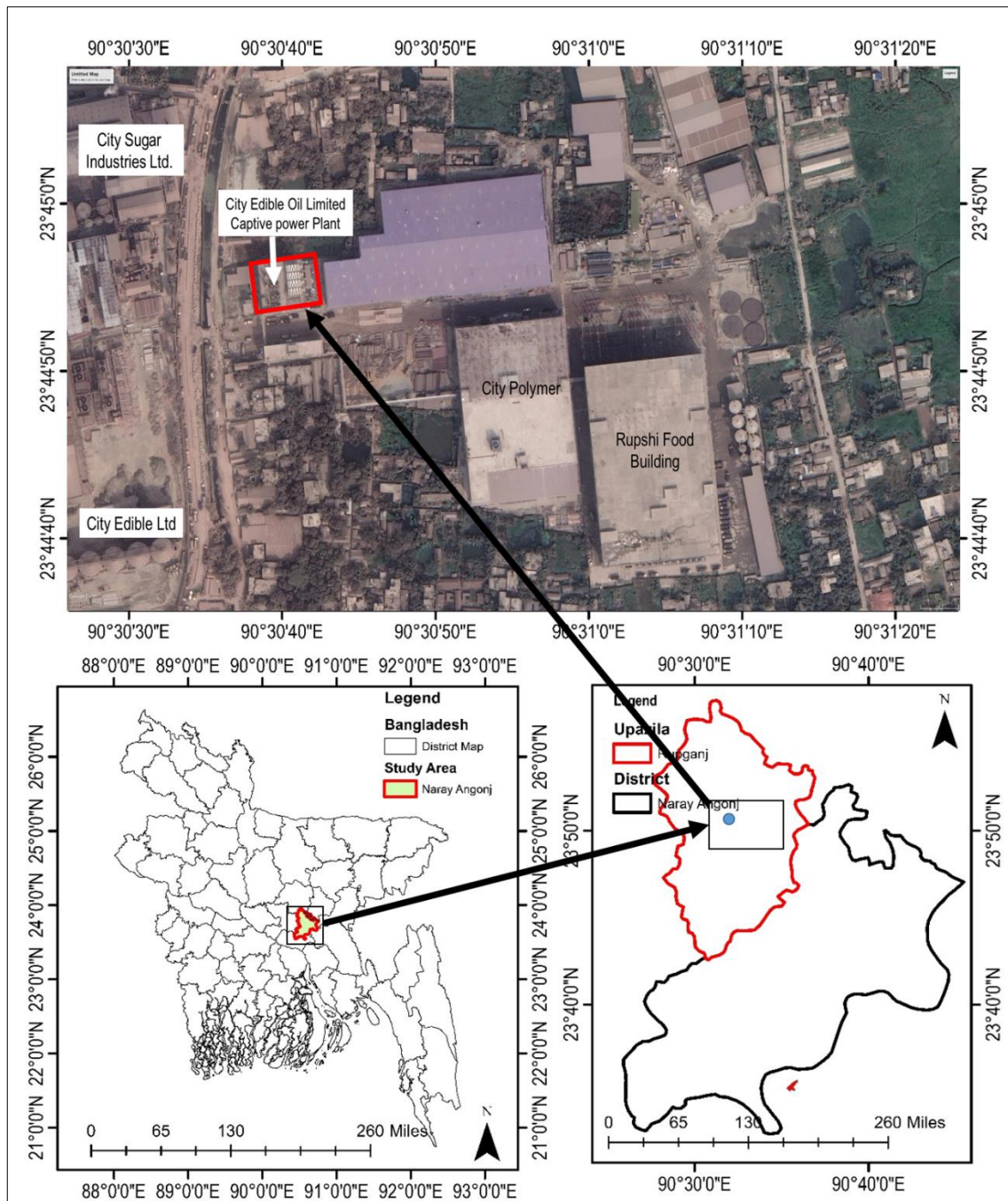


Figure 3-1: Location Map of **City Edible Oil Captive Power Plant Limited**.

3.3 Basic Information of Project

City Edible Oil Captive Power Plant Limited running project and it continue its production since 2019. The proponent has taken NOC from BEZA, REB, Fire Service and Local Authority and Department of Environment. The proponent is now in the process of taking a loan from Asian Development Bank (ADB). The basic data of the project has been shown in the following Table.

Table 3-1: Basic Information of **City Edible Oil Captive Power Plant Limited**.

Name of the project:	City Edible Oil Captive Power Plant Limited
Project Proponent:	Fazlur Rahman (Managing Director)
Project Location:	Block: B, Plot No: 17, at Uttar Rupshi, Rupgonj, Narayanganj.
Office Address:	City House, Plot # NW (J) 06, Road # 51, Gulshan - 02, Dhaka-1212, Bangladesh.
No. of Employees:	20 persons
Employees Engaged in Environmental Management	01
Total area of land of Economic Zone:	77.96 Acre
Project Area:	1780 m ²
Type of Industry:	Red
Status of Operation	Running
Present use of land:	Covered with industrial activities.
Final Product (Name & Amount) :	Gas Engine Based Power
Production Capacity	17.6 MW
Power Plant Capacity & Co-Generation:	Power Plant: 4 x 4.4 MW GEJ Jenbacher Gas Engine Based Power Plant (Total: 17.6 MW) 4 Nos Gas Generator Additional: 3 Exhaust Gas Boiler (APROVIS, Germany) as Co-Generation {(2 x 4) + (1 x 2) = 10 Ton/Hour Steam @ 18bar (3 Nos Exhaust Gas Boiler) Additional: 2 Absorption Chiller (Broad, China) as Co-Generation (2 x 466 = 932 RT) 2 Nos Chiller
Boiler Plant:	3x 55 Ton/Hour (Total: 165 Ton Per Hour Net Steam @ 18 Bar Pressure) 3 Nos Water Tube Boiler
Water Requirements:	System Requires 500m ³
Source:	Deep Tube Well.
Power Requirements:	50 KW/H
Gas Requirements:	4400 m ³ /hr.
Possible Air Pollutants Escaped:	Through stack
Stack	4 nos.
Stack Height	39 m or 128 feet

3.4 Project components

City Edible Oil Captive Power Plant Limited has consisted of the following major units which are

The major infrastructures within the project include:

1. Gas Engine Room
2. PCB (power Control Board)
3. ECB (Exhaust gas Boiler)

4. Stack
5. Colling Tower
6. Water Reservoir Tank
7. Chiller
8. Lube oil reservoir tank
9. Gas pipe networking
10. Power network line
11. Step down transformer

Project layout plan of **City Edible Oil** has been shown in following figure 3.2

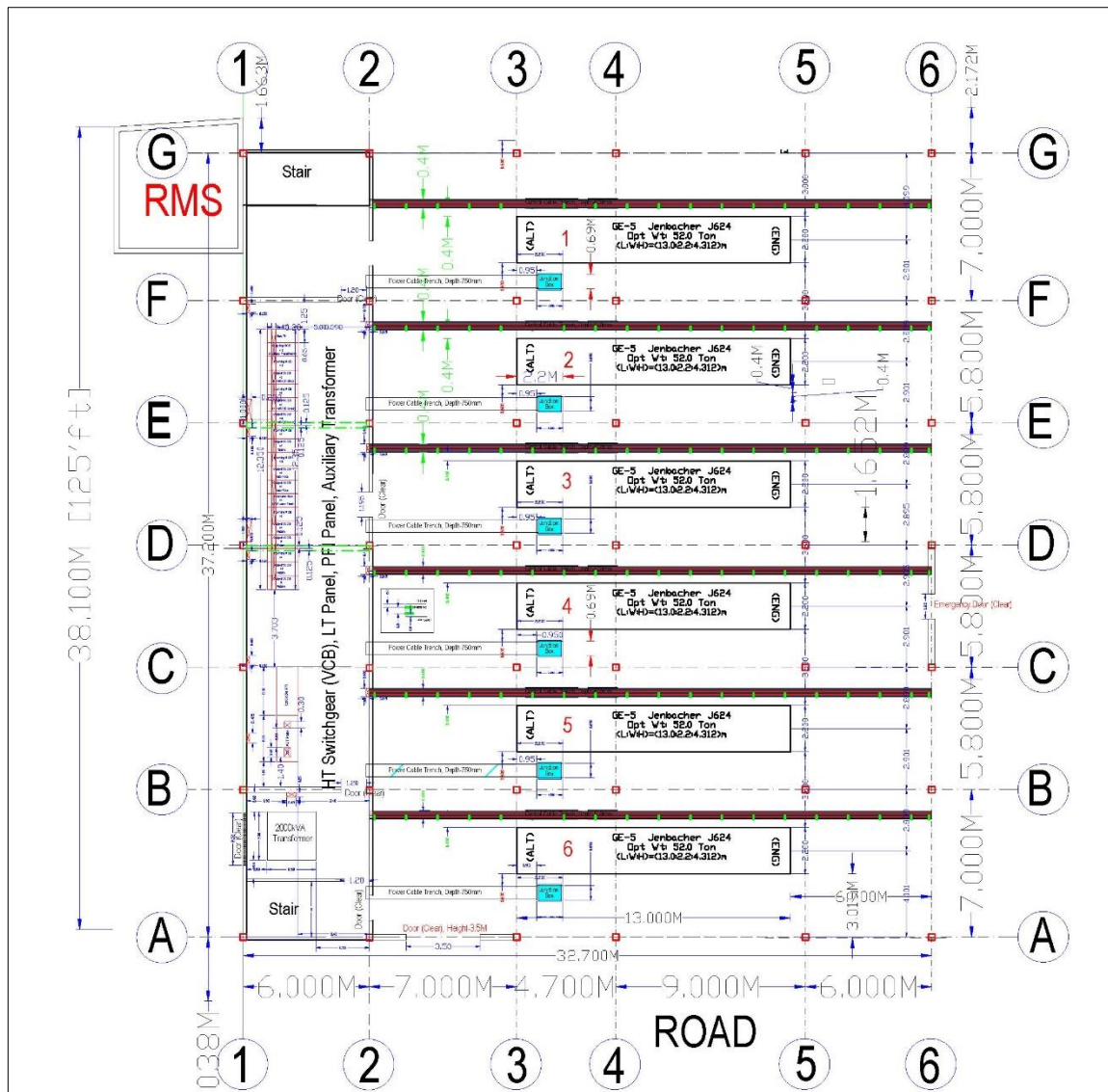


Figure 3-2: Gas Engine Layout of City Edible Oil Captive Power Plant

3.5 Final Product:

The project is a 17.6 MW power generation company. The final product capacity is-

Table 3-2: Production List with Capacity of **City Edible Oil Captive Power Plant Limited**

Product Name	Amount
Power	17.6 MW

3.6 List of Machinery:

Table 3-3: List of Machinery, Equipment and Accessories (Imported) for Power Generation

SL	Equipment name	Use Area	Nos. of Equipment	Capacity
1	Jenbacher Gas Engine Based Power Plant	Power Plant	4	4x 4.4 MW =17.6 MW
2	Exhaust Gas Boiler (APROVIS, Germany)	Exhaust Gas Boiler as Co-Generation	3	{(2 x 4) + (1 x 2) = 10 Ton/Hour Steam @ 18bar
3	Absorption Chiller (Broad, China) as Co-Generation	Absorption Chiller as Co-Generation	2	(2 x 466 = 932 RT)

3.4 Raw Materials:

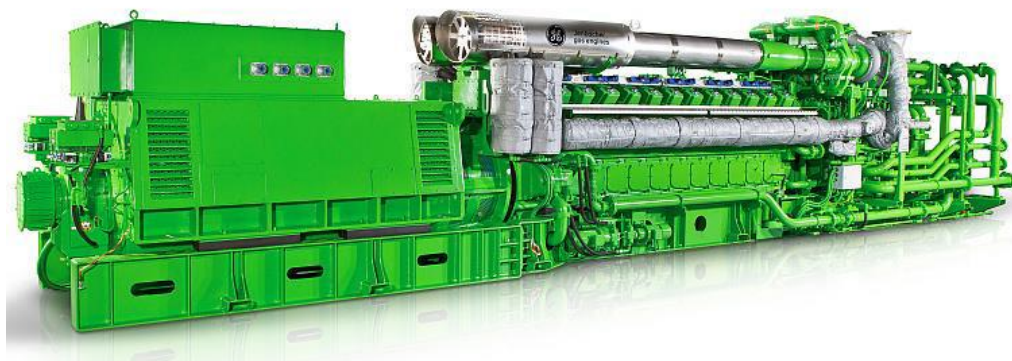
Raw Materials	Quantity/hr.	Origin
Gas	4400 MT	Titas Gas

3.7 Production process & Description for Power Plant & Co generation

Announcing the world's first 2-stage turbocharged gas engine it providing a new level of engineering excellence, the generator offers significant advantages, particularly in the area of multiple engine power plants for independent power generation and combined heat and power (CHP) solutions.

Electrical output: 4397 kW el.

Thermal output: 2071 kW



3.7.1 Technical Data:

			100%	75%	50%
Power input	[2]	kW	9,695	7,423	5,151
Gas volume	*)	Nm³/h	950	728	505
Mechanical output	[1]	kW	4,491	3,368	2,246
Electrical output	[4]	kW el.	4,397	3,291	2,180
Recoverable thermal output					
~ Intercooler 1st stage	[9]	kW	1,248		
~ Lube oil		kW	138		
~ Jacket water		kW	685		
~ Exhaust gas cooled to 377 °C		kW	~		
Total recoverable thermal output	[5]	kW	2,071		
Total output generated		kW total	6,468		
Heat to be dissipated					
~ Intercooler 2nd stage		kW	452		
~ Lube oil		kW	281		
~ Surface heat	ca. [7]	kW	174		
Spec. fuel consumption of engine electric	[2]	kWh/kWel.h	2.21		
Spec. fuel consumption of engine	[2]	kWh/kWh	2.16		
Lube oil consumption	ca. [3]	kg/h	0.90		
Electrical efficiency			45.4%		
Thermal efficiency			21.4%		
Total efficiency	[6]		66.7%		
Hot water circuit:					
Forward temperature		°C	95.0		
Return temperature		°C	80.0		
Hot water flow rate		m³/h	119.6		
Fuel gas LHV		kWh/Nm³	10.2		

3.7.2 Exhaust gas data

Exhaust gas temperature at full load	[8]	°C	377
Exhaust gas temperature at bmep= 18 [bar]		°C	~ 419
Exhaust gas temperature at bmep= 12 [bar]		°C	~ 467
Exhaust gas mass flow rate, wet		kg/h	23,262
Exhaust gas mass flow rate, dry		kg/h	21,813
Exhaust gas volume, wet		Nm³/h	18,376
Exhaust gas volume, dry		Nm³/h	16,572
Max. admissible exhaust back pressure after y-pipe		mbar	50

Combustion air data

Combustion air mass flow rate		kg/h	22,563
Combustion air volume		Nm³/h	17,460
Max. admissible pressure drop at air-intake filter		mbar	10

3.7.3 Technical data of heat recovery

General data - Hot water circuit

Total recoverable thermal output	kW	2,071
Return temperature	°C	80.0
Forward temperature	°C	95.0
Hot water flow rate	m³/h	119.6
Nominal pressure of hot water	PN	10
min. operating pressure	bar	6.0
max. operating pressure	bar	9.0
Pressure drop hot water circuit	bar	1.70
Maximum Variation in return temperature	°C	+0/-5
Max. rate of return temperature fluctuation	°C/min	10

General data - Cooling water circuit

Heat to be dissipated	kW	733
Return temperature	°C	55
Cooling water flow rate	m³/h	50
Nominal pressure of cooling water	PN	10
min. operating pressure	bar	0.5
max. operating pressure	bar	5.0
Loss of nominal pressure of cooling water	bar	~
Maximum Variation in return temperature	°C	+0/-5
Max. rate of return temperature fluctuation	°C/min	10

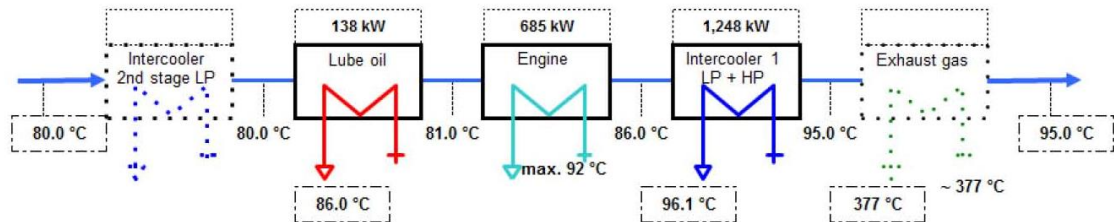
connection variant H2-ioi
JMS624 J 624 GS-H111

Hot water circuit (calculated with Glykol 3%)

Recoverable thermal output = 2,071 kW

(±8 % tolerance +5 % reserve for cooling requirements)

Hot water flow rate = 119.6 m³/h

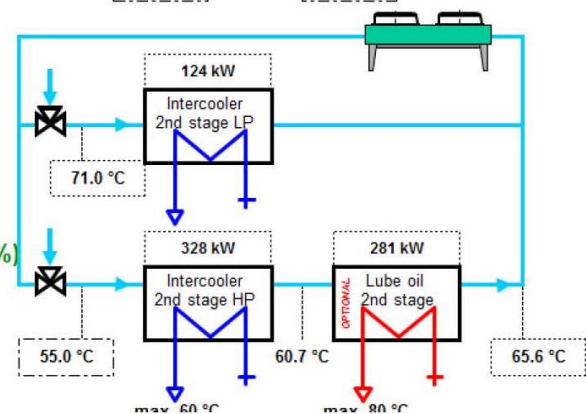


Low temperature circuit (calculated with Glykol 3%)

Heat to be dissipated = 733 kW

(±8 % tolerance +5 % reserve for cooling requirements)

Cooling water flow rate = 50.0 m³/h

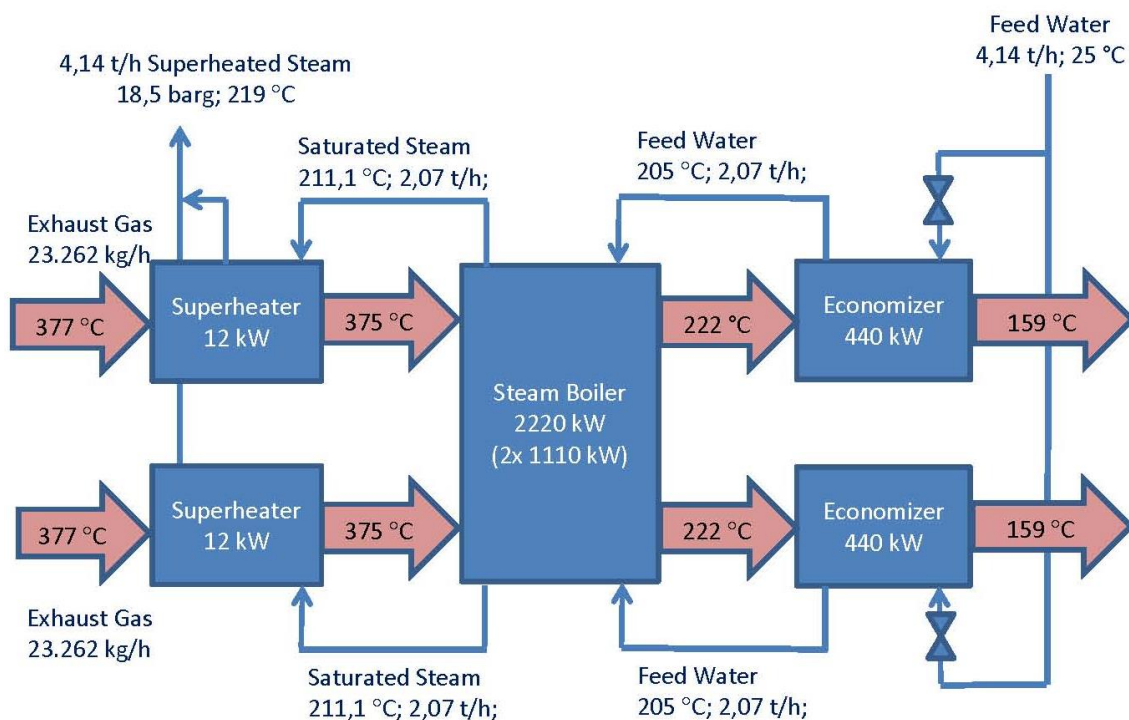


3.7.4 Double Steam Generator for 2x engines (natural gas):

THERMAL BALANCE (100% load of each engine)

thermal output	kW	2x 1110 + 2x 440 (eco) + 2x 12 (superh.) Σ 3124 kW		
Exhaust Side				
flow rate	kg/hr	2x 23.262		
inlet temperature	°C	377		
outlet temperature	°C	159		
pressure drop	mbar	35,5		
Water Steam Side				
flow rate	kg/hr	4.140	4.140	4.150
inlet temperature (feed water)	°C	25	15	35
outlet temperature	°C	219	(superheated steam)	
steam pressure	barg	18.5		

3.7.5 Double Steam Boiler with 2 Economizers and 2 super heaters:



Total exhaust gas back pressure (each exhaust duct): 35,5 mbar

3.7.6 Steam Generator:

thermal output	kW	2220 + 880 (Eco)
steam production	kg/hr	4.140 (saturated at 18,5 barg)

TUBE SIDE exhaust gas (natural gas)

flow rate (wet)	kg/hr	2x 23.262
inlet temperature	°C	375
outlet temperature	°C	222
max. operating temperature	°C	500
max. operating pressure	barg	0.1
pressure drop	mbar	22 (each bundle)
connections	DN/PN	700/10

SHELL SIDE water / saturated steam (18,5 barg)

flow rate	kg/hr	4.140
inlet temperature	°C	205
outlet temperature	°C	211,1
max. operating pressure	barg	21
connections	DN/PN	in: 25/25 out: 80/40

MATERIALS

tubes	steel
tube plates	steel
baffles	steel
shell	steel
exhaust gas inlet chamber	steel
exhaust gas outlet chamber	steel
gaskets	ceramic seal (tube side) Sigraflex Universal (shell side)

total length	mm	+/- 9500
shell diameter	mm	Ø 2000

3.7.7 Safety Equipment:

According to TRD 604 / 24 h operation

Consisting of:

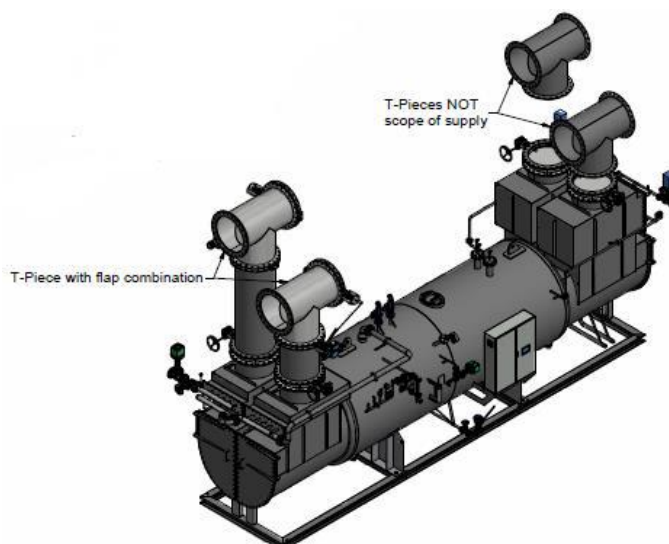
- 2 pieces water level limiter (LW), electrode and switch amplifier
- 1 piece water level controller (interval)
- 1 piece water level gauge visual
- 2 pieces **safety valve, blow-off pressure 21 barg**
- 1 piece maximum pressure limiter
- 1 piece maximum pressure controller (as pressure transducer)
- 1 piece maximum temperature limiter (after superheater)
- 1 piece conductivity electrode
- 1 piece continuous blow-down valve (automatic)
- 1 piece bottom blow-down valve (automatic)
incl. 3/2-way-solenoid valve
- 1 piece manometer with test connection
- Wiring between control box and safety equipment
(only possible with insulation)

Additional:

- 1 piece stop valve for bottom blow-down
- 1 piece stop valve for continuous blow-down
- 1 piece stop valve for feed water inlet
- 1 piece stop valve for steam outlet
- 1 piece sealed stop valve

On-site requirements:

- Power supply: 3~400V+N+PE 50Hz, TN-C-S
- Fused: **25 A**
- For Bottom blow-down valve (automatic)
 - Pressurized air supply: min. 4 barg, max. 6 barg
 - Installation of piping



3.7.8 Non-Electric Chiller:

Non-Electric Chiller (Chiller + water distribution system)

3.7.9 Function

Cooling, heating, hot water (separately or simultaneously)

3.7.10 Application

·Provide chilled/heating water for central air conditioning system

3.7.11 Cooling capacity

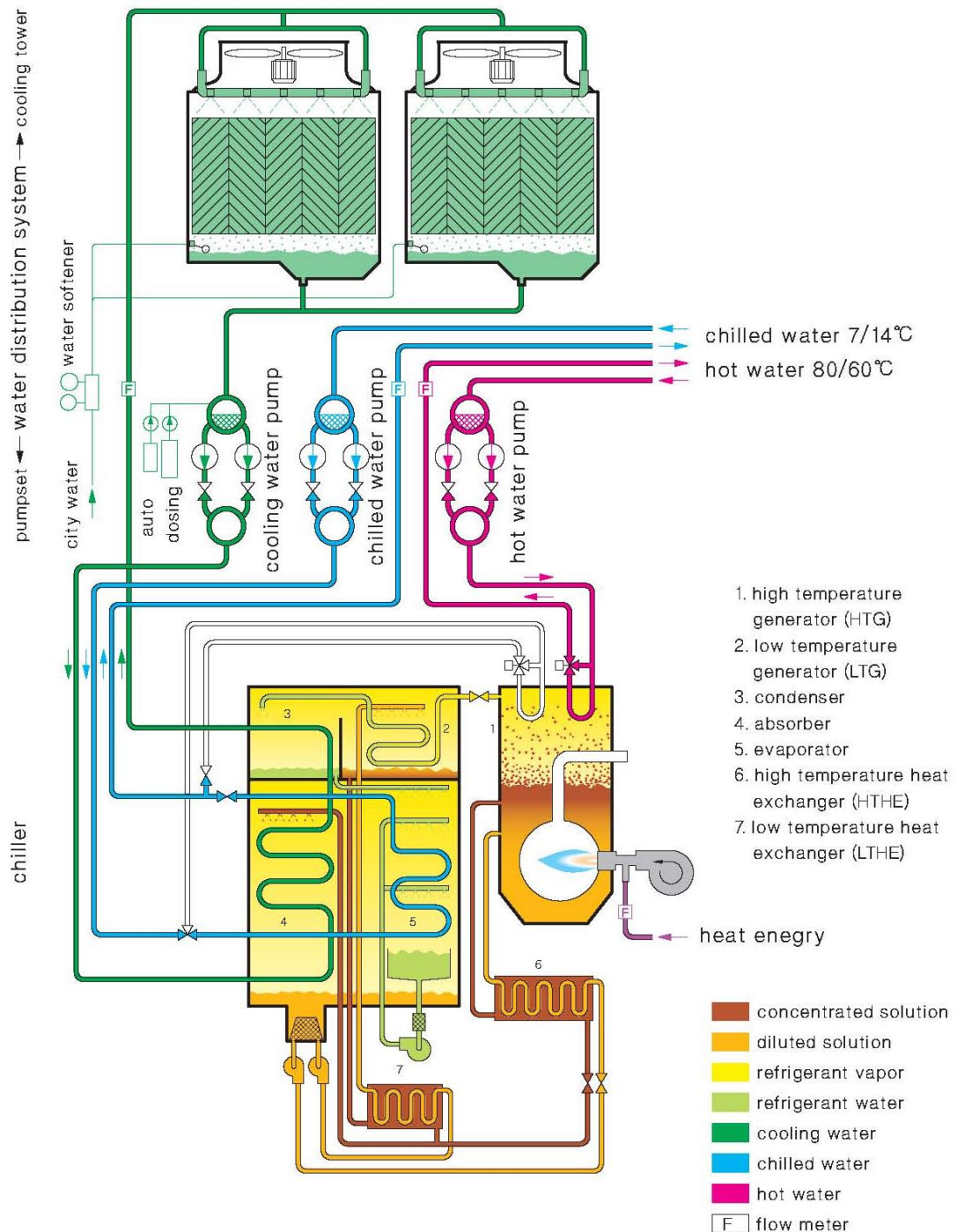
(2 x 466 = 932 RT)

3.7.12 Energy sources

Waste heat from power generation industrial waste streams (steam, hot water, exhaust, etc.)

3.7.13 The cooling principle

The input heat energy heats LiBr solution to 140°C and generate vapor, which is then condensed into water by cooling water. When the refrigerant water enters evaporator (in high vacuum condition), its temperature goes down immediately to 5°C and is sprayed over the evaporator tubes, to make chilled water drop down from 14°C to 7°C to make cooling. The refrigerant water absorbs heat from air conditioning system and evaporates, then is absorbed by concentrated LiBr solution from the generators. The cooling water takes away the heat and rejects it into the air. Diluted solution is pumped into HTG and LTG separately to be heated to begin the process all over again.



3.7.14 Energy Saving Comparison

Compared with conventional machine room layout, BROAD packaged pumpset system reduces the rated power demand by 50~70%, and the operating electricity consumption by 70~85% (the electricity for pumpset only amounts to 2~5% of the rated cooling capacity).

3.7.15 Power consumption comparison:

• BY300 (pumpset for 3489kW/992Rt chillers)

Power consuming parts	Conventional machine room power demand	Packaged pumpset	
		power demand	Operating power consumption
Cooling water pump	180 kW	44 kW	11~44 KW
Cooling tower fan	37 kW	37 kW	6~37 KW
Chilled/heating water pump	110 kW	60 kW	30~60 kW
Total electricity/cooling capacity	327 kW	141 kW	100 kW (annual)
	9.4 %	4.04 %	2.86%
Annual operating consumption	1000 MWh	300 MWh (power saving is 76 %)	

3.7.16 Safety

- The world' s only non-electric chiller with full range of American and European safety certificates
- High temperature generator is equipped with 8-level mechanical and electronic anti-explosion devices to ensure no explosion (even in case of sabotage)
- Cooling water system is equipped with auto biocide device to eliminate legionnaires



Some photography of total project is given below



Figure 3-3: Power generating Engine



Figure 3-4: PCB (Power Control Board)



Figure 3-5: Power Distribution Board.

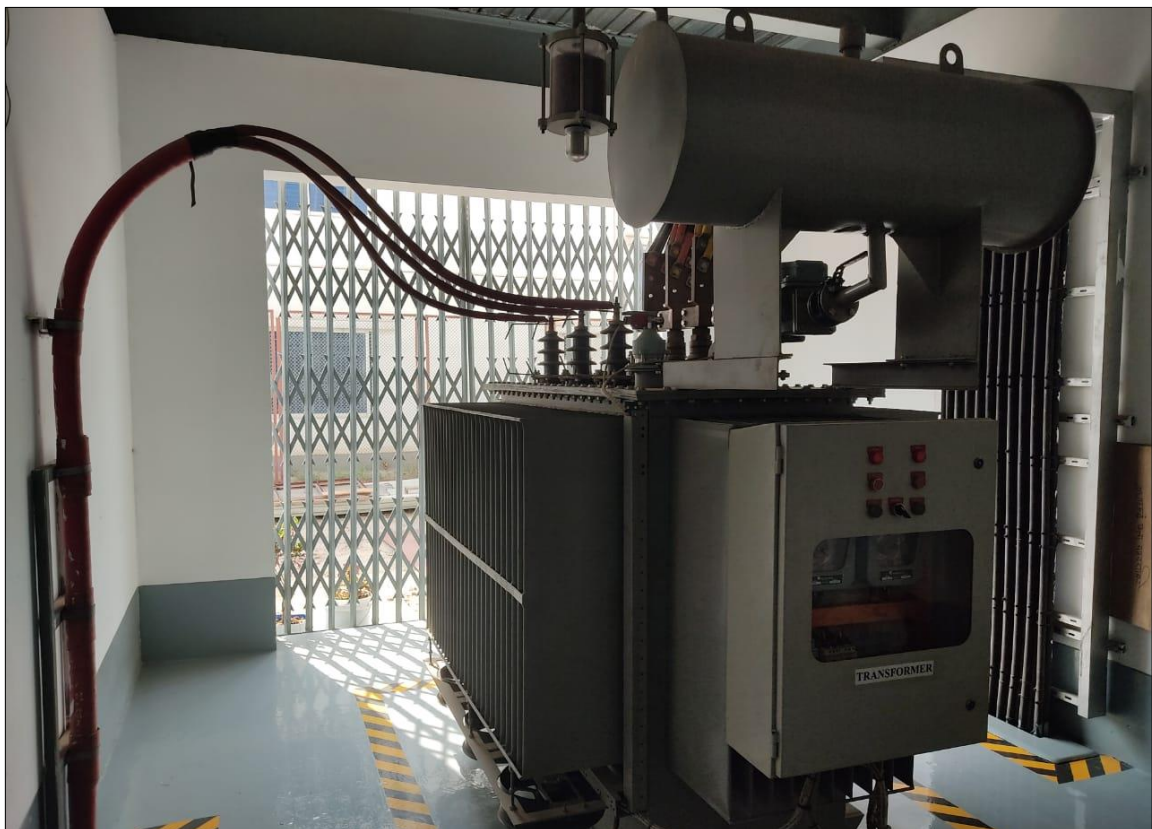


Figure: Transformer (power is converted through this transformer and supplied to production unit)



Figure 3-6: Exhaust Gas Release through this stack (stack height 39m)



Figure 3-7: Water Cooling tower.

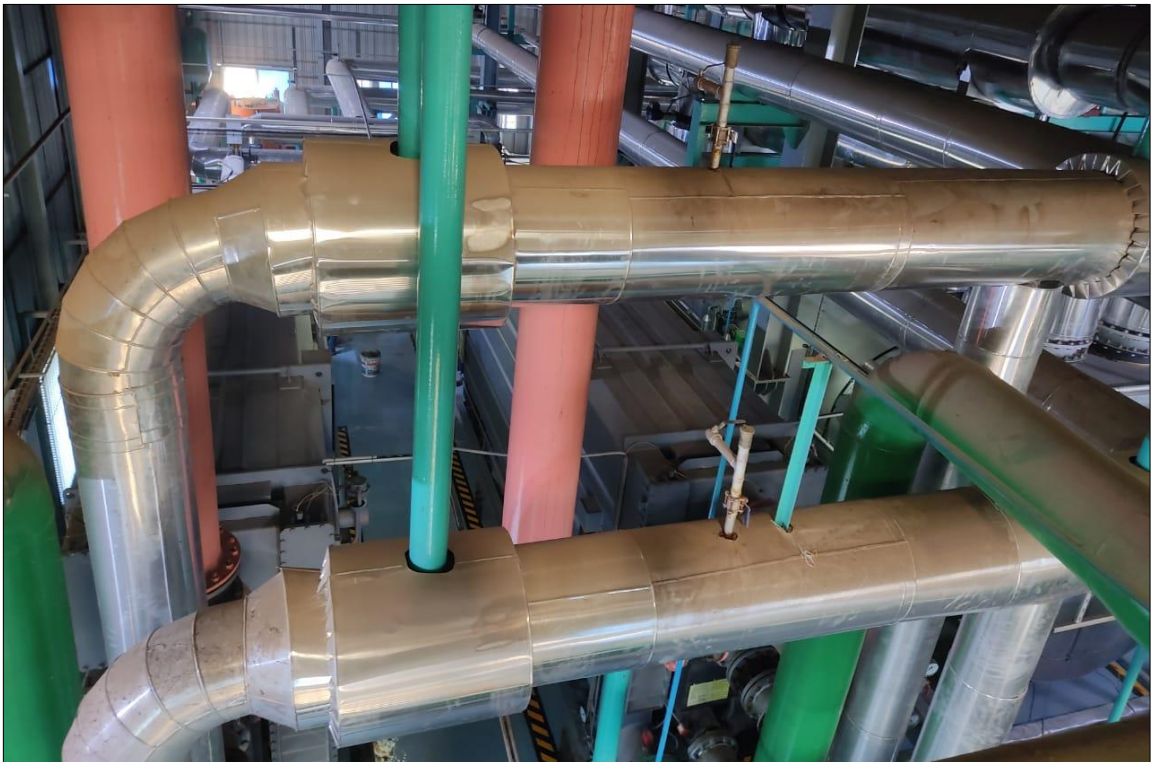


Figure: Exhaust gas distribution pipe network.

3.8 Resources and Utility Demand

3.8.1 Fuel & Lubricant:

Vehicles will consume Octane while Generator will use gas as fuel. Required lubricants will be available locally. No lubricant oil will be utilized for combustion work as the burnt lubricants will only be used for internal cooling process of electric generators.

To operate **the City Seed Crushing Uni-2 Captive Power Plant**, lubricant oil is used in total 4

modern technology engines which all are gas-based engines. Gas based engines are the most

common engines found in now a days. In comparison to diesel-powered engines, coal-based

engines, **gas-based engines** produce **fewer environmental pollutants**, create less vibration

and noise, and are lighter in weight. Usually, lubricant oil in coal based engine burns and it

creates negative impact on the environment. On the contrary, gas-based engines never burn

the lubricant oil and their qualities remain up to the mark. After certain period, it will be sell to

the well-recognized 3rd party. The 3rd party customers carry out those lubricants from factory by themselves and refined it for further use. So no direct and indirect impacts due to this

mentioned lubricant was found during project site visit by ESIA team. That's why we didn't

mentioned any impacts in the impact identification section and as well as we didn't suggest

any Environmental Management Plan against this issue.

3.8.2 Water Demand:

To operate the **City Edible Oil Captive Power Plant Ltd**, the system requires **500m³** water which is totally used in closed system but not as a **daily basis**. Water at the site is available from **deep tube-well**. This water is used only for machine cooling purpose and the water is completely recyclable. For a certain period of time, the system losses some water or evaporates which is considered as a makeup water and the amount is 1m³/hr.

Due to this evaporation or system loss, the shortage amount of water is required to fill into the system to continue the process.

3.9 Gas Distribution line

The project, City Edible Oil Captive Power plant located within City Economic Zone. A total 7 km gas distribution line was built to continue supply of natural gas to the project. The EZ authority has developed the 7km long distribution line by their own cost alongside of EZ connectivity road. Daily 105600 m³ gas is required for operate the four Engine properly. This total amount of gas supplied from EZ so this project is not involving to develop any gas pipeline for this project.

The gas supply pipeline is passes beside the government road and no resettlement issue arise because to total land area is owned by government itself. Local area people also benefited by this pipeline because the gas pipeline is only gas distribution line to supply gas.

4 Environment Baseline Study

4.1 Introduction

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

- To identify environmental and socioeconomic components that may be affected due to project activities;
- To recognize potential environmental impacts on them
- To provide a base line against which environmental conditions in the future project may be measured;

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

4.2 Objective and Methodology

The primary objective of the environmental and social baseline condition study is to provide an environmental and social baseline against which potential impacts from the construction and operational phases of the Project can be compared. The methodology adopted for collecting the baseline data was as follows:

- Study area of 10 km radial zone from the center of the proposed Project location was selected for the baseline studies.
- The environmental and social Baseline data and survey was carried out during the period of October 2020 to November 2020.
- Primary data collection was through environmental monitoring and field survey for water, air, soil, noise and ecology.
- Social baseline of the study area was captured through social surveys involving field consultations, interviews, meeting with stakeholders, discussions with government departments and secondary data review etc.
- Secondary data was collected from government reports, academic institutes, websites, published literature, interactions with government department and stakeholders etc.

Table 4-1: Existing Environmental Settings of **City Edible Oil Captive Power Plant**.

Particulars	Details
Location	City Edible Oil Captive Power Plant Ltd., Uttar Rupshi, Rupgonj, Narayanganj, Dhaka Division
Total Area	19010 m ²
Site Elevation	Average 17 feet from ASL
Land Type	Medium high and low land, the project area is barren and less productive land.
Connectivity	Road Connectivity: Only 500 away from Dhaka-Sylhet highway; Rail Connectivity: 10 km away from Komolapur Railway Station; Air Connectivity: 14 km away from Hazrat Shahjalal International Airport (HSIA); Port Connectivity: Dhaka River port is 12 km away from the project; Chittagong Sea Port is 235 km away from Project.
Climatic conditions	Temperature: Annual average maximum: 36° C; minimum: 12.7° C Humidity: Average humidity is 80 to 90% Rainfall: Mean annual rainfall is over 2376 mm
Seismic Zone	Zone II
Forests / National Parks	None within 10 km
Archaeological Site	None within 300 m from the site (Sonargaon Archaeological site about 3km north)
Water Bodies	Shitalakshya River
Ecologically Critical Area	No ecologically critical areas were found in the study area. Shitalakshya River, one of the ECAs, located about 20km from the project .
Reserve/Protected Forests	No reserve or protected forests area was found in the study area.
Predominant Geological Formations	The project site is underlain by several hundred meters of alluvial sediments. The surface is covered by two meters of alluvial silt, which is underlain by approximately 0.3 meters of silty sand and sand.
Topography	The project site, and indeed the entire region, has a flat topography with very little relief or changes in elevation. The area has an elevation of 0.1 meters to 5.3 meters.
Major Physiographic Units	The area falls into Physiographic unit of old Meghna estuarine floodplain
Major Soil Type	The area general soil type is non-calcareous dark grey floodplain soils.
Principal crops	Like other cities of Bangladesh, agriculture is important in parts of the project area. The major products of the area are paddy, potato, brinjal, patal, cauliflower, sugarcane and mula (radish). Extinct or nearly extinct crops are kaun, sesame, jute, and mustard seed, indigo.
Flooding	This area is more prone to flood than the other area of Dhaka city. The area is generally flooded by the ingress from the backwater flow of the Meghna Rivers, Shitalakshya and Balu

	Rivers.
Seismicity	The project area falls in the Earthquake Zone-II of the seismic map of Bangladesh. This zone refers medium intensity of seismic effects.
Environmental Hotspots	River, School, College, Madrasha, Masjid, Mender etc.
Major Settlement	Residential area, Commercial area, Slums and Squatters, Bus terminals, Institutional etc.
Major Industries/ Business Entrepreneurs	City Auto Rice & Dal Mills Ltd, City Sugar Mills Ltd., and all industries in City Economic Zone Ltd.

4.3 Study Area

Narayanganj was a sub-division of former Dhaka district. It was upgraded to a district on 15th February, 1984. Narayanganj the oldest and the most prominent river port of Bangladesh, grew into a prominent place of trade and commerce in the long past for which it was previously known as a Ganj. It is said that one prominent Hindu religious leader named Bicon Lal Pandey acquired the ownership of this region from East India Company. He declared the markets located on the bank of the river Shitalakshya as endowed property by a will in order to meet the expenses of the worship of God Narayan. Consequently, the name Ganj was turned into Narayanganj after the name of God Narayan. The district is bounded on the north by Gazipur and Narsingdi districts, on the east by Brahmanbaria and Cumilla District, on the south by Munshiganj District and on the west by Dhaka District. The total area of the District is 684.37 sq. km. (264.00 sq. miles). The District lies between 23°33" and 23°57" north latitudes and between 90°26" and 90°45" east longitudes. In this study, study area covers both the immediate site, and an extended area of about 2 km radius. Geographically the project is located at 23.749430° and 90.516158°.

In this study, study area covers both the immediate site, and an extended area of about 2 km radius. Immediate area here is the area that is enclosed by the project perimeter which falls mainly in **City Edible Oil Captive Power Plant Ltd.**, Rupganj Upazila. Geographically the project is located at Latitude 23.749430° North and Longitude 90.516158° east.

However, the surrounding area covers mainly Rupganj Upazila. In physico-chemical component, parameters included are land, water quality, air quality, climate, and noise. Primary and secondary data has been collected. In case of primary data collection emphasis has been given only to project boundary area. Secondary data has been

collected from different government and non-government organizations. Secondary data covers environmental and socioeconomic information of Narayanganj area of Bangladesh. Following figures shows the google location map and 1 Km, 2 km and 10km surrounding areas of **City Edible Oil**.

4.4 Environment: Physical

4.4.1 Climate

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

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

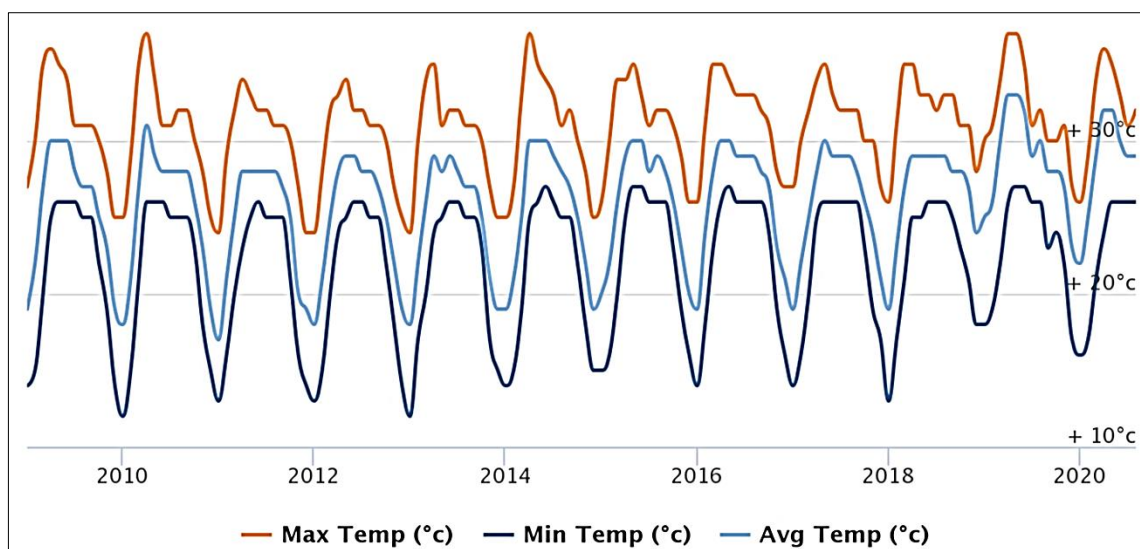
Winter: November to February: The winter or dry season is the coolest and driest period. However, according to Bangladesh Meteorological Department (BMD) the highest temperature recorded during winter in Narayanganj is 37° C and a minimum of 9° C. Rainfall is very rare during this period. Winds are predominantly blowing from the Northwest but with a high frequency of calm wind situations.

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

Monsoon: May to October: In the wet season more than 85% of the total annual rainfall occurs. Monthly average temperatures remain high with a maximum of 36° C. The period of periodic heavy thunderstorms lasts until June. June to mid-September to early November is the transitional period with decreasing rainfall, often thunder. Following table shows the average and monthly maximum and minimum temperature of last 2 year of study area.

4.4.1.1 Temperature

The period from February to March is marked by continuous increase in the temperatures. May is the hottest month of the year with a mean daily maximum and minimum temperature of 34 °C and 27 °C, respectively. With the onset of monsoon by mid-May, the temperatures descend slightly. January is the coolest month of the year with a mean daily maximum and minimum temperature of 24 °C and 14 °C, respectively.



Source: BMD, AccuWeather

Figure 4-1: Temperature of the study area

4.4.1.2 Wind

The following graph shows that the maximum monthly wind speed is available in the months of April, May, June and July. Minimum monthly wind speed found in the months of October, November and December. The wind speed in the months of January, February and March is moderately higher than in the months of December and November. The average wind speed in the study area is more than 12 km / h. Maximum wind speed recorded at more than 30.7 km / h in May, 2013.

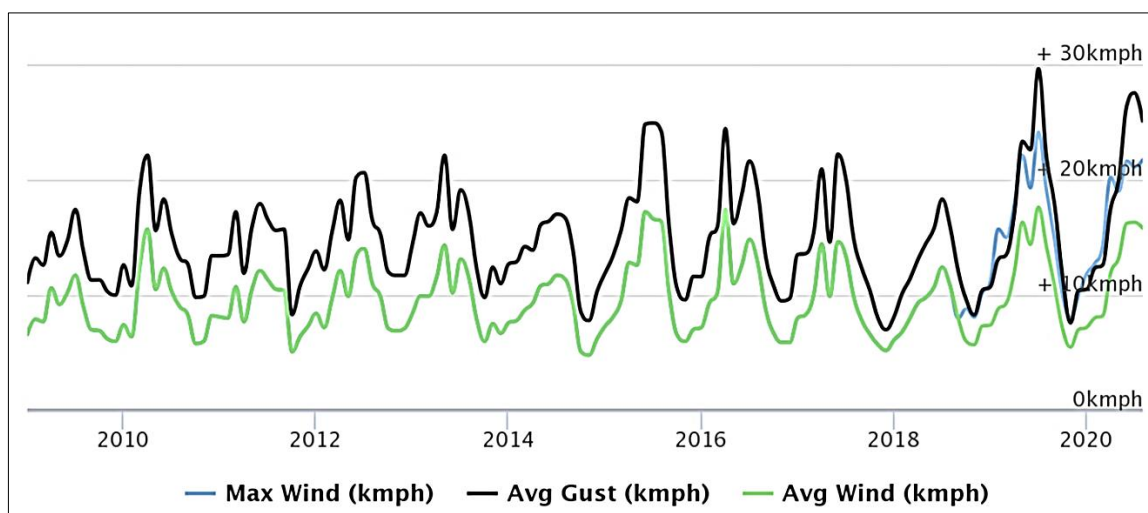


Figure 4-2: Average Monthly Wind Speed over the Year at Project Site.

Following graph represent the direction of wind at the study area. According to the graph yearly 1438-hour time wind roses from south to east, 1303-hour wind roses from south to

south east. 902 hours from East to southeast, 796 hours from south, only 672-hour wind roses from North.

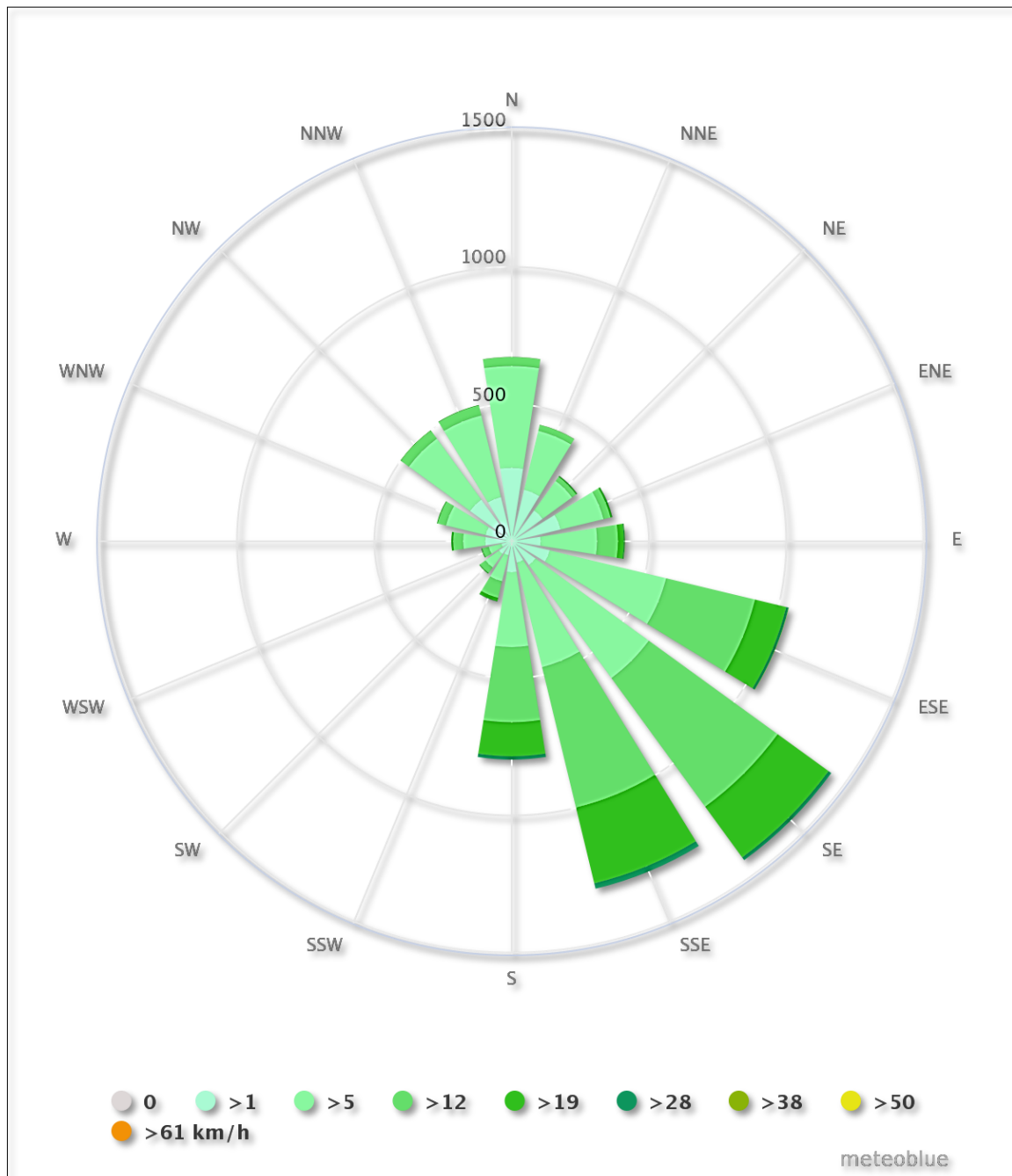


Figure 4-3: Wind Roses over the Year at Project Site.

4.4.1.3 Precipitation

About 80% of the precipitation occurs during five monsoon months (May to September). Minimum precipitations were recorded during the month of November to February whereas average showering does occur in March, April and October. According to world-weather the annual rainfall in 2019 was 2947.8 mm and total rainy

day was 222 and. Maximum intensity of rain occurs in month October, 2018 and it was, 26.16 mm per day. Approximately 80% of it occurs during the monsoon. The monthly average normal rainfall variation based on the climatology data and number of normal rainy days in each month in the project area have been given in the following figure represent the average precipitation data of the study area.

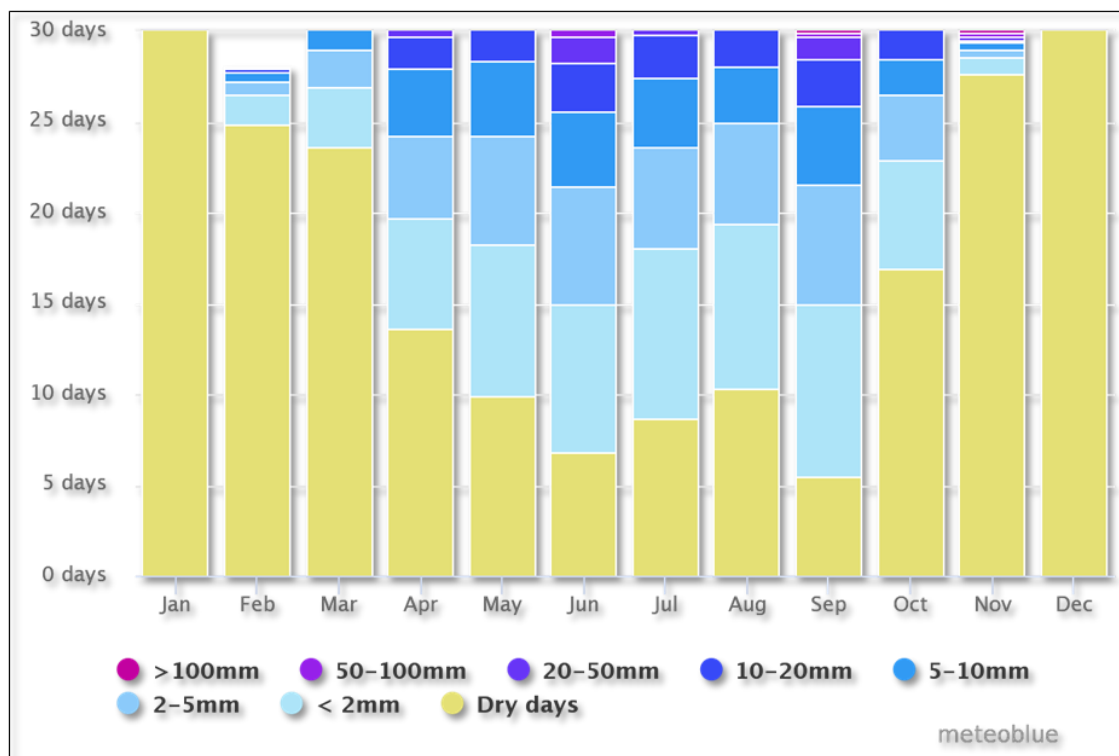


Figure 4-4: Average Rainfall amount and Rainy Day

4.4.1.4 Humidity

Due to the heavy rainfall and high air temperature, the humidity levels in Bangladesh remains high. Analyzing the meteorological data, it has been found that during the pre-monsoon period the humidity level remained at its lowest point. Within the study area, February is the driest month with an average minimum of around 49% humidity. However, humidity increases to maximum in the monsoon period. The average maximum humidity ranges from 80% to 90%, whereas the minimum average ranges from 42% to 64%. The monthly maximum, and maximum averages and minimum, minimum average of the last 10 years (2010-2020) are shown in the following Figure.

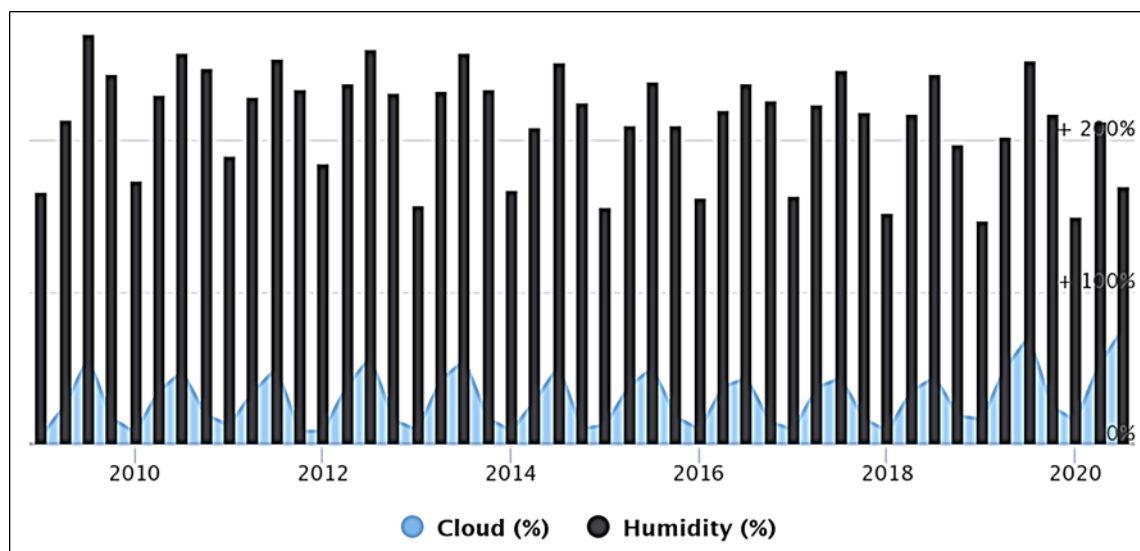


Figure 4-5: Monthly Maximum, Minimum and Average Humidity at study area

4.4.2 Land Use

The area enjoys all the infrastructure facilities like water, electricity, NG, telecommunication etc. Narayangonj District is a district in central Bangladesh, part of the Dhaka Division. The main city of the district is Narayangonj. It is near the capital city of Dhaka. Narayangonj District consists of five district. 47 unions and 827 Mauza. Out of the five up district Rupganj is the largest with an area of 247.97 km². Which is 32.65% of the total area of the District. Bandar is the smallest with an area of 55.84 km². Sharing 7.34% of the total area of the District.

A land use map on 2km study area has been generated by using GIS and classified into five different classes which area Industrial area, agriculture area, dense vegetation area, newly developed area and water body. According to LULC 0.109 km area covered with newly developed area, which may have developed for any kinds of development activities like, industry, building or others. 3.1075 km area covered with industrial and land development activities, 7.506 km area is barren land and agricultural land and 0.46 km area is dense vegetation land. Details LULC of the 2km study area is given in table

SN	Class	Count	Area (m ²)	Area (km ²)	
1	Newly Developed Land	485	109125	0.109125	0.859252
2	Built Area	13810	3107250	3.10725	24.46654
3	Wetland	6857	1542825	1.542825	12.14823
4	Barren Land	33364	7506900	7.5069	59.10945
5	Vegetation	2025	455625	0.455625	3.587598
				12.72173	100.1711

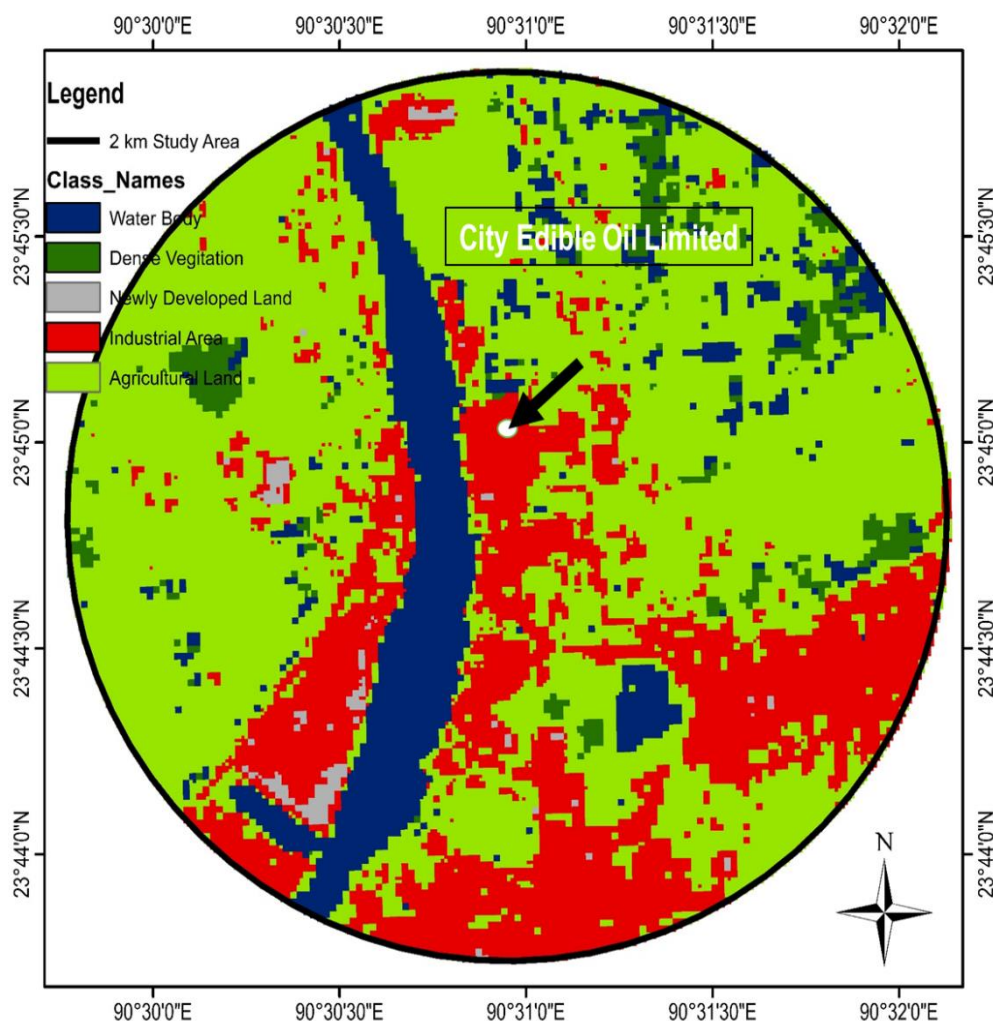


Figure 4-6: 2km Land Use and Land Cover (LULC) Map of the Study Area

4.4.3 Geology

The Geology of Bangladesh is affected by the country's location, as Bangladesh is mainly a riverine country. It is the eastern two-thirds of the Ganges and Brahmaputra river delta plain stretching to the north from the Bay of Bengal. There are two small areas of slightly higher land in the north-center and north-west composed of old alluvium called the Madhupur Tract and the Barind Tract, and steep, folded, hill ranges of older (Tertiary) rocks along the eastern border.

Geologically, of the study area lies on the edge of Madhupur Tract, a Pleistocene Terrace and the Holocene Floodplain, a Ganges-Brahmaputra- Meghna alluvial plain of north central part of Bangladesh, at an elevation of 0 to 10m PWD. The landform units are high land, low land, and medium high and medium low land categories. The land types are classified on the basis of maximum depth of flooding. The depth of high land is 0.3m, low land is 3.0m, medium high land is 0.9m and medium low land is 1.8m

respectively. The study area mainly composed of two major physiographic units, viz. Recent Meghna floodplain and Brahmaputra floodplain areas.

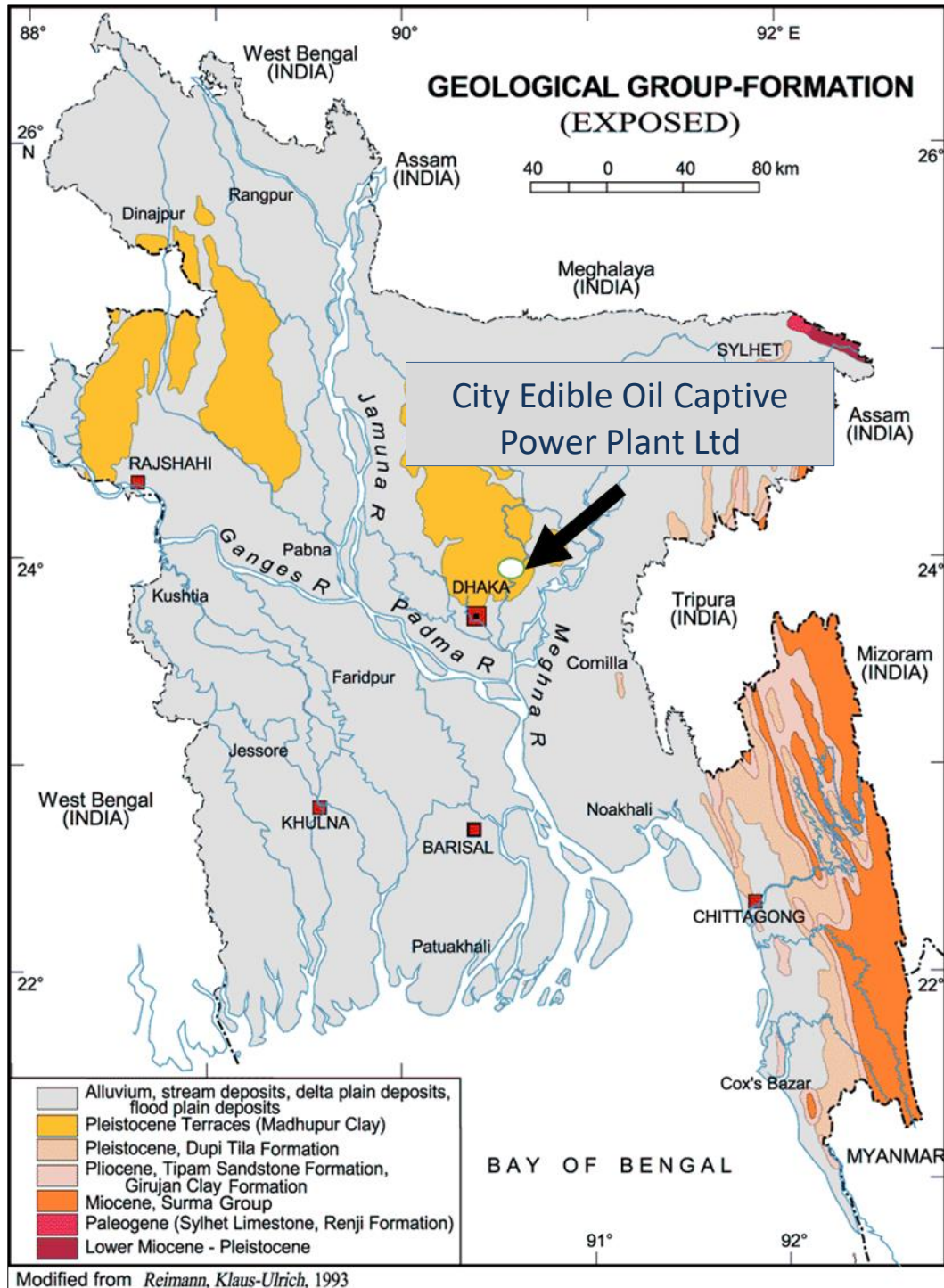


Figure 4-7: Geology of the project area

4.4.4 Topography

Topography is the configuration of a land surface including its relief and contours, the distribution of mountains and valleys, the patterns of rivers, and all other features, natural

and artificial, that produce the landscape. Although Bangladesh is a small country, it has considerable topographic diversity. It has three distinctive features:

- (i) a broad alluvial plain subject to frequent flooding,
- (ii) a slightly elevated relatively older plain, and
- (iii) a small hill region drained by flashy rivers.

The general topography of the project area is relatively flat. The topography of the specific project location is 11.6 – 13.9 m MSL (Figure 6.11). Topographically the cluster of the project location is almost flat, with many depressions, natural water bodies, bounded by the Rivers.

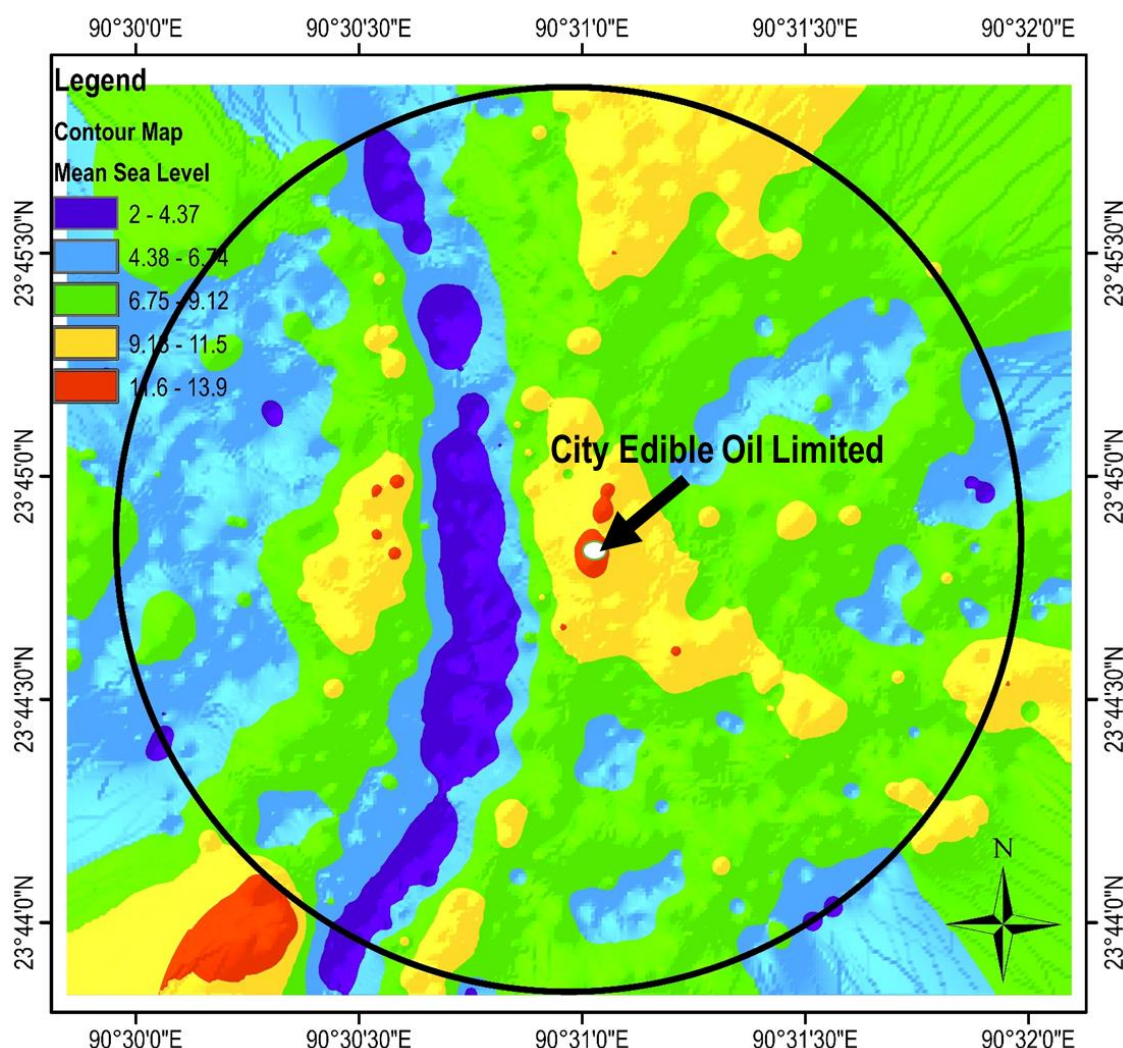


Figure 4-8: Contour Map of the study area

4.4.5 Water Quality Assessment

Water sampling and analysis was undertaken to understand the overall baseline water quality characteristics of the surface and groundwater in the study area. Samples were

taken from representative selected water bodies and groundwater sources representing different parts of the study area. The surface water sampling was based on the identification of major surface water bodies such as the Shitalakshya River adjacent to the site. Groundwater sampling locations were selected to obtain a representative water sample from various zones within the study area. The samples were collected from deep tube wells. A total of 4 samples, two (2) surface water and two (2) ground water samples were collected. **And the water quality standard tested by Control Engineering Laboratory (A third party testing organization) (water quality test report has attached with this report in annexure)** Detail of the sampling location is provided in following table 4-2,

Table 4-2: Details of Surface and Ground Water Sampling Locations

Sl.	Sampling location	Sampling Water	Sampling Code	Geographic location	Type of Source
1.	North-West (River Side)	Surface water	SW1	23°45'4.48"N; 90°30'49.75"E	Shitalakshya River
2.	South-west (River Side)	Surface water	SW2	23°44'53.83"N; 90°30'52.28"E	Shitalakshya River
4.	North Side	Ground water	GW1	23°45'16.78"N 90°30'53.90"E	Deep tube wells
5.	South Side	Ground water	GW2	23°44'59.38"N 90°30'54.68"E	Deep tube wells

The samples were analyzed for parameters covering bacteriological and physio-chemical characteristics which include certain heavy metals and trace elements. Water samples were collected as grab water sample in a standard sampling bottle and 500 ml sterilized clean PET bottle for complete physio-chemical and bacteriological tests respectively.

The samples were analyzed as per standard procedures/method given in standard Method for examination of water and wastewater Edition 23, published by APHA as well as using on site field test kit. Details of the analysis method and protocol are presented in following table 4-3.

Table 4-3: Water quality (limited parameters) of Shitalakshya River

SN	Parameter	Unit	Test
1	Temperature	(°C)	Digital thermometer
2	TDS	(mg/l)	Digital TDS meter
3	EC	(µmhos/cm)	Digital EC meter
4	DO	(mg/l)	Digital DO meter
5	pH		Digital pH meter

6	Salinity	(ppt)	Digital Salinity meter
7	Fecal Coliform	mg/l	Lab Analysis
8	Iron (Fe)	mg/l	3113.B
9	Oil and Grease	mg/l	Lab Analysis

Source WTBL Lab. (water collected on 02.11.2020 and analysis reporting date 10.11.2020)

Table 4-4, show the surfaced Water Quality of the project are and table 4-5 shows the ground water quality,

Table 4-4: Surface water quality of the project area

Sl.	Parameters	SW1	SW2	Bangladesh Standard, mg/l
1	COD	40	40	≤ 200
2	DO	7.62	7.47	4.5-8.5
3	BOD	47	53	≤ 50
4	pH	8.3	8.3	6.5-8.5
5	TDS	110	120	≤ 2100
6	Alkalinity	120	120	150
7	Hardness	78	80	200-500
8	Iron	Nil	Nil	2
9	Temperature	26.9	27.1	Summer-40 Winter-45

Table 4-5: Ground water quality of the project area.

Sl.	Parameters mg/l	GW1	GW2	Bangladesh Standard (mg/l)
1.	Arsenic (As)	-	-	0.05 mg/l
2.	Iron (Fe)	0.2	0.1	0.3-1.0 mg/l
3.	Lead (Pb)	-	-	0.05 mg/l
4.	pH	7.4	7.8	6.5-8.5
5.	Temperature	27.1	27.0	20-30 °C
6.	Total Coliform	-	-	0 mg/l
7.	TDS	890	240	≤1000 mg/l
8.	Hardness	498	129	200-500

The sample collection procedures for the water quality test have been shown in figure 4.9. The test results show that the baseline water quality of both surface and ground water source has been found in the standard limit of the applicable regulations.



Figure 4-9: Images of Water quality sampling period

4.4.6 Air Quality Assessment

Population density within the project area of the Upazila is high and there are many motor vehicles operating on the project roads and other roads within the upazila. It is expected that the project will not cause significant deterioration of air quality in the area. Close vegetation is observed in and around the project area.

Most importantly, during the operational activities of City Edible Oil Plant and Power Plant (which are already described in Section 3.7), no activator species were found that could cause much air pollution to conduct any air dispersion model.

On basis of production process and emitted air quality, no air modelling is conducted during prepared this ESIA. To ensure the subproject does not cause deterioration of ambient air quality a detail management plan has been included in this ESIA report. See Figure 4-10 for an illustration of how to measure air quality in a given location.



Figure 4-10: Air Quality Monitoring at Project Site

Table 4-4 shows the air quality standard and table 4-5 show the method of air quality data analysis.

Table 4-6: Air Quality Standard

Parameters	SPM	PM _{2.5}	PM ₁₀	SO ₂	CO	CO ₂	NO _x
Units	µg/m ³	µg/m ³	µg/m ³	µg/m ³	ppm	ppm	µg/m ³
DOE Standard	200	65	150	365	9	NYS	100
NAAQS	500	65	150	120	9	NYS	120

Table 4-7: The following methods were used to analyze the indoor air quality parameters

Parameters	Methods
CO (Carbon Monoxide)	Electrochemical
CO ₂ (Carbon Dioxide)	NDIR (Non-Dispersive Infrared)
SO ₂ (Sulphur Dioxide)	Electrochemical
NO ₂ (Nitrogen Dioxide)	Electrochemical
SPM (Suspended Particulate Matter)	Laser
PM _{2.5} (Particulate Matter)	Laser
PM ₁₀ (Particulate Matter)	Laser

Table 4-8: The following measurement uncertainties were assigned to the respected parameters

CO (Carbon Monoxide)	± 0.2 ppm
CO ₂ (Carbon Dioxide)	2 % of Rdg. ± 10 ppm
SO ₂ (Sulphur Dioxide)	± 0.5 ppm of Rdg
NO ₂ (Nitrogen Dioxide)	± 0.5 ppm of Rdg
SPM (Suspended Particulate Matter)	± 0.4%
PM _{2.5} (Particulate Matter)	± 0.4%
PM ₁₀ (Particulate Matter)	± 1.1%

The geographical location and setting of the ambient air quality monitoring locations has been listed in following table.

Table 4-9: Ambient Air Quality Sampling Locations

Sl.	Station Code	Geographic Location	Sampling Location
1.	AQ1	23°45'4.48"N; 90°30'49.75"E	North-west corner
2.	AQ2	23°44'53.83"N; 90°30'52.28"E	South-west corner
3.	AQ3	23°45'5.70"N; 90°30'59.68"E	North-east corner
4.	AQ4	23°44'55.34"N; 90°30'59.81"E	South-east corner

Ambient air quality measurements are essential to provide a description of the existing conditions or the baseline against which changes can be measured and to assist in the determination of potential impacts of the proposed **City Edible Oil Limited. Unit-2** air quality. Air quality test has been conducted on 2nd November, 2020 at the proposed project site and the test was analyzed by **Control Engineering Laboratory** (is a sister concern of WTBL). The test results are given in the below Table 4-4.

Table 4-10: Test Results of Air Quality Analysis in the project premises

Sl. No.	Sampling Locations	SPM	PM _{2.5}	PM ₁₀	CO	SO ₂	NO _x
01	North-west corner	105	25	82	0.5	05	05
02	South-west corner	115	33	72	1.0	19	09
03	North-east corner	197	49	147	0.7	07	18
04	South-east corner	176	29	133	0.4	13	14

(Source: Environmental Monitoring Report City Economic Zone)

The baseline survey result shows that the ambient air quality is in the limit of applicable standards discussed above. SPM of north-east corner is very high level

(197 μm) and close to the acceptable level of DoE (200 μm). Due to the roadside and vehicle movement, SPM of the north-east corner is very high.

4.4.7 Ambient Noise Quality

Noise levels were recorded at four (4) locations in the project area during the sampling time. Noise levels were recorded in the form of sound pressure levels with the help of a digital sound level meter. The details of noise monitoring locations are given in following table. The purpose of ambient noise level measurement was to determine sound intensity at the monitoring locations. These locations are chosen in such a way that a representative data could be recorded all over the block. The sound level is recorded in form of A-weighted equivalent continuous sound pressure level (L_{eq}) values with the use of A-weighting filters in the noise measuring instrument.

The noise level at the project site has given in table 4-11 and noise quality test report is given in table 4-12.

Table 4-11: Bangladesh Standard According to ECR-1997

Location	Average Noise Level (dB(A))				Applicable Standard* (dB(A))	
	$L_{eq_{day}}$	$L_{eq_{night}}$	$L_{eq_{max}}$	L_{min}	Day	Night
NS 1	55.5	43.5	67.33	41	75	70
NS 2	50.5	39	59	42	75	70
NS 3	56.5	44.5	69.67	41.67	75	70
NS 4	57.5	47	71	45	75	70

Table 4-12: Details of Ambient Noise Monitoring Locations

Sl.	Station Code	Geographic Location	Sampling Location
1.	NS1	23°45'4.48"N; 90°30'49.75"E	North-west corner
2.	NS2	23°44'53.83"N; 90°30'52.28"E	South-west corner
3.	NS3	23°45'5.70"N; 90°30'59.68"E	North-east corner
4.	NS4	23°44'55.34"N; 90°30'59.81"E	South-east corner

The noise quality result shows very close to the acceptable limit of DoE standards when the maximum L_{eq} is considered. So, it is necessary for the project to take actions necessary to mitigate the noise level as well as to provide protection to the workers working beside the source of noise generation.



Figure 4-11: Noise Quality Sampling Images

4.5 Environment: Ecological

4.5.1 Introduction

Narayanganj is an area in central Bangladesh situated near the capital city Dhaka. The area mainly covers with home state forest areas, marshy lands, agricultural crop lands and vegetation. Wetland includes ponds, ditches, and small canal connect to the Shitalakshya River. The areas support a diverse animal group and hold a balanced ecosystem.

While establishing this project a lot of interventions were carried out there. These might have impacted on the terrestrial and aquatic biodiversity within the impact zone of the project. In view of this, this study assesses the terrestrial and aquatic flora and fauna within the impact zone of the project. The section below outlines the scope of work or core components of this study.

4.5.2 Scope of work

The proposed Captive Power Plant will contribute 17.6 MW of electricity which will be completely used for the day-to-day process of Edible Oil Plant reducing the electricity pressure on the national grid. The proposed project will have substantive amount of environmental and social impact which demands and impact assessment. The scope of conducting the ESIA study includes

- a) Identify the terrestrial plants within 5km radius of the project the impact zone of project.
- b) Identify the terrestrial fauna (vertebrate) within the impact zone of project.
- c) Identify the aquatic macro fauna/fish species within the impact zone of project.

4.5.3 Methodology

To identify the biodiversity, data were collected from the impact zone of project during **January 2020** as outlined below through physical observation and carrying out FGD and KIIs with the local people:

4.5.4 Collection of Terrestrial Plants Data

Plant species were recorded surrounding 5 km of plant area. At first, the areas were visited to monitor and plant species were recorded. Then one focus group discussion (FGD) and two key informant interviews were carried out with the local people to prepare a checklist of the plant species available in that area. The participants were also asked to express their observations about changes of plant diversity in last one year by showing the images of plant found nearby plant area.

4.5.5 Collection of Terrestrial Fauna Data

Four vertebrate classes (mammals, birds, reptiles and amphibians) were surveyed as this group of animals presumably important and indicator species of a balanced ecosystem. To conduct the biodiversity survey, the researcher team carried out an ecological survey in the core and surrounding areas (up to 5 km) of the plant site. The sampling was made in a realistic manner to achieve the objectives of this study. Within the impact zone a broad range of terrestrial habitats were identified where wildlife species distributed in a dynamic way with having diversity, abundance and the status of animal species/animal groups supported by those micro and macro-habitats.

Survey of amphibians, reptiles, mammals and birds in the **project** areas and adjacent areas carried out through conducting field survey by employing different survey methods such as transect line sampling, point sampling, time sampling methods, opportunistic survey and zigzag survey, and one FGD. Data were collected based on the direct observation in the field. However, where the animal was not immediately available or difficult to locate or trace, observations were made on foot print, pug marks, trailing, tracks, burrows, nests, animal holes, caves on the trees or fruits made by animal, etc. Besides, local people were discussed (during FGD) to ascertain the existence and to assess the status/abundance of amphibians, snakes, monitor lizards, mongooses, jackals, foxes, bats, dolphins, birds etc.

Standard taxonomy books, field notebooks, field manuals and taxonomic sheets used for identification of species. The species, which were not possible to identify in the field,

brought to laboratory of the Department of Zoology, University of Dhaka for proper labeling for its subsequent identification.

4.5.6 Collection of fish data

Fish species was identified and changes in their biodiversity were investigated using key 2 informant interviews and 1FGD. Key informant interviews were conducted with respondents from both aquatic habitat dependent people and outside people who have good knowledge about the biodiversity in those habitats. FGD (4-8 people) was conducted with the habitat depended people to discuss any disputed issue that might have arisen from interviews as well as to triangulate the findings. The fish species were identified using the book of Rahman (2005) and the latest scientific names were updated according to ITIS (2016).



Figure 4-12: Some photography during fish survey

4.5.7 Results

4.5.7.1 Flora

The plant species recorded from the surrounding area (10 km radius) of the **project** are given in following Table.

Table 4-13: List of plant species recorded from the surrounding area (10 km radius) of the Project, Narayangonj.

S N	Scientific Name	Family	Local Name	Local Status	IUCN Status	Usage	Habit
1.	Banyan (Ficus benghalensis)	Moraceae	Bat tree	R	T	Medicine, Rubber	Tree
2.	Azadirachta indica	Meliaceae	Neem	VC	T	Medicine, Vegetable, Wood	Tree
3.	Aegle marmelos	Rutaceae	Bel	C	LC	Fruit and Medicine	Tree
4.	Aphanamixis polystachya	Meliaceae	Pithraj	R	LC	Wood	Tree
5.	Syzygium cumini	Myrtaceae	Jaam	VC	LC	Fruit	Tree
6.	Bombax ceiba	Ceiba pentandra	Simul Tree	R	LC	Cotton, Wood	Tree
7.	Borassus flabelifer	Palmae	Tal	R	LC	Fruit, Fuel wood and Timber	Tree
8.	Mangifera indica	Anacardiaceae	Aam	VC	LC	Fruit and Timber	Tree
9.	Phoenix dactylifera	Arecaceae	Khejur	C	LC	Fruit	Tree
10.	Cocos nucifera	Palmae	Narikel	VC	LC	Fruit and Fuelwood	Tree
11.	Litchi chinensis	Sapindaceae	Lichu	C	LC	Fruit	Tree
12.	Areca catechu	Palmae	Supari	VC	LC	Fruit and Timber	Tree
13.	Carica papaya	Caricaceae	Pepe	C	LC	Fruit	Shrub
14.	Cynodon dactylon	Gramineae	Durba	R	LC	Grass	Herb
15.	Psidium guajava	Myrtaceae	Peyara	C	LC	Fruit	Shrub
16.	Dipterocarpu s turbinatus	Dipterocarpaceae	Garjon	R	LC	Timber	Tree
17.	Albizzia procera	Fabaceae	Sheel koro	R	LC	Wood and Timber	Shrub
18.	Zizyphus mauritiana	Rhamnaceae	Baroi	C	LC	Fruit	Tree
19.	Averrhoa carambola	Averrhoaceae	Kamrang a	C	LC	Fruit	Tree

S N	Scientific Name	Family	Local Name	Local Statu s	IUCN Statu s	Usage	Habi t
Local status: VC – Very Common, C – Common, R – Rare, VR – Very rare							
IUCN status: VU—Vulnerable, NT—Near Threatened, LC—Least Concern							

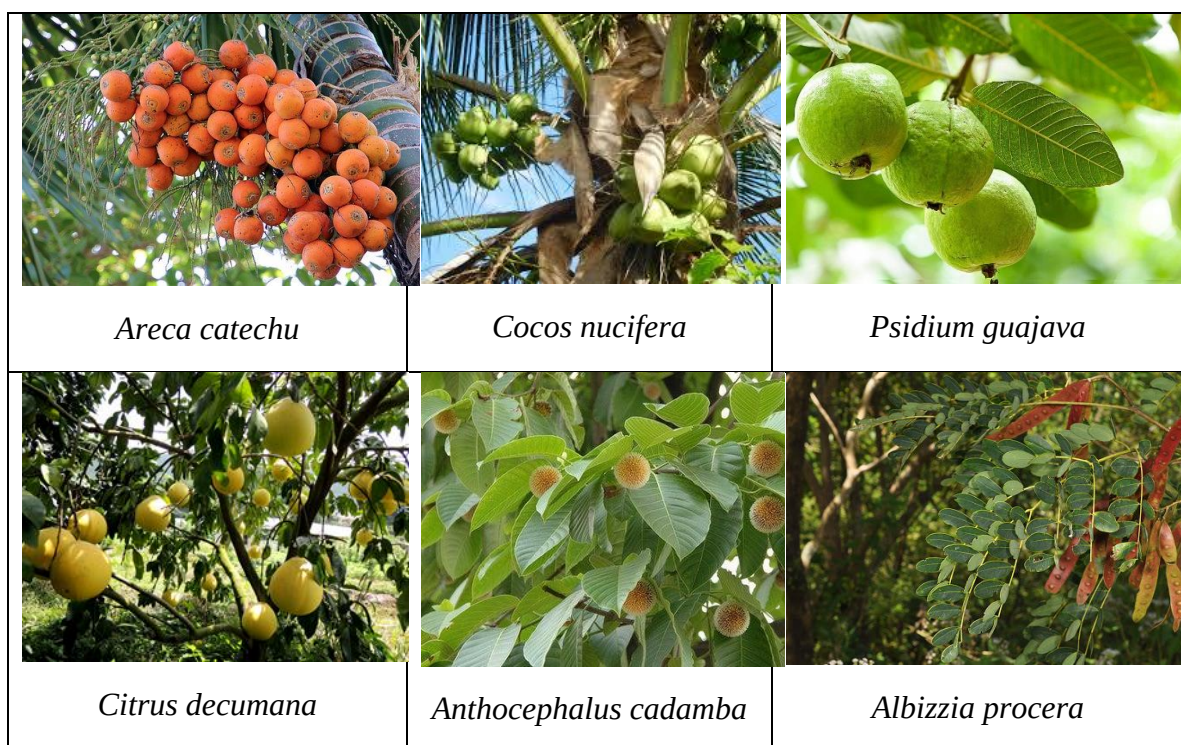
*Mangifera indica**Artocarpus heterophyllus**Syzygium cumini*

Figure 4-13: Some photography during Flora survey

4.5.7.2 Fauna

Amphibian:

There are 42 species of amphibian species, 157 reptilian species, 124 species of mammals and 718 birds' species reported from Bangladesh (Khan 2010, Sarker and Sarker 1988). However, in the current study, a total of 9 Amphibians, 17 reptiles, 12 mammals and 43 birds were identified in the project surrounding areas.

A total of 2 amphibian species were identified in the present surrounding area (Table 4.14). On the basis of frequency of occurrence or relative abundance Common Toad, Skipper Frog and Indian Bull Frog were commonly (44.45%) found. Furthermore, Green Frog, Pierries Cricket Frog and Ornate Narrow-mouthed Frog were less common (33.33%). On the other hand, Common Tree Frog was rare (22.22%) anuran species in the study area.

Table 4-14: List of Amphibian species identified in the surrounding areas of the **project**, Narayanganj.

SL	Scientific Name	English Name	Local Name	IUCN Status	Local Status	Occurrence of species	
						Primary Survey	Local people consultation
1.	Bafo melanostictus	Common Toad	Bang	LC	CR	√	
2.	Rana Cyanophytis	Skipper Frog	Bang	LC	C		√
Local Status code: CR – Common Resident, C – Common, UR – Uncommon Resident, RR – Rare Resident, V – Vagrant, WV – Winter Visitor; UWV – Uncommon Winter Visitor IUCN Status code: CR – Critically Endangered, EN - Endangered, VU - Vulnerable, LC - Least Concern							

Reptiles:

A total of 3 reptile's species were identified in the present study area (Table 4.15). On the basis of frequency of occurrence or relative abundance Common Garden Lizard, Common skink, Common House Lizard, Yellow-bellied House Gecko and Checkered Keelback water snake were found as common (29.41%). Indian Roofed Turtle, Common House Lizard, Common Smooth Water Snake, Common Wolf Snake, Indian Rat Snake/Western Rat Snake and Spectacled Cobra were less common (35.29%) in this area.

Table 4-15: List of Reptilian species identified in the impact zone of the **project**, Narayanganj.

S N	Scientific Name	Local Name	Family	IUCN Status	Local Status	Occurrence of species	
						Primary Survey	Public consultation
1.	Enhydridis engydris	Smooth Water Snake	Painnya	-	C		√
2.	Hemidactylus	House Lizard	Shap/Huriya	LC	CR	√	
3.	Naja naja	Narrow	Goda Tik	LC	CR	√	

	Kaouthia	headed Softshel l	Tiki				
Local Status code: CR – Common Resident, C – Common, UR – Uncommon Resident, RR – Rare Resident, V – Vagrant, WV – Winter Visitor; UWV – Uncommon Winter Visitor IUCN Status code: CR – Critically Endangered, EN - Endangered, VU - Vulnerable, LC - Least Concern							

Mammals:

A total of 04 mammalian species were identified in the impact area (Table 4.16). On the basis of frequency of occurrence or relative abundance Indian Grey Mongoose and House Rat were commonly (16.67%) found in the study area. Jungle cat, Mole Rat, Greater Bandicoot Rat, Asian House Shrew are common (66.66%) in the study area.

Table 4-16: List of Mammals identified in the surrounding area of the PROJECT, Narayanganj

SN	Scientific Name	Common Name	IUCN status	Occurrence of species		
				Primary Survey	Local people consultation	Published Literature
1.	Canis aureus	Jackal	LC		√	
2.	Herpestes edwardsii	Mongoose	LC	√		
3.	Sciurus carolinensis	Squirrel	LC		√	
4.	Felis chaus	Jungle Cat	NT		√	
IUCN Status code: CR – Critically Endangered, EN - Endangered, VU – Vulnerable, LC-Least Concern, NT- Near Threatened						

Birds:

A total of 09 bird's species were found in the surrounding area (Table 4.17). On the basis of frequency of occurrence or relative abundance commonly (54.76%) found species were Red Junglefowl, Spotbill Duck, Burmes Hoopoe, Common Kingfisher, Asian Cuckoo, House swift, Rock Pigeon, Spotted Dove, Little Cormorant, Indian Pond Heron, House Crow, Grey Drongo, White-rumped Shama, Oriental Magpie, Asian Pied Starling/Myna, Jungle Myna, Bank Myna, Common Myna, Red-vented Bulbul, House sparrow etc. Bar-headed Duck, Greylag Goose, Black-rumped Flameback, Barn Owl, Crested Goshawk, Brahminy Kite, Great Cormorant, Little egret, Black-hooded Oriole and Purple-rumped Sunbird were less common species (26.19%) in the study area.

Table 4-17: List of Birds identified in the surrounding area of the PROJECT, Narayanganj.

SL	Scientific	English	Local	IUCN	Birdlif	Occurrence of Species
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	Name	Name	Name	Status	e Status	Primary Survey	Local people consultation
1.	Corvus splendens	House Crow	PatiKak	LC	LC	√	
2.	Passer domesticus	House Sparrow	Pati Chorui	LC	LC	√	
3.	Alcedo atthis	Common Kingfisher	Machrang a	LC	LC	√	
4.	Copsychus saularis	Ribon	Doel	LC	LC	√	√
5.	Corvus splendens	House Crow	Kak	LC	LC	√	√
6.	Egretta albe	Great Egret	Baro Bak	LC	LC	√	
7.	Egretta gazatta	Small Egret	Chhoto Bak	LC	LC	√	
8.	Dirrurus gazatta	Black Drongo	Fingry	LC	LC	√	
9.	Dirrurus adsimilies	House Sparrow	Choroi	LC	LC	√	√
IUCN Status code: CR – Critically Endangered, EN - Endangered, VU - Vulnerable, LC - Least Concern							

Fish: The fish species recorded from the impact zone (10 km radius) of the PROJECT are given in following table.

Table 4-18: Fish species identified in the impact zone (10 km radius) of the **PROJECT**, Narayangonj.

SL#	Scientific Name	Local Name	IUCN status
1.	carp tribe	Cyprinidoes	LC
2.	Labeo rohita	Rui	LC
3.	Catla catla	Catla	LC
4.	Cirrhinus mrigala	Mrigel	LC
5.	Labeo calbasu	Kalibaush	LC
6.	Mystus aor	Airh	LC
7.	Mystus vitatus	Tangra	LC
8.	Clarias batrachus	Magur	LC
9.	Heteropneustes fossilis	Shing	LC

10.	Wallago attu	Boal	LC
11.	Channa marulius	Gazer	LC
12.	Ompok pabda	Pabda	LC
13.	Punti	Barbus puntius	
14.	Ctenopharyngodon idella	Grass Carp	LC
15.	Hypophthalmichthys Molitrix	Silver carp	LC
16.	Oreochromis mossambicus	Telapia	LC
17.	Oreochromis niloticus	Nilotica	LC

4.6 Climate Change and Natural Hazard

Establish captive power plant requires significant long-term investments, so understanding the impacts of climate change will help with financial planning, technology choices and energy projections. Climate change and associated impacts will be felt as a result of changes in temperature and precipitation, sea level rise, changes in the frequency and severity of extreme climate events, and dynamics of hazardous conditions (IPCC, 2007). Developing countries are considered to be particularly susceptible to climate change because of their exposure and sensitivity to climate-related extremes, and especially because of their limited adaptive capacity to deal with the effects of hazards. Given this limited adaptive capacity, they are considered particularly vulnerable to climate-related damage, just as they are particularly vulnerable to other stresses.

Climate change is a global problem. The world's climate is changing and will continue to change in the coming century. Climate change is essentially climate change over a period of decades to centuries. This is a normal part of the natural variability of the Earth, which is associated with the interactions between the atmosphere, ocean and land, as well as changes in the amount of solar radiation reaching the Earth. However, the term “climate change” is defined by the United Nations Framework Convention on Climate Change (UNFCCC) as “climate change that is directly or indirectly related to human activities that change the composition of the global atmosphere and which, in addition, the natural climate variability observed in comparable time periods” (IPCC, 2007). The risks associated with these changes are real but highly uncertain. Societies' vulnerability to the risks of climate change can exacerbate current social and economic problems, especially

for those parts of society in developing countries that are resource dependent and sensitive to climate change.

Bangladesh is recognized worldwide as one of the most vulnerable countries to the effects of climate change. This is due to the predominance of floodplains, low altitude from the sea, high population density, high levels of poverty and huge dependence on nature, its resources and services. The country has a history of extreme climate events that claim millions of lives and destroy past development gains. People and the social system have the knowledge and experience to cope with the consequences of such events - to some extent and to one degree or another. Historically, Bangladesh has tried to adapt to changing conditions. The Intergovernmental Panel on Climate Change (IPCC) has identified the country as one of the most vulnerable countries to climate change, which could seriously affect the lives and livelihoods of millions of Bangladeshis in the coming decades. In this regard, Bangladesh has already prepared a National Adaptation Action Program (NAPA) and a climate change strategy and action plan (MEF 2005 and MEF 2009).

According to the fourth assessment, the IPCC report, continued emissions of greenhouse gases at or above current rates will cause further warming and cause many changes in the global climate system during the 21st century, which are likely to be more severe than those observed in the 20th century.

4.7 Natural Hazards

4.7.1 Seismicity

Earthquake vulnerability of any place largely depends on its geology and topography, population density, building density and quality, and finally the coping strategy of its people and it shows clear spatial variations. Bangladesh has been classified into three seismic zones where Zone-I the most severe and Zone-III the least impact. The project area falls in Zone-II, which means that there is considerable risk regarding earthquake. Based on last 40 years weather data, **the project area is comparatively less prone** to earthquake compared to northern part of Bangladesh. The seismic zones of Bangladesh have been provided in following figure. The following Table shows the seismic zones of Bangladesh where indicated that the project area is fallen in the II category which is quieter than Zone I. This has been considered in the civil construction design so that the construction can withstand earthquake of 7 on the Richter scale.

Table 4-19: Seismic Zoning of Bangladesh

Zoning	Area Marcella Scale
Zone-I	North and East Region of Bangladesh
Zone-II	Lalmai, Barind, Madhupur Tracts, Dhaka, Narayanganj, Cumilla, Noakhali, and Easter part of Chattogram folded belt.
Zone-III	Khulna division south-east Bangladesh.
Zone-IV	Sylhet, Moulivibazar, Hobiganj, Netrokona, Mymensing, Sherpur, etc.

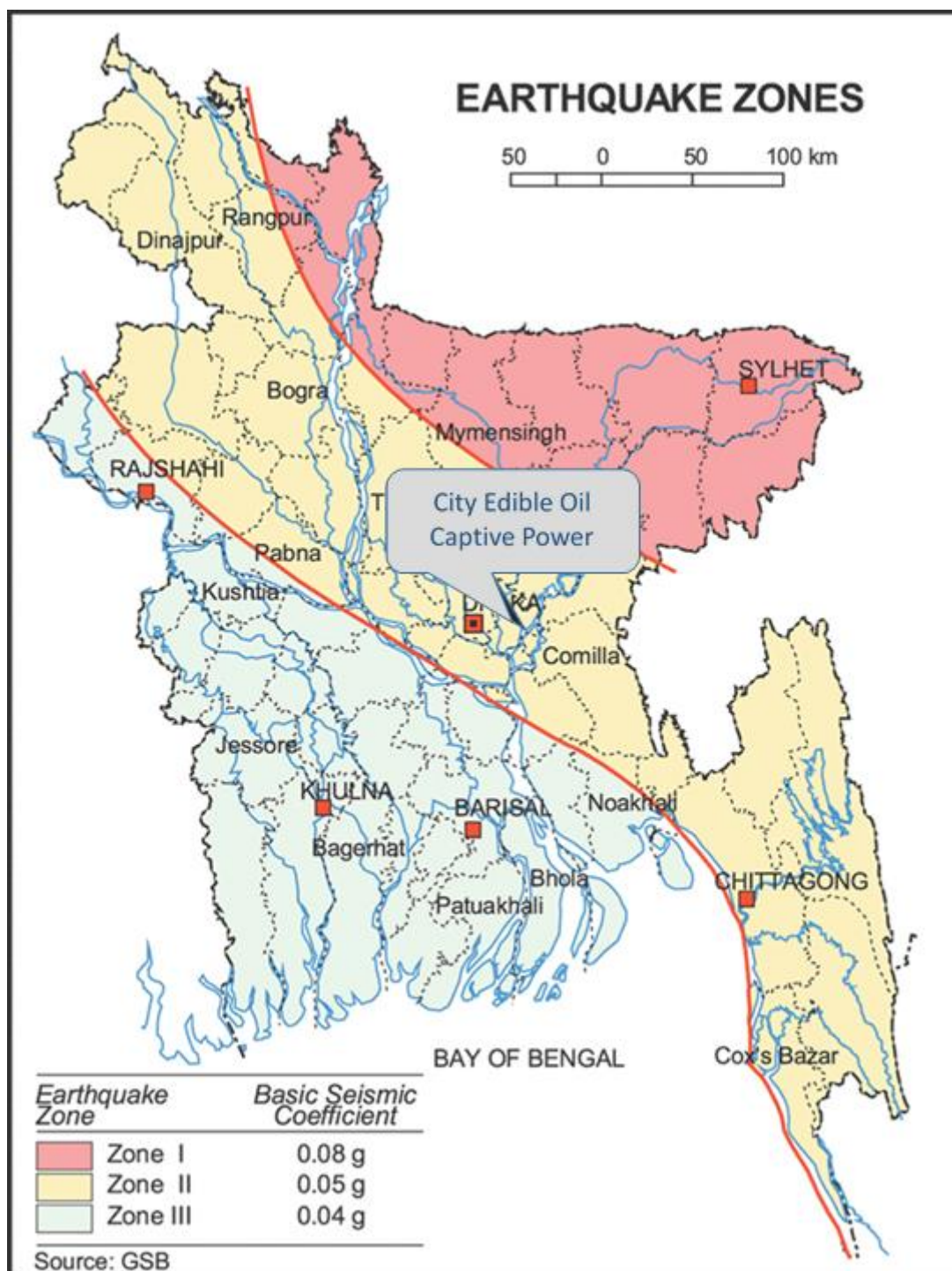


Figure 4-14: Earthquake zoning map of Bangladesh

4.7.2 Cyclone

Typhoons are tropical revolving storms. They are called 'Cyclones' in English, when they occur in the Indian Ocean area. The coastal regions of Bangladesh are subject to damaging cyclones almost every year. They generally occur in early summer (April-May) or late rainy season (October-November). Cyclones originate from low atmospheric pressures over the Bay of Bengal. During the years 1960 to 1998,

Bangladesh has been hit by 30 severe cyclones and during 1998 to 2017 has been hit by 10 severe cyclones, 32 of which were accompanied by storm surges. Following table contain a brief account of these disasters with particular reference to the wind speed, surge height, loss of life, damage to crop and properties, etc. Following figure represent the cyclone prone area of Bangladesh.

SPARRSO has published a map of cyclone-prone Bangladesh which is established on 40 years data observation, where the project is at low risk, but due to seasonal fluctuations during some periods of the summer season, a surface storm such as “Kalboishakhi” has developed in the project area. But the intensity of such storms is very low to be considered a cyclone in order to be identified as a risk. So, it is clear to us that the project is located in a **cyclone-free zone**.

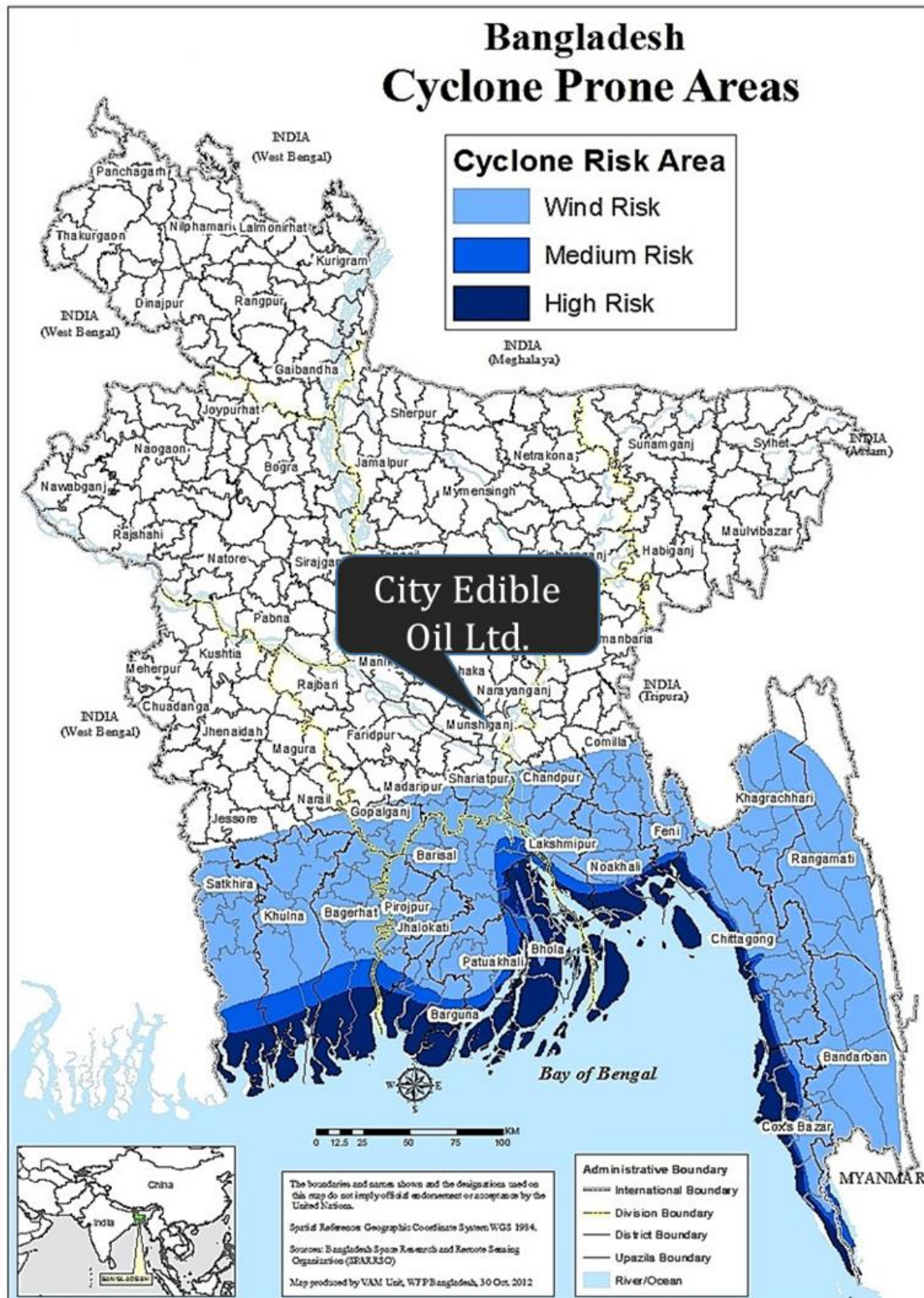


Figure 4-15: Cyclone Prone area Map of Bangladesh

4.7.3 Flood

Flood relatively high flow of water that overtops the natural or artificial banks in any of the reaches of a stream. When banks are overtopped, water spreads over the floodplain and generally causes problems for inhabitants, crops and vegetation. Since floodplain is a desirable location for man and his activities, it is important to control floods so that the damage does not exceed an acceptable level.

Floods are more or less a recurring phenomenon in Bangladesh and often have been within tolerable limits. But occasionally they become devastating. Each year in Bangladesh about 26,000 sq. km, 18% of the country is flooded. During severe floods, the affected area may exceed 55% of the total area of the country. In an average year, 844,000 million cubic meter of water flows into the country during the humid period (May to October) through the three main rivers the Ganges, the Brahmaputra-Jamuna and the Meghna. This volume is 95% of the total annual inflow. By comparison only about 187,000 million cu m of stream flow is generated by rainfall inside the country during the same period. Following figure show the flood intensity during 1954 to 1999 in Bangladesh.

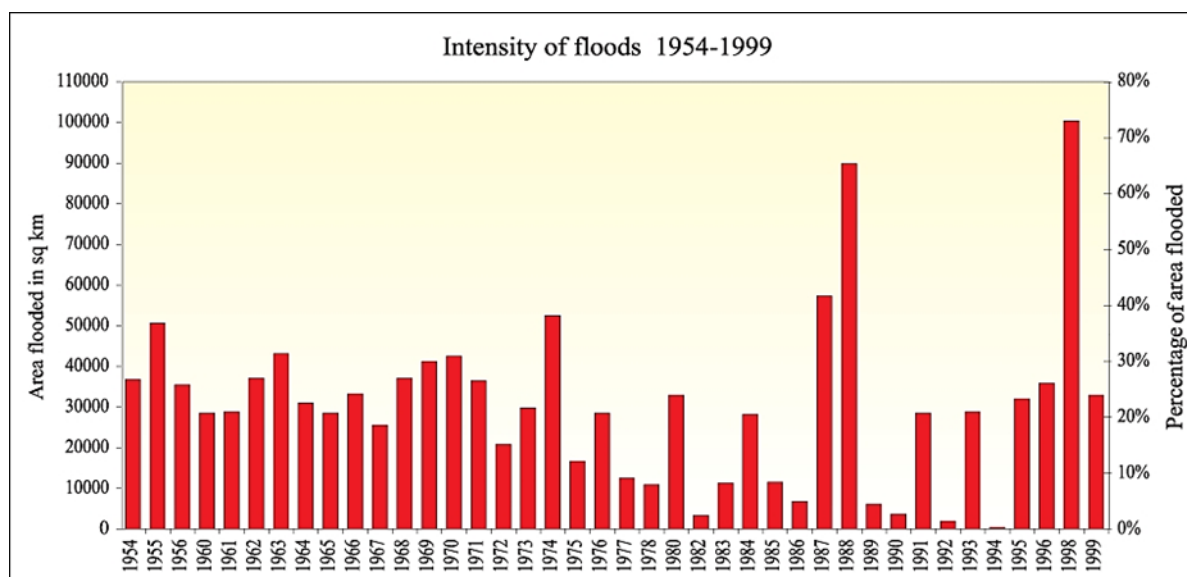


Figure 4-16: Intensity of Flood during 1954-1999

4.7.4 Flood Risk Assessment

Methodology of Flood Risk Assessment Flood risk is the likelihood (or often referred to as probability of occurrence) and the adverse consequences of flooding. Flood risk for assets and people at any location in a floodplain is a function of flood hazard at that location and their exposure and vulnerability to the flood hazard.

Flood risk is a measure of the statistical probability of flooding combined with the adverse consequences of the flooding. The practical determination of future flood risk is made up of four major components.

- ❖ Probability of flooding;
- ❖ Exposure of the receptors-at-risk to different flood characteristics;
- ❖ Value of receptors-at-risk; and;
- ❖ Vulnerability of these receptors-at-risk.

Operating the formulae requires the implementation of a 3-step procedure as illustrated in the following figure in order to produce the flood risk value.

- Step 1: Determine the unit damage rates for a range of return periods.
- Step 2: For each return period, multiply the corresponding unit damage rates with the relevant damage factors to produce the estimated flood damage. The applicable factors are flood depth, duration and strata (urban and rural).
- Step 3: Multiply the estimated flood damage for each return period with the probability of occurrence to compute the flood risk index.

The probability of occurrence is, of course, equal to $1/\text{Return Period}$. For each return period, multiply the probability with the corresponding estimated flood damage.

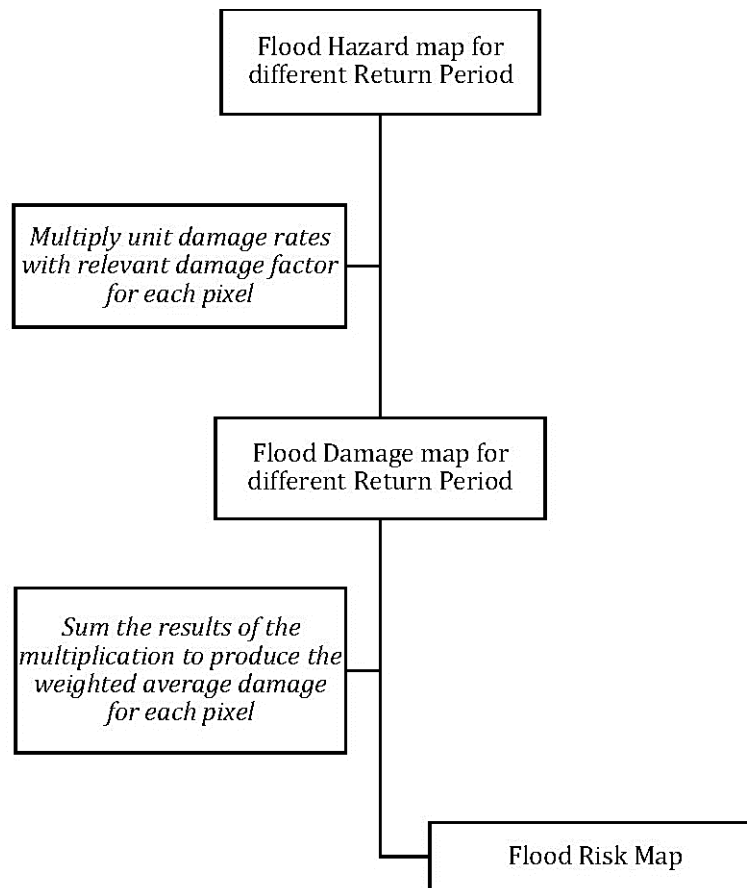


Figure 4-17: Procedure for Generating Flood Risk Index and Producing Map

Damage Function and Damage Vulnerability Mapping

The study area has been divided into two zones i) Northern Part (Upper Part) and ii) Southern Part (Down). It is assumed that both of the zones are industrial though the Northern part is fellow land/agricultural land at present and Southern part is completely industrial area except few spots. Damage function and damage vulnerability analysis zones are presents in the following figure.



Figure 4-18: Risk Analysis zone in and around of the study area

Figure 4-18: shows the depth-damage curves for two hydrological conditions i) inundation duration less than 7 days and ii) inundation duration greater than 7 days for the Industrial settlements. Depth- damage functions for this element was constructed with the help of inundation depth maps (inundation depth map of 1 in 2.33 years, 1 in 10 years, 1 in 20 years, 1 in 25 years, 1 in 50 years and 1 in 100 years). It is noted that the damage function shown here only for industrial settlements though the northern site is fellow land/agricultural zone. It is assumed that this northern site will be a proposed industrial site.

Industrial settlement vulnerability maps for the different return periods of flood were constructed as shown in the Figure. In the industrial vulnerability map the flood depths were divided into six scales (<0 m, 0.0m to 0.5m, 0.5m to 1.5 m, 1.5m to 2.0m, 2.0m to 3.0m and 3.0m to 6.0m) and their respective vulnerability is: no vulnerable (<0), low vulnerable (0–0.28), medium low vulnerable (0.28–0.63), medium high vulnerable (0.63–0.72), high vulnerable (0.72–0.86) and very high vulnerable (0.86–1.0) for different return periods.

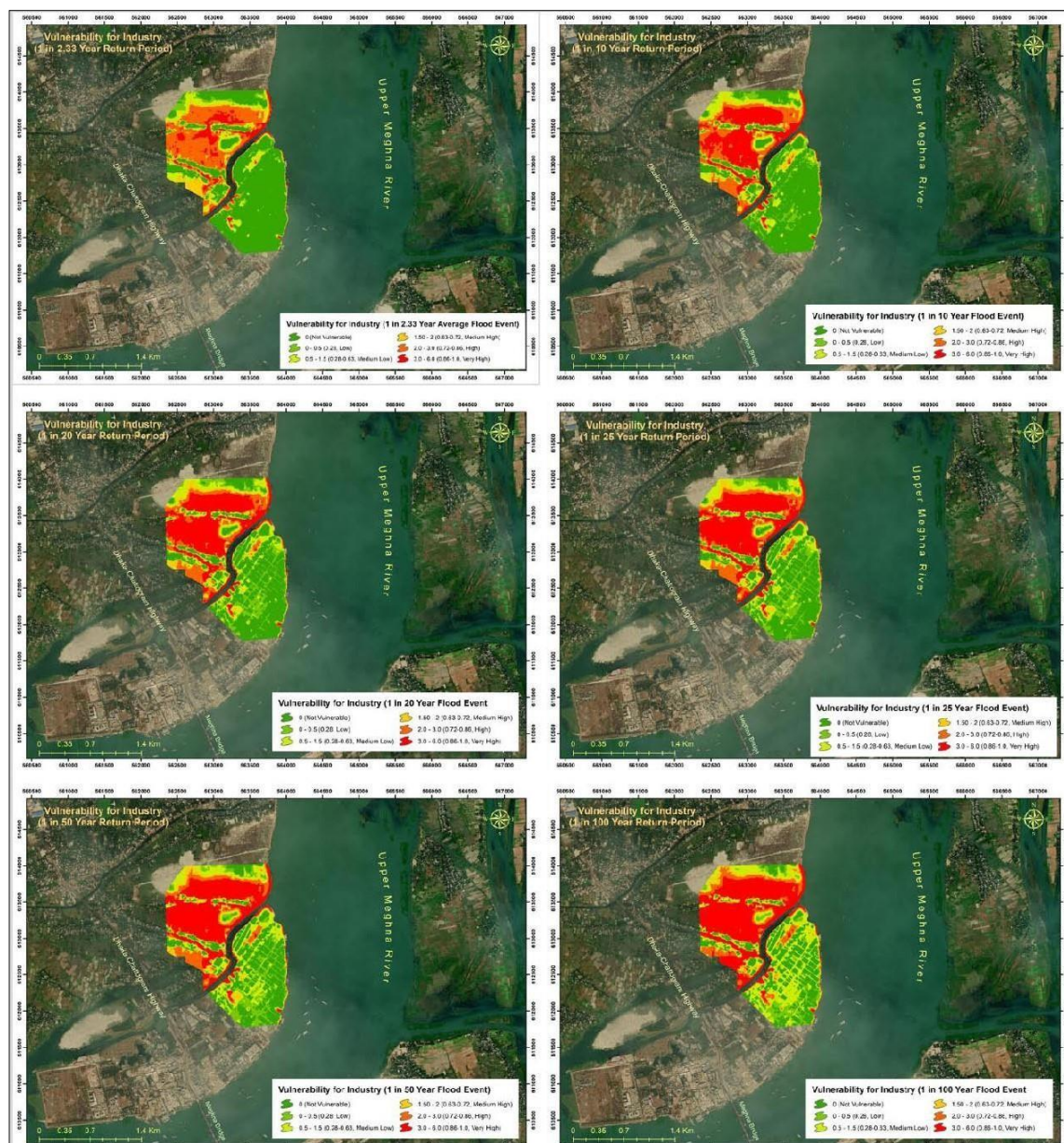


Figure 4-19: Vulnerability rank for industrial settlements at different return periods of flood

The result of vulnerability map for the industrial settlement showing in the Figure depicts the industrial settlement vulnerability increases with the increase in return period. Overall, irrespective of any class of vulnerability, 51.59% of the total industrial settlement area is vulnerable to flood at 2.33-year return periods. The percentage becomes 80% at 100-year flood. Now, if looking on the basis of vulnerability class, about 21.84% of the total study areas are “high” and 7.29% of the total areas are vulnerable to flood at 2.33 return period. However, at 100-year flood, this percentage increases sharply to 33%. Industrial area with “low” and “medium low” vulnerable of

flood increase gradually with the increase in return periods (6% of the total industrial settlement area at 2.33 return periods with low vulnerable to increase to 10% of the total settlement area at 100-year flood). 100-year return period flood vulnerability is smaller than the 25-year flood vulnerability with low class and it is adjusted in medium class vulnerability. Industrial settlement vulnerability with medium high remains constant in different flood events where vulnerability with “high” class reduces with increases of flood return periods. However, it is adjusted in the “very high” class vulnerability by increasing with the increases of flood return periods.flood.

Table 4-20: Percentage of Industrial area with different levels of risk at different return periods of flood

Flood depth, [m]	Percentage of Industrial area with different levels of risk at different return periods of flood						
	2.33	10	20	25	50	100	Vulnerability Class
<0.0 m	48%	39%	32%	30%	24%	20%	Not Vulnerable
0.0 -0.50m	6%	9%	12%	13%	13%	10%	Low
0.50m - 1.5m	10%	11%	13%	13%	16%	21%	Medium Low
1.50m - 2.0m	6%	5%	5%	5%	5%	6%	Medium High
2.0m - 3.0m	22%	15%	12%	12%	11%	10%	High
3.0m - 6.0m	7%	21%	25%	27%	29%	33%	Very High

Flood Mitigation Measures

Different flood mitigation measures actions can be taken to protect the Meghna Economic Zone from river flooding and monsoon flood based on numerical model result analysis and traditional approach. Flood mitigation measures can be evaluated in terms of reduction of flood inundation and increase in flood protection level for the areas affected. The probable measures are as follows:

- ✓ Channelization in the study area/ proper drainage system inside the economic zone and connect with the peripheral river by drainage outlets.
- ✓ Widening and lowering the Upper Meghna at least 5.0km upstream and downstream of the study area
- ✓ Floodwalls/ flood protection embankment to protect the overtopping
- ✓ Removing hydraulic obstacles in the Upper Meghna River

4.7.5 River Morphology

The terms river morphology and its synonym fluvial geomorphology are used to describe the shapes of river channels and how they change in shape and direction over time. The morphology of a river channel is a function of a number of processes and environmental conditions, including the composition and credibility of the bed and banks (e.g., sand, clay, bedrock); erosion comes from the power and consistency of the current, and can affect the formation of the river's path. Also, vegetation and the rate of plant growth; the availability of sediment; the size and composition of the sediment moving through the channel; the rate of sediment transport through the channel and the rate of deposition on the floodplain, banks, bars, and bed; and regional aggradation or degradation due to subsidence or uplift. From the historical imagery (2002, 2012 and 2020) of Shitalakshya River adjacent to the project site it can be concluded that there **is no significant shifting tendency occur. The shape and direction of River also did not change and no substantial erosion and sedimentation found in the River banks.** The following Figure shows the morphological changes of Shitalakshya River near the project site during the period of 2002 to 2020.

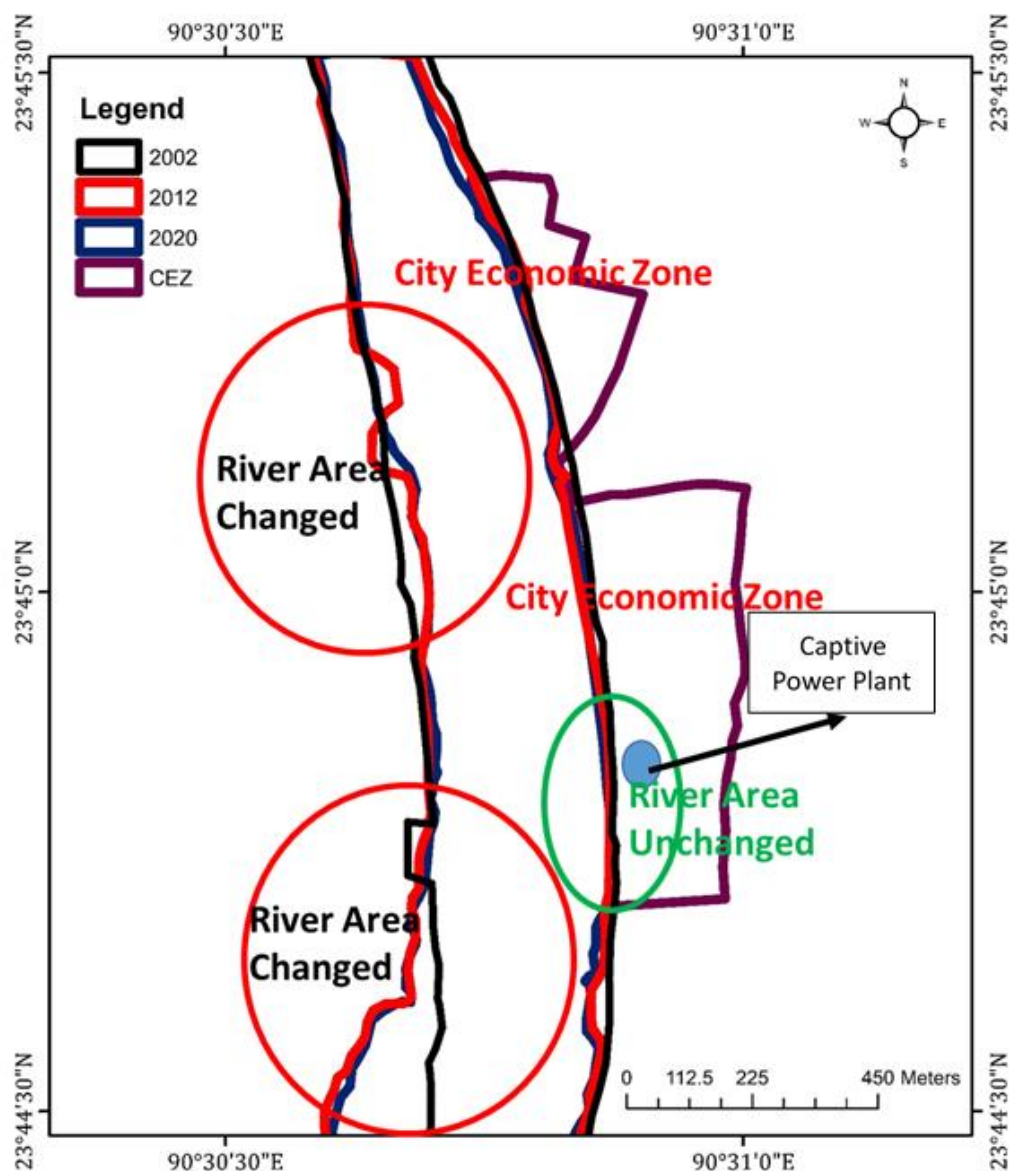


Figure 4-20: River Morphological study beside **City Edible Oil Captive Power Plant Limited**.

5 Description of The Social Conditions

5.1 Background

The socio-economic baseline survey was carried out within 1 kilometer of the plant location which has been considered as the impact zone for the project. A total number of 100 HHs were surveyed. Additionally, the socio-economic impacts of the project will not extend over 1 kilometer radius. Both primary and secondary sources data are utilized for understanding socio economic condition at the project area. Narayanganj was a sub division of former Dhaka district. It was upgraded to a district on 15th February, 1984. Narayanganj, the oldest and the most prominent river port of Bangladesh, grew into a prominent place of trade and commerce in the long past for which it was previously known as a Ganj. Rupganj thana was turned into an upazila in 1983. Nothing is definitely known about the origin of the upazila name. It is said that there lived an influential Zaminder named Rup Babu and the upazila name might have derived as Rupganj after the name of that Zamindar.

Area and Location: The upazila occupies an area of 176.48 sq. km. It is located between 23°37' and 23°43' north latitudes and between 90°28' and 90°37' east longitudes. The Thana is bounded on the north by Kaliganj upazila of Gazipur zila, on the east by Palash and Narsingdi Sadar upazilas of Narsingdi zila and Araihasar upazila of Naranganj zila, on the south by Sonargaon upazila and on the west by Gazipur Sadar upazila of Gazipur zila and Uttara, Gulshan and Demra upazila of Dhaka zila.

5.2 Economic Situation

The district is pioneer in merchandising and manufacturing of jute, yarn and dying items. Cottage industry like weaving abounds in this district. International trading, mport and export business, garments industries, knitwear garments, shipyard brickfield etc, create employment opportunities to the people facilitating additional income to the household population. The rural economy of Narayanganj District is agricultural. Various fruits like banana, guava are grown and fish of different varieties abound in this district. Varieties of fishes are caught from rivers, channels, creeks and from paddy fields during rainy season. The major income generating activities of the people in this district is business and working in the mill and factories.

The status of non-farm activities in the district is increasing. The following Table 5.1 shows the number of establishments and their distribution by major industries and the persons engaged by sex and activity.

Table 5-1: Physical and cultural resources and the persons engaged by activity

Activity	Establishments			Person Engaged		
	Total	Urban	Rural	Total	Male	Female
Manufacturing	5	4	1	213	206	7
Electricity, gas and water supply	12805	7452	5353	208074	172734	35340
Construction	30	24	6	477	464	13
Wholesale and retail trade	37	37	0	1641	1451	190
Hotels & Restaurants	46120	33010	13110	104872	102144	2728
Transport, storage and communication	4808	3333	1475	13543	12974	569
Bank, insurance and financial institution	1389	850	539	5780	5177	603
Real estate and renting	281	255	26	3743	2729	1014
Public administration and defense	226	160	66	3373	3086	287
Education	1635	645	990	8818	6813	2005
Health and social work	3790	3666	124	80239	6936	1103
Community, social and personal services	7569	4671	2898	19529	17572	1957
Narayanganj district	79557	54776	24781	381012	335136	45876

Source: Census of non-farm economic activities 2011-2013

To assess the baseline socio-economic condition in the project area relevant stakeholders and key informants were met. As a source of secondary data, Bangladesh Bureau of Statistics (BBS), Banglapedia, concerned books and periodicals were also consulted. The socio economic information has been taken within the area of one Kilometer radius from the project site.

5.3 Household Socio-Economic Study

5.3.1 Socio economic study

In order to assess the baseline conditions of the population living within the air-shed of 1 kilometer from the Project site, a socio-economic questionnaire survey of 100 families was carried out. The 100 families represent a sample of the total households which were covered by the baseline survey carried out in January 2020.

Study Methodology

The methodology for the social baseline study included different methods and tools, as follows:

- Collection of Secondary Data through literature survey;
- Sample-based household survey of 100 HHs;
- Focus Group Discussions (FGD) with day laborers, women groups and the land owners and
- Consultations with project affected persons, representatives of the local elite, local government, local administration and chairman of the local union parishad (the local government administration and members of the Union parishad).

Secondary data on demographic and socioeconomic issues of the study area have been collected from various sources including the population census of Bangladesh Bureau of Statistics (BBS) and from Upazila level offices and Ward Council.



Figure 5-1: Field Enumerator at the Respondent Premises

Coverage of the survey

For socio-economic baseline study the household surveys were carried within 1km in radius from the plant in Rupshi Bazar area. The complete lists of all households located in in the above mentioned areas have been prepared to generate sampling frame of the study population. Each sample household has been interviewed by a Field Investigator and data/ information has been gathered from the sample households using a questionnaire.

Introduction

The proposed plant will be constructed within City Economic Zone. So there is no need for land acquisition. Additionally, there is no settlement in this area, and the area is not used for any income generation activities.

Therefore, no population will be displaced and no resettlement will be required; and no loss of income is associated with the proposed project.

5.4 Socio-Demographic Characteristic of the Project Area

5.4.1 Household size and Sex-ratio

According to the household survey, males and females constitute 56.2% and 43.8% respectively of the population in the study area. The average sex-ratio in the project area is 128.2, which indicates prevalence of male population in the study area (Table, 5-2). The national sex-ratio was found to be 98.21 according to the population census of 2011.

Table 5-2: Sex Distribution of Household Members by Study Area

Study Area	Percentage		
	Male	Female	Total
All	56.2	43.8	100.0

According to the household survey, the average household size is 4.1 in all area (i.e. the average number of persons per household). Overall, the average household size in the Project area is lower than the national average household size which is 4.5 persons (BBS, 2011). The following Table shows the average family size of the project area

Table 5-3: Average Family Size and Sex Ratio of Household Members by Study Area

Study Area	Average Family Size(number)	Sex Ratio
All	4.1	128.2

5.4.2 Age Distribution of the Population and Marital Status

Age distribution of the population in study area obtained from survey data shows that 6.1% of the population is children (0-4 years), 19.9% are adolescents in the 5-14 years old group, 32.0% are 15-30 years of age, 26.4% are of age 31-45, 12.3% are of age 46-60 and the remaining 3.3% are above 60 years (Table-5-4).

Table 5-4: Age Distribution of Household Members

Age Group (Year)	Percentage
Up to 4	6.1
5-14	19.9
15-30	32.0
31-45	26.4
46-60	12.3
Above 60	3.3
Total	100.0

Table 1-19 presents marital status of the population in the study area. It is revealed from the table that, 56.6% of the population in the study area is married. The percentage of unmarried people in study area is 42.5. However, 0.7% and 0.2% of the population in the study area are widow and divorced respectively.

Table 5-5: Marital Status of Household Members of Study Area

Marital Status	Percentage
Married	56.6
Unmarried	42.5
Divorced	0.2
Widow	0.7
Total	100.0

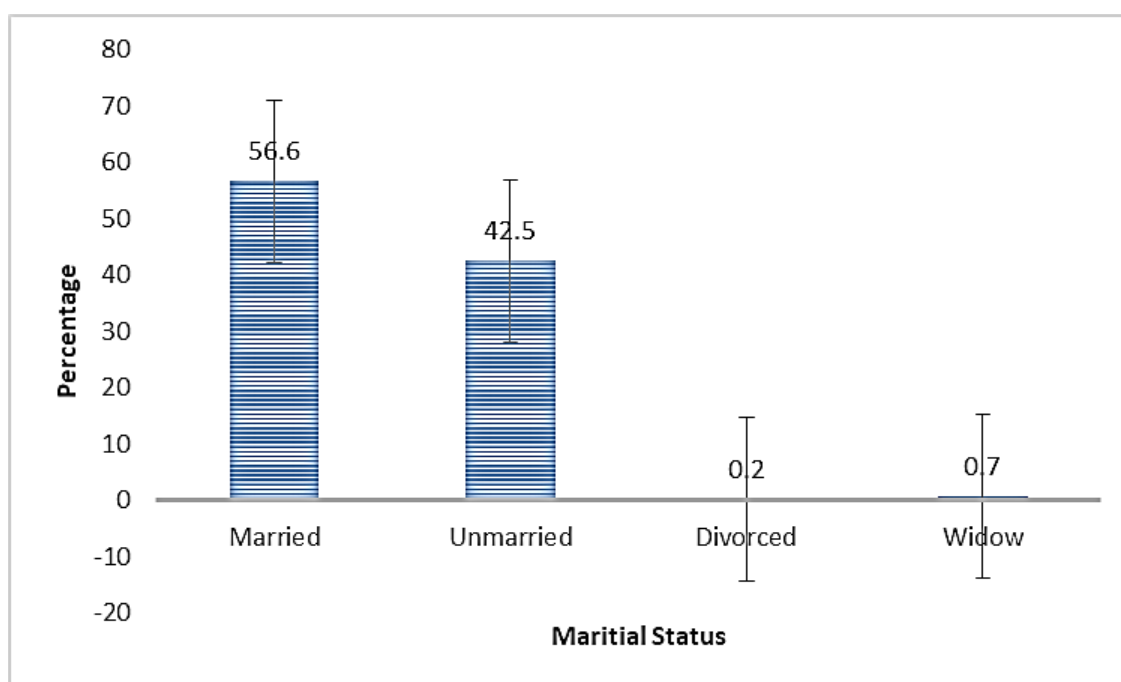


Figure 5-2: Marital Status of Household Member

5.5 Educational Status

According to the survey, in the study area, 0.3% of the population is illiterate and 5.4% of the population can sign their name, although they can neither read nor write. The population having primary level education (up to 5 years of schooling) and secondary level education (up to 10 years of schooling) are 34.9% and 32.3% respectively. Based on the data collected from the socio-economic survey, 14.6% of the population has a Secondary School Certificate (S.S.C) and equivalent. It has been found that 8.2% of population has Higher Secondary Certificate (H.S.C) and equivalent and 4.3% of the population has Bachelors/ equivalent degree and above (Table-5.6). The national literacy rate is estimated at 57.91%, according to BBS 2011.

Table 5-6: Educational Status of Household Members of Study Area

Educational Status	Percentage
Illiterate	0.3
Can sign only	5.4
Primary	34.9
Secondary	32.3
S.S.C and equivalent	14.6
H.S.C and equivalent	8.2
Degree and above	4.3
Total	100.0

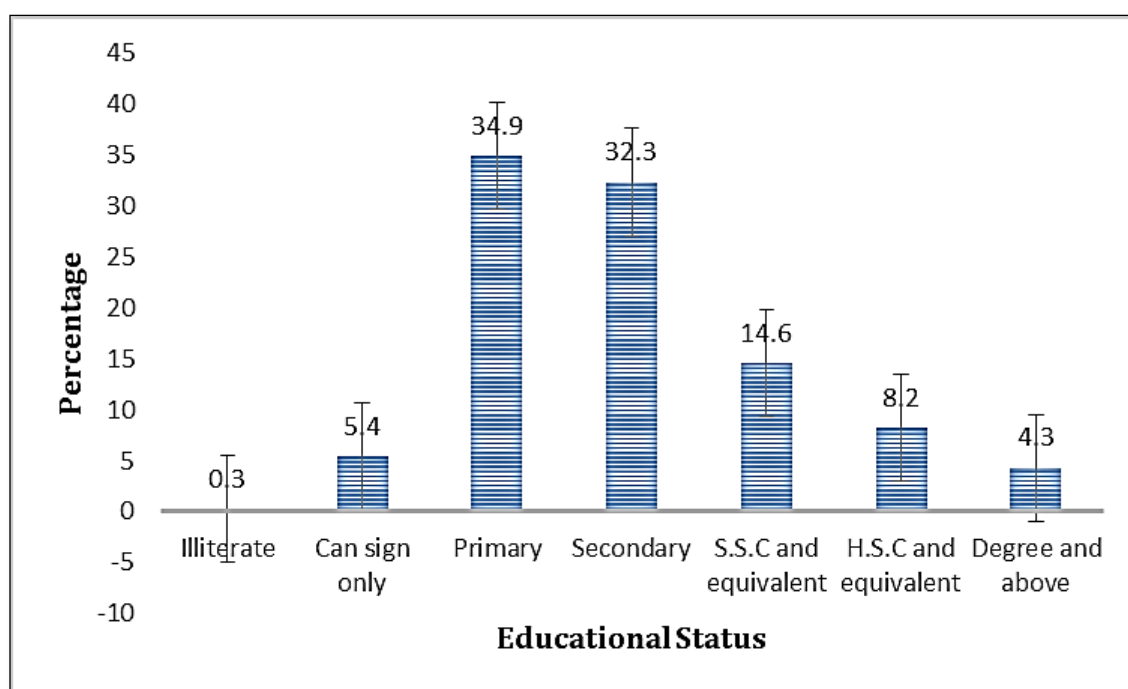


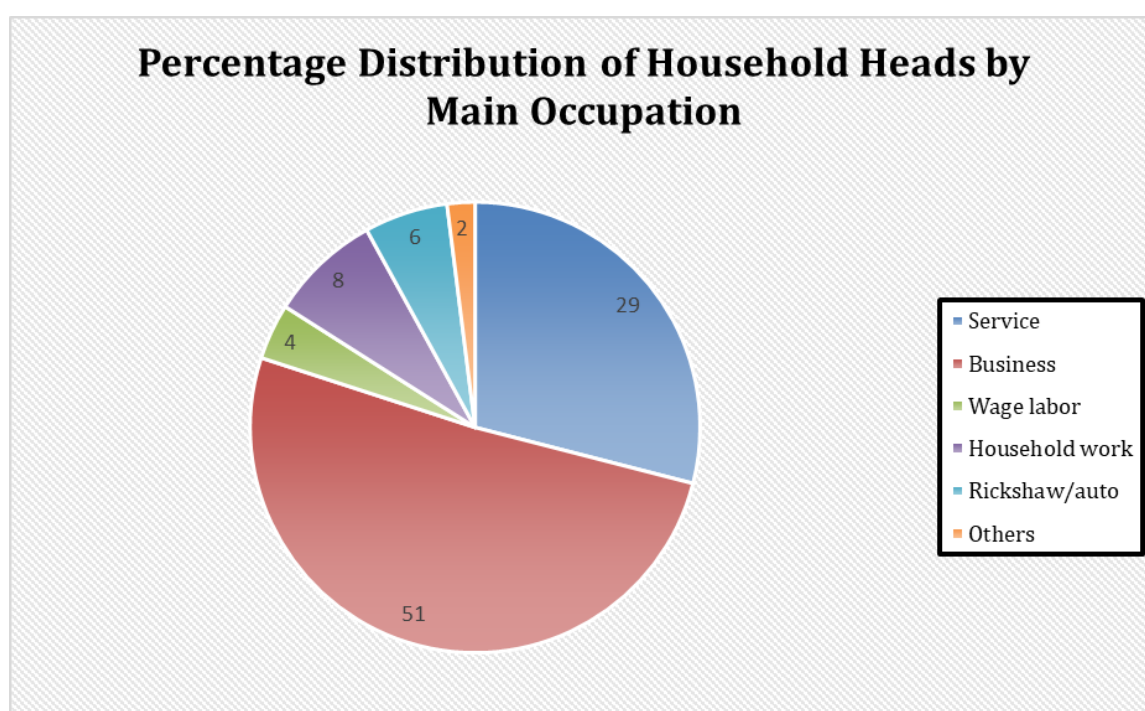
Figure 5-3: Educational Status of Household Members of Study Area

5.6 Occupation and Employment

The household heads in the surveyed are engaged in different types of primary occupation such as service and business etc. The survey reveals that, the highest percentage (51.0%) of the workforce is engaged in Business followed by different types of services (29.0%); only 4.0% household heads are wage laborer and 8.0% of the household heads is engaged in household work (Table-5-7).

Table 5-7: Percentage Distribution of Household Heads by Main Occupation

Main Occupation	Study Area
Service	29
Business	51
Wage labor	4
Household work	8
Rickshaw/auto	6
Others	2
Total	100



However, the survey reveals that 33.3% of the household heads are engaged in business as secondary occupation whereas 66.7% of the household heads are engaged in wage labor in the study area (Table-5-8).

Table 5-8: Percentage Distribution of Household Heads by Secondary Occupation

Secondary Occupation	Study Area
Wage labor	2(66.7)
Business	1(33.3)
Total	3 (100.0)

Note: Figures within parentheses represent percentages

5.7 Religion status of the study area

According to the survey, 100% of the household heads in the study area are Muslim by Religion.

Table 5-9: Percentage Distribution of Household Heads by Religion

Religion	Study Area
Muslim	100(100.0)
Total	100(100.0)

5.8 Land Use pattern and Household Land Ownership:

According to the household survey, about 3.0% of household land is allocated for the agricultural lands. Other types of household land use include: 100% for homestead and 2.0% for pond/ditches respectively (Table-5-10).

Table 5-10: Percentage Distribution of Households Surveyed by Different Uses Pattern of Land

Pattern	Study Area
Homestead	100.0
Agricultural land	3.0
Pond/Ditch	2.0

5.9 Household Income, Expenditure and Distribution

According to the survey, average annual income per household is Taka 160,140 in the study area whereas the average annual expenditure per household is Taka 84,040 in the study area.

Table 5-11: Average Annual Income and Expenditure per Household by Study Area

Study Area	Average Annual Income Per Household(Tk.)	Average Annual Expenditure Per Household(Tk.)
All	160,140	84,040

Average annual income per household at current price was estimated at taka 137,748 at the national level, according to BBS 2011. However, according to BBS 2011, at the national level, average annual expenditure per household was estimated at taka 134,400 at current price.

The distribution of household income as obtained from the survey reflects that about 5.0% of households in the study area have annual income of Taka 250,000 and above. 12.0 % of households belong to the annual income bracket ranging from Taka 200,000-250,000. According to the survey, 34.0% households belong to the average income ranging from Taka 150,000 to Taka 200,000 and 33.0% households belong to the average income ranging from Taka 100,000 to Taka 150,000. The survey reveals that, 16.0% of the households in the study area have annual income of Taka 100,000 and below.

The survey reveals that annual expenditure is up to Taka 100,000 for about 74.0% of the households in the study area. 26.0% of the households belong to the average annual expenditure ranging from Taka 100,000-150,000.

5.10 Sources of Household Income

According to the survey, business is one of the major sources of livelihood accounting for 45.2% of household income in the study area, succeeded by service that contributes 29.0% to household income. The survey also reveals that, 8.1% of the households' income source is house rent.

Table 5-12: Percentage Distribution of Households by Source of Income

Source	All
Service	29.0
Business	45.2
Daily labor	4.8
Foreign remittance	2.4
Rickshaw/auto	4.8
House rent	8.1
Others	5.7
Total	100.0

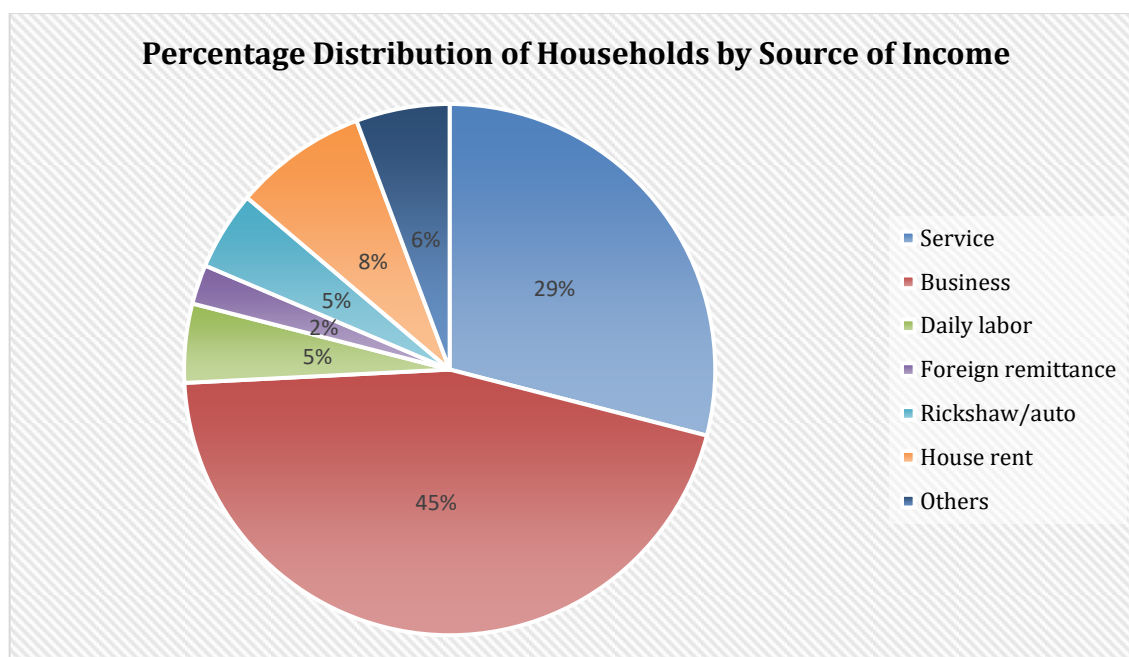


Figure 5-4: Percentage Distribution of Households by Source of Income

5.11 Transportation and Communication

To reach in the project area, there are better communication facilities with a network of metalled road. A number of roads of different categories namely national highway, Upazila, Union and Rural roads passes through the study area. Communication facilities includes Pucca road 85 km, mud road 200 km. The following table describes the communication facilities of the projected area.

Table 5-13: Transportation and Communication system of Study area

SN	Name	Number
1.	Length of metalled(Km)	147.32
2.	Semi metalled road(km)	41.99
3.	Bridge (km)	3
4.	Baily bridge (km)	3
5.	Culvert	219
6.	Bus stand	12
7.	registered rickshaw	11314

5.12 Industry

There are industrial activities in or around the project site. The industries that are existing around the project area mainly, garments industry, knitting, dying, bio-polythene

industry etc. No local industries will be affected by the project activities. Noted manufactories Garments factory, cement factory, spinning mill, steel mill, printing mill, rolling mill, paper mill, oil mill, textile mill. Cottage industries includes goldsmith, blacksmith, weaving, wood work, bamboo work, cane work. Main exports Industrial products, sari, cotton fabrics, and vegetables. According to the census of BBS 2011 the number of selected industry are given below.

Table 5-14: Number of selected industry in study area

SN	Industry name	Number
1.	Textile mill	32
2.	Garments factor	82
3.	Rice mill	56
4.	Steel and engineering	24
5.	Aluminum	1
6.	Jute mill	1
7.	Sugar mill	2

5.13 Cultural and Social Resources:

No major archaeological excavations have been found within a radius of 10 km from the project. But, Rupganj Upazila is bounded by kaliganj (gazipur) and palash upazilas on the north, sonargaon upazila on the south, araihazar and narsingdi sadar upazilas on the east, demra, khilgaon, badda and khilkhet thanas on the west. Archaeological heritage and relics are found Bajra Mosque, residence of Mura Para Zamindar, Mura Para Shahi Mosque, At-ani Mosque and Tara Mosque at Gandharbapur, Brahmangaon Jami Mosque, Golakandail Kalim Shah Jami Mosque.

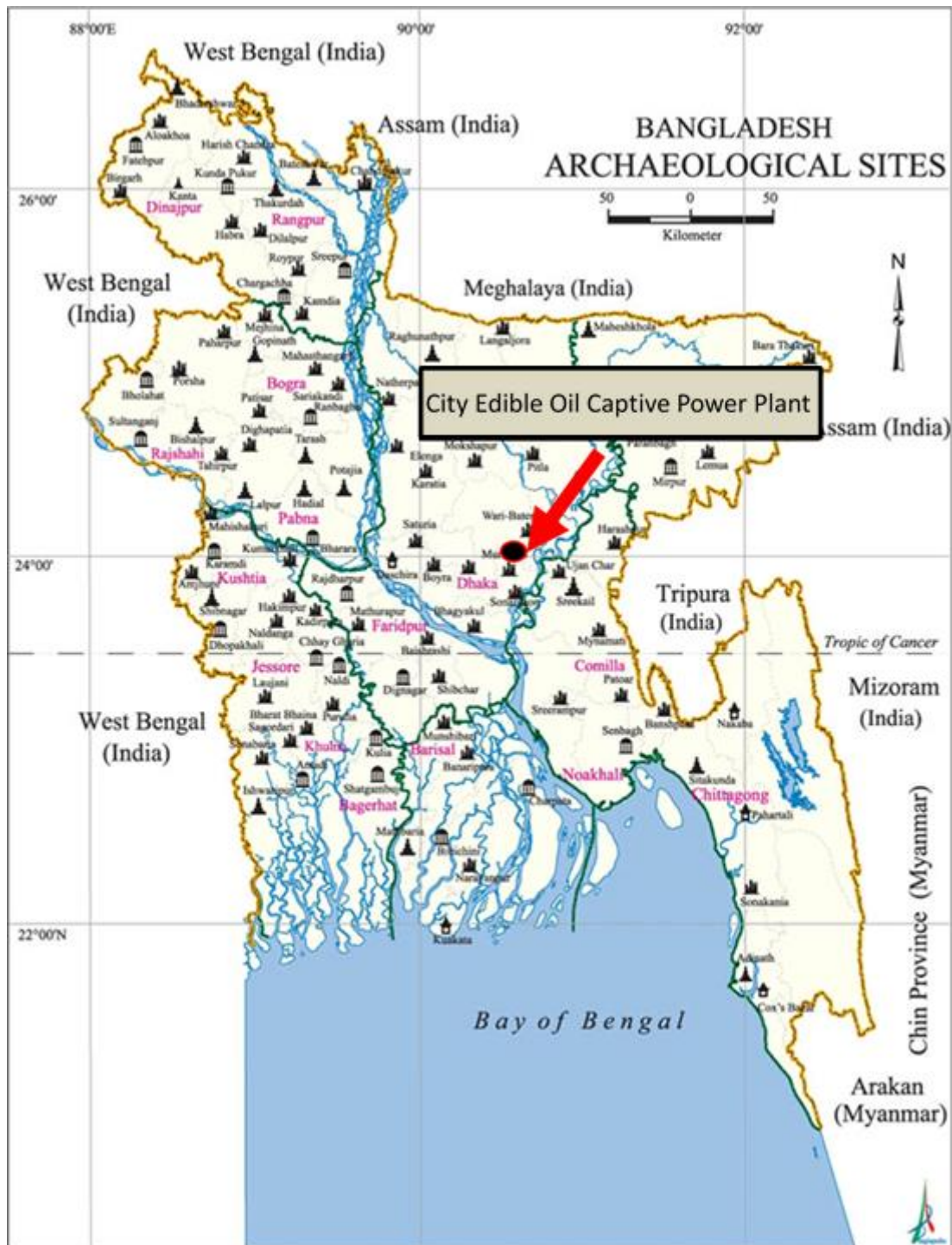


Figure 5-5: Major Archeological Site of Bangladesh and Project Location

6 Public Consultation and Disclosure

6.1 Introduction

Community participation always plays a key role for sustainable development. According to the guidelines of the DOE and the development partners, people's participation in planning and implementation phases of category A & B Projects (usually red category) is essential to take necessary actions for minimizing any undue socio-cultural, political or any other conflicts and to address environmental issues. People have the right to know about what is going to happen in their surroundings. They must be informed about the positive and negative impacts of the proposed Project. Therefore, a series of public consultation meetings (PCM) and public disclosure (PD) were undertaken with community stakeholders in accordance with the World Bank's Environmental Guidelines.

6.2 Approach and Objectives of PCM and PD for ESIA

6.2.1 Approach of PCM and PD for ESIA

PCM and PD offer an opportunity for people to participate in the decision making process for design, development, and implementation of the Project. It provides a platform for project-affected persons and different stakeholders to express their views on possible impacts of the proposed intervention on environmental and social parameters.

PCM and PD for ESIA are planned at two different stages (ESIA scoping stage and draft ESIA report stage) in order to collect opinions and feedback of the public and to disseminate information on the Project and EIA Study.

EIA Scoping Stage

The first stage of the PCM and PD for ESIA is conducted at the time of environmental scoping in the initial stage of the ESIA study. Information on the Project and scope of the ESIA study is disseminated to the public and then comments and opinions are collected to incorporate into the report.

Draft EIA Report Stage

The second stage of the PCM and PD for ESIA is conducted at the time of preparations of draft ESIA report. Information about findings of draft environmental and social impact assessment study and proposed mitigation measures are disseminated to the general public that are directly or indirectly affected by the Project. In addition, their feedback and opinions are obtained which are reflected in the ESIA report together with

their comments and request on the environmental and social mitigation measures, environmental management plan (EMP) and environmental monitoring plan (EMoP).

6.2.2 Objectives of PCM and PD for EIA

The primary objective of the PCM and PD is to incorporate the opinion and suggestions of the public and all other stakeholders at the Project planning stage to ensure wider acceptability of the Project. The key objectives are as follows:

- 1) To provide information on the economic, environmental, and social benefits as well as potential negative impacts from the Project;
- 2) To ensure that the potential project affected persons (PAPs), stakeholders, and local communities are engaged in a meaningful dialogue and are well informed prior to the decision of the Project Proponent as to the nature and extent of social and environmental impacts attributable to the proposed Project with respect to planning;
- 3) To ensure that the concerns of, and issues raised by the PAPs, stakeholders, and local communities are incorporated and adequately addressed in the EIA study;
- 4) To engage in a participative exercise with PAPs, stakeholders, and local communities and obtain expertise and local, traditional wisdom and knowledge from them in order to plan the mitigation measures; and
- 5) To facilitate periodic opportunities to the principal stakeholders to offer their inputs on all key components of the Project.

6.2.3 Stakeholder Engagement Plan

In order to ensure effective engagement and open, frequent and honest dialogue with local communities and other key stakeholders, a stakeholder engagement plan is designed throughout the life of the Project. This plan is to be developed and implemented in order to identify stakeholder and their issues of concern, establishes the methods for consultation, and provides a specific action plan for stakeholder engagement throughout the life of the Project.

Table 6-1: Stakeholder Engagement Plan

Key Stakeholders		
Project Proponent	:	City Edible Oil Captive Power Plant Ltd.
Related organizations/ Local government	:	Union Parishad (UP member-male and female)
Local people	:	Land owners, Businessmen, Fishermen, Day Labor, Teacher, Religious people, etc.

Private business	:	Private companies/ factories around the zone
Non-Governmental Organizations	:	Community Based Organizations (CBOs)
Engagement methods		
EIA phase	:	- Organizing consultation meetings inviting key stakeholders above at draft scoping report and draft EIA report
Pre-construction/ Construction phase/ Regular operation Phase	:	– Regular communication with local community through personal contact; – Meeting with the representative of village on the quarterly basis; – Participatory meeting with villagers; – Interview survey with villagers;
Information disclosure		
EIA phase: Preconstruction/ Construction phase/ Regular operation Phase	:	– Disclosures of draft scoping report and draft ESIA report.
Grievance mechanism process and complaints register		
All phase	:	– Receiving complaints and opinions from the public on regular basis through the engagement method; – Meeting with the representative of village – Participatory meeting with villagers

6.3 Public Consultation Meetings (PCMs)

Participatory Rapid Assessment (PRA) and Focused Group Discussions (FGDs) were held in major settlement areas of the Project site to inform people about the objectives of the Project. In each of the consultation, participants were encouraged to share their observations, suggestions, and experiences on various environmental and safety issues and suitable mitigation and enhancement measures. Issues discussed are:

1. Awareness and extent of the Project and development components;
2. Benefits of the Project for the economic and social advancement of the community;
3. Labor availability in the Project area or requirement of outside labor involvement;
4. Local disturbances due to dust, noise generation during construction activities;
5. Necessity of cutting trees and the degree of clearing vegetation at Project sites;

6. Water logging and drainage problem, if any;
7. Discharge of polluted water into the River;
8. River bank protection;
9. Earth filling to develop the zone.

These meetings were aimed to:

1. ensure that the public was provided with opportunities to participate in the decision making process and to influence decisions that would affect them;
2. identify the widest range of potential issues about the Project as early as possible and in some cases, have those resolved;
3. ensure that government departments were notified and consulted early in the process; and
4. Ensure a broad range of perspectives were considered in any decision.

Positive Impacts of the Project by Local People:

1. The proposed project will create employment opportunity for the adjacent local community during construction and operation phases;
2. Existing road network and transportation facility will be improved due to establishment of **City Edible Oil Captive Power Plant Ltd.**;
3. Land value around the Project will be increased;
4. Education, health, bazaar, telecom, hotel & restaurant facilities will be available and established;
5. New business will be introduced;

Negative Impact of the Project by the Local People:

1. Pollution of river water;
2. Increase traffic congestion;
3. Pollution of air environment during construction phase.

The following recommendations have been given by the participants during consultation:

1. As positive externalities, proposed **City Edible Oil Captive Power Plant Ltd.** should improve and create livelihood to the local people;
2. For less disturbance to local settings, **City Edible Oil Captive Power Plant Ltd.** should engage qualified contractor to ensure quality of works as well as timely completion of work;
3. Local people should be employed by the contractor during construction work;
4. Adequate safety measures should be taken during construction work;
5. Concerns were also raised on possible traffic and population pressure caused by

external employed personnel;

6. Water treatment system should be installed to prevent water pollution.
7. Regarding land filling, they said that very recently by taking different scheme at 18 points the Ministry of Shipping, Dhaka, Bangladesh has taken an initiative to restore the navigability of rivers. By doing this, the navigability of the river of Meghna Branch will return, they added. They had already submitted the proposal to the relevant authority. Moreover, the authority of the **City Edible Oil Captive Power Plant Ltd.** can also use the sand for filling the zone, they said.
8. Finally, local people have appreciated the Project and employment generation; and have promised that they will cooperate with the executing agency during Project implementation.

6.4 Public Disclosure Meetings (PDMs)

For the implementation of PD at the draft ESIA stage, the additional arrangement was made to implement at the draft ESIA stage taking into account the opinion received at the scoping stage as follows:

1. Preparation and disclosure of the main part in local language in addition to the documents which are officially required in accordance with EIA procedure;
2. Arrangement of PD before the day of holding PCM;
3. Arrangement for changing PD period to 1 month from 2 weeks;
4. Distribution of the reports to more places.

Public Opinion

Project City Edible Oil Captive Power Plant Limited.

Place: Rupshi, Narayanganj

Suggestions with regard to Implementation of the Project

SN	Date	Name of the Stakeholders and designation	Suggestion	Impact +/-/0
1	02/11/2020	Mr. Alhaj Abdur Matin, Farmer, Gazaria	- Water and Sound pollution should be restricted. - Meeting with details lay out Plan - t with the concerned engineers	+
2	02/11/2020	Md. Sirajul Islam, Manager Local Brickfield.	- Precautions are to be taken against environmental pollution. - No objection against proposed factory.	+
3	02/11/2020	Jafrin Akther Housewife, Local area.	Traffic congestion occur.	-
4	02/11/2020	MD, Rezaul Maksud Jahidi, School Teacher,	- Positive impact on overall socio-economic condition. - No impact on environment. - Precautionary measure should be taken. - Ensure social welfare from the plant - Firefighting must ensure	+
5	02/11/2020	Md. Shah Alam, R.E office, REB.	No comment	0
6	02/11/2020	Mr. Bayjidul Islam, Retired teacher,	No effect	0
7	02/11/2020	Md. Momin Mia, Van Driver,	Positive impact on employment.	+
8	02/11/2020	Mr. Abu Baker Siddique, Officer, Kamil Madrasa.	Employment facility will be increased.	+
9	02/11/2020	Md. Johirul Islam, Retired School Primary School Headmaster,	Positive impact on overall socio-economic condition	+
10	02/11/2020	Md. Nurul Islam, Owner near factory,	Request for controlling to the minimum limit of sound pollution and vibration	+

11	02/11/2020	Md. Ruhul Amin Local businessman,	Negative impact, water, sound pollution and vibration.	-
12	02/11/2020	Moulana Ahmed Karim Local mosque Imam	No comments	
13	02/11/2020	Md Solaiman, Student,	Positive impact on overall socio-economic condition	+

Note: Impact+/-/O, Positive impact (+), Negative impact (-), Zero impact (0)



Figure 6-1: Some photography during public consultation

7 Key Impacts identification

7.1 General Consideration

In the case of most development projects, potential negative impacts are far more numerous than beneficial impacts. A number of project activities during operation of facilities of **City Edible Oil Captive Power Plant Ltd.**, have been identified in chapter 3 of this report. This chapter identifies potential positive and negative impacts that may be generated from those project activities, which is the first step of forming this EMP report.

Though regional and national economic benefits associated with the implementation of any development project are considered to fall outside the scope of an EMP, they are also considered here. It is fully recognized that the long-term benefits will ultimately contribute to an improvement in the quality of life in the project area.

7.2 Scoping of Impacts

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

7.3 Checklist for identification of probable Environmental Impact

Following table represents the checklists developed for of **PROJECT**; in this checklist major activities which create the **Significant Environmental Impacts (SEIs)** are shown. The terms none, minor, moderate major, short termed and long termed are used in checklists to classify the magnitude and duration of probable SEI.

Table 7-1: Checklist for identification of probable Environmental Impact of **PROJECT** during Operation Phase

Action Affecting Environmental Resources and Values	SEIs without Mitigation Measures				Impact Type				Duration	
	None	Minor	Moderate	Major	Adverse	Beneficial	Reversible	Irreversible	Short Term	Long Term
Noise Generated from Generator			✓		✓		✓			✓
Untreated sanitary wastewater discharge can pollute the			✓		✓			✓		✓
Air pollution from generator		✓			✓			✓	✓	
Solid Wastes from production, daily activities as well as from routine maintenance work			✓		✓			✓		✓
Accidental, Fire and Natural Hazard				✓	✓			✓		✓
Employment- Recruitment of new staffs and operators				✓		✓				✓

7.4 A Checklist for Preliminary Climate Risk Screening

Table 7-2: Checklist for Preliminary Climate Risk Screening

Climate Screening Questions		Score	Remarks
Location and Design of project	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc.)?	1	The proposed power project is located beside the Shitalakhya River with about 300m distance. The plant is 2 m above the flood level of 1988. The design Dead Load= 1.5 kN/m ² and Live Load= 6.0 kN/m ² . The maximum wind speed recorded at more than 30.7 km / h in May, 2013, which is expected to be considered during design. This information might give an indication about the climate change impact resiliency about the project.
Temperature	• Is annual and monthly temperature (i.e. seasonality) projected to change?	0	
	• Are the frequency, intensity and duration of extreme temperatures projected to change?	1	
	• Is the average annual basin temperature projected to change?	0	
Extreme precipitation and flooding	• Are the frequency, intensity and duration of extreme precipitation projected to change?	1	
	• Is runoff projected to change in the basin?	0	
Droughts	• Is the frequency, intensity and duration of droughts projected to change?	0	
Strong Winds	Is the project location exposed to winds from tropical cyclones, such as hurricanes or typhoons?	1	
Sea level rise	• Is local sea level projected to change by the end of the project lifetime?	0	
Storm surge	• Does the project location include areas that have experienced storm surge in the past?	1	
Geophysical hazards (earthquakes,	• Have there been historical earthquakes?	1	
	• Is the project located below a dam or levee that could be damaged by flood?	0	
Performance of project outputs	• Would weather/climate conditions and related extreme events likely affect the performance of project output(s) (throughout their design life time)?	0	

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

7.5 Cumulative Impact Assessment

The mentioned factories (Bangladesh Edible Oil, Navana Health Care and Navana Pharmaceutical Ltd, Gazi Auto Tires Factory, Rony Knit Composite, Mir Cement etc.) besides the proposed project are not heavily pollutant industry. Also they are not located within 500m radius of the proposed project. Therefore, there are no anticipated impacts due to the mentioned factories. So we considered that there is no need to conduct any cumulative impact assessment.

7.6 Environmental Impact Value (EIV)

The environmental parameters are grouped into 3 categories which are: Physical resources, Ecological resources, and Human use values. Relative importance of the parameters is selected based on 'LGED guideline, 1992'. The environmental impact was assessed by Environmental Impact Values (EIVs) which may be defined mathematically as equation.

$$E(IV) = \sum^n V_i W_i$$

Table 7-3: Environment Impact value of City Edible Oil Captive Power Plant

Environmental Parameters			RIV*	DoI**	Individual EIV***
I	Ecological Parameters	Plantation	5	+2	10
		Eco-System destruction	2	-1	-2
Total Ecological Parameter Value					= +8
II	Physical Resource	Surface water	2	-1	-2
		Air & Sound pollution	4	-1	-4
		Soil quality	1	-1	-1

		Climate	2	-1	-2
Total Physical resource Parameter Value					= -9
III	Human Interest Parameters	Employment Opportunity	3	+3	9
		Economic Development	4	+4	16
		Resettlement	1	0	0
		Loss of Agricultural Land	2	0	0
Total Human Interest Parameter Value					= +25
Total Environmental Impact Value:					$E(IV) = \sum nVi Wi = (25+8-9) = +24$

Source: Based on expert opinion and filed survey, 2020

Note: RIV* is relative impact value, DoI** is degree of impact and EIV*** is environmental impact value

The adverse changes have been given values -1, -2, -3, -4 and -5 to represent very low, low, moderate, high and severe negative impacts respectively. Similarly +1, +2, +3, +4 and +5 represent very low, low, moderate, high and very high positive impacts respectively. A value from the scale representing effect of the project on each parameter was taken to compute the EIV of City Edible Oil Captive Power Plant Ltd.

The result of EIV shows that, it has positive value which means project has positive impact among the residents of the village and development of the country. Physical resource has negative value that can be mitigate through taking some appropriate mitigation measures.

7.7 Risk Assessment and Mitigation Measure

Risk is a term that can be defined as the possibility of suffering harm from hazard and hazard is a source of risk that refers to actions that can cause harm. No industrial sector today is free of risk belonging to its internal and external environment. It is obligatory at every step of industrial operations to make risk assessment. Technical assessment of nature and magnitude of risk as called risk assessment.

A risk assessment is a careful examination of consequences resulting from the undesired events that could cause harm to people or property, so that sufficient precautions can be taken. Workers and others have a right to be protected from harm caused by a failure to take reasonable control measures.

7.7.1 The Risk Assessment Process

Risk assessment involves the identification of the hazards present and an estimate of the extent of the risks involved, taking into account whatever precautions are inherent to the process/activity.

There is more than one approach to risk assessment, for example:

- Look at each activity (not forgetting non-routine activities, e.g., maintenance, breakdowns etc.). That could cause harm or adverse effects;
- Look at hazards and risks in groups e.g. machinery, transport, materials, electrical etc;
- Look at each section e.g. stores, workshop, laboratory, office, etc.

The approach should match the circumstances. The actions required for an assessment to be suitable and sufficient and compliant with other legal requirements.

7.7.2 Risk Assessment Matrix

The risk assessment matrix process is one of the tools and techniques for controlling risks in the project risk management phase. It falls under the qualitative and quantitative risk analyses process, according to the Project Management Institute's (PMI) Project Management Body of Knowledge (PMBOK).

$$\text{Risk (R)} = \text{Severity (S)} \times \text{Probability}$$

Risk Assessment Matrix					
Probability (P)	Severity				
	Low (1)	Minor (2)	Moderate (3)	Significant (4)	Severe (5)
Rare (1)	Very Low (1)	Very Low (2)	Very Low (3)	Low (4)	Low (5)
Unlikely (2)	Very Low (2)	Low (4)	Low (6)	Medium (8)	Medium (10)
Possible (3)	Very Low (3)	Low (6)	Medium (9)	High (12)	High (15)
Likely (4)	Low (4)	Medium (8)	High (12)	Very high (16)	Very high (20)
Frequent (5)	Low (5)	Medium (10)	High (15)	Very high (20)	Extreme (25)

7.7.3 Environmental Risk Assessment

Environmental Risk Assessment is a process for estimating the likelihood or probability of an adverse outcome or event due to pressures or changes in environmental conditions resulting from human activities. ERA is complementary to methods used in State of Environment Reporting (SOE), Environmental Impact Assessment (EIA) and risk management. The following aspects of the environment were considered as part of the risk assessment:

- a. Ground Water
- b. Surface Water
- c. Ecology (Including biodiversity issue relating to air quality and noise)
- d. Social (Including social issues relating to air quality, noise, visual amenity, socio- economic and cultural heritage)

It should be noted that the risk assessment did not include activities undertaken in accordance with existing process, given that these activities are undertaken in accordance with existing approvals and procedures (Subject to their own risk assessment processes) and in accordance with existing environmental management procedures.

Table 5.4 Environmental aspects, Potential impact, Risk assessment and Mitigation Measure with the power plant during preconstruction/Construction phase:

Environmental Aspects	Potential Impact	Identified Risk	Risk Evaluation				Risk Rating		Mitigation Measure
			Severity		Likelihood		Score	Level of Risk	
			Condition	Score	Condition	Score			
Air Quality	Air pollution & Dust emission	Dust will emanate from moving vehicles with construction material such as sands and gravel for structures to be added at site, if the moving vehicles are not covered will lead to dust along the route.	Minor	2	Possible	2	4	Moderate(Yellow)	√ The factory has planted trees in its premises to reduce carbon emission and thus minimize air pollution. √ Provision of spraying water to reduce dust emission on road. √ Masks are provided to workers to avoid inhalation problem of due to dust and chemical spells

Environmental Aspects	Potential Impact	Identified Risk	Risk Evaluation				Risk Rating		Mitigation Measure
			Severity		Likelihood		Score	Level of Risk	
			Condition	Score	Condition	Score			
Water Quality	Water contamination	Machinery and vehicles operating at site will require fossil fuels. Leakage of oil can cause water contamination	Minor	2	Unlikely	1	2	Low (Green)	√ Machine is sorted in a certain place within a container and container need to handover to all supplier or waste buyer for recycling or proper disposal according to local Laws and regulations.
Soil Quality	Soil erosion and sedimentation	- Maintenance work that excavate soil. - Leakage of oil vehicle can cause oil contamination.	Minor	2	Rare	1	2	Low (Green)	√ Contamination of soil is reduced by suitable management of oil & fuel.

Environmental Aspects	Potential Impact	Identified Risk	Risk Evaluation				Risk Rating		Mitigation Measure
			Severity		Likelihood		Score	Level of Risk	
			Condition	Score	Condition	Score			
Noise	Noise pollution	Noise can generate from vehicle movement & especially from the pre-construction & Construction Phase. During construction phase noise is expected from machinery working on site,	Insignificant	1	Unlikely	2	2	Low(green)	- Use of PPE like ear plug/ear muffs in the noisy workplace like generator, boiler etc. - Building noise insulated ensure satisfactory maintenance of relevant equipment. However as the factory already has lot of tress which is very helpful for reducing noise to make buffer zone.

8 Evaluation of Predicated Adverse Impacts and Mitigation

8.1 Impact due to Pre-Construction

8.1.1 Overland Drainage and Impact on surface water

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

Mitigation

- Surface drainage are controlled to divert surface runoff away from the construction area;
- Completed areas are restored/re-vegetated;
- Containment of sanitary waste are adequately disposed of to avoid surface and ground water contamination.
- Proper storage and disposal facility has to be developed for cuttings, drilling fluids and other chemicals and lube oil wastes generated during drilling, testing and commissioning

8.1.2 Change in Landscape

Impact Origin

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

Mitigation Measure

Any built up part of the plant are designed considering key criteria of landscape like coherence, readability, hierarchy and stability. It is understood that the infrastructure is have a modern architectural view with all facilities available, which does not provide any significant visual intrusion.

8.1.3 Loss of and Displacement from Agricultural land and House

Impact Origin

The project has been set up in fallow land, which will result in no loss of agricultural land as well as agricultural product of the country also any house.

Mitigation Measures

For economic development, Bangladesh has no option other than going for commercialization. To do so, some portion of land would have to be converted to commercial/industrial land. But attention should be given so that conversion of such land use should take place in comparatively less fertile area. The present land for proposed plant is not so fertile and hence ultimate loss in economic value due to loss in agricultural products will be overcome by industrial production in near future. Moreover, the land was purchased long before by compensating actual land value, so it is expected that by this time, the displaced land owner must find himself adopted in new income generation activities.

8.1.4 Disruption of Earth Surface**Impact Origin**

Establishment of the project hasn't disrupted the natural surface of earth & thus will not obstruct the natural drainage system of the area.

Mitigation measures

Since, the land development has been done efficiently, so no more mitigation measures need to be adopted.

8.1.5 Inadequacy of Buffer Zone**Impact Origin**

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

Mitigating Measure

A green belt has been developed by planting trees of various species in all possible open spaces within project premises. Trees take carbon-di-oxide and discharge oxygen for their photosynthesis, which helps to clean the air. Some trees also absorb the toxic gases

and particulate. In addition, the wood, fruit and fuel values are considerable. It also maintains the ecological balance and improves scenic beauty.

8.2 Impacts due to Construction

8.2.1 Air pollution

Source of Impacts

The area is predominated by sandy-clay soils. Sometimes sandy soil can pollute the air during heavy wind. It is anticipated that the air would be polluted with dust sand particles for the movement of light and heavy transport vehicles and during piling work. This air pollution may create some breathing problems to the workers. Very few people live near the site except power station staffs.

Mitigation Measures

To reduce air pollution in site, attempt is normally made to complete the construction of infrastructures within the wet season. Due to high rainfall in this period, air and soil remain wet and dust particles cannot spread easily. If construction work is continued during dry period, dust control arrangement by sprinkler shall be placed.

8.2.2 Noise Pollution and vibration affect

Noise and vibration are generated from various construction activities such as piling of foundation, crushing of stones and bricks and installation of machines and equipment, etc. In addition, working conversation of the labor force also enhances the noise pollution. The noise pollution and vibration create disturbance to the workers of the adjacent establishments and surrounding people involved in various activities as well as nearby staff quarter people.

Mitigation Measures

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

8.2.3 Spreading diseases

Source of Impacts

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

Mitigation Measures

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

8.2.4 Accidents

Sources of Impacts

Adequate precautionary measures will be undertaken at the project site to avoid any accident. However, accident is unexpected and it may occur any time during construction work and cause loss of lives and properties.

Mitigation Measures

A high level of precautions shall be undertaken that would reduce the occurrence of accidents remarkably. Adequate first aid facilities and emergency contacts to the adjacent health complexes and other emergency services will help to save the lives from accidents.

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

Source of Impacts

Heavy construction work may disturb the wildlife.

Mitigation/Management Measures

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

8.2.6 Hazardous Materials

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

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

Measures should include

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

8.2.8 Influx of Temporary Laborers

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

8.2.9 Economic benefits to the people of Project area

Review the suitability and capacity of local workers. The project will be encouraged to recruit local labor, goods and services, wherever these are available provided acceptable quality and price. The project will be required to follow a local procurement policy.

The project will develop a Recruitment Policy for approval by **PROJECT**. The Recruitment Policy will include:

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

8.3 Impact at Due to Operation of the Project

Unjustified and unplanned Operation of any project can potentially affect quality of life, air, noise, water, land, flora, fauna and human by increase in water, noise and air pollution, increase in hazardous waste generation, pollution from spillage/surface runoff, disturbance to flora and fauna, by loss of trees resulting from increased access, increase in land values, threatening agriculture, etc. Environmental issues during the operational phase of the **City Edible Oil Captive Power Plant Ltd.**, project has been identified for each of its components:

8.3.1 Impact on Air Quality

The project's operating activities are heavily modified and all the equipment and methods incorporated in this project are less polluting. All engines used in this power plan are gas-based and a heat regeneration system (exhaust gas boiler) is installed at the project site. And the project is using natural gas direct from the gas distribution line in the center of the economic zone, where natural gas contains very little sulfur and nitrogen to produce Sox and NOx. The details of the production process and types of machinery specifications are described in Chapter 3, Section 3.7. in that section it is clearly described that the amount of exhaust gas is ignorable and does not have major impacts that can be counted as air pollution. But there is a small possibility of emitting some exhaust gases that could contain some CO, CO₂, NO_x, PM_{2.5} and a little SO_x. So below are the details of the mitigation measures that are taken at the project site.

Mitigation measure

The following measures will be implemented to minimize impacts to local communities during operation phase of **City Seed Crushing Uni-2 Captive Power Plant**:

- Provision of cover on haul trucks (preferable to cover truck) transporting raw materials, final product beside and inside the factory area.
- Water spraying on exposed areas to suppress dust emission,
- Proper maintenance of equipment's relevant operational work.
- Dust collector will be preferred to establish inside the factory area so that particulate matter (PM₁₀ & PM_{2.5}) will no longer a problem.
- Use covered conveyer for final product handling to reduce emission level.
- Use water sprayer regularly around loading & unloading side so that dust emission will no longer a problem at factory side.
- Clean primary and secondary roads of factory to diminish the reluctance dust problem.

8.3.2 Impact on Climate Due to Power Generation and Distribution

The negative environmental impacts from generating electricity through conventional coal burning at thermal power plants are very well known. This most importantly includes air pollutant emissions such as ozone, sulfur dioxide (SO₂), nitrogen dioxide (NO₂), particulate matter, and other gases, which are the cause of some serious environmental concerns such as acid rain, health effects, and many others. In addition,

the burning of coal results in carbon dioxide emissions; a primary greenhouse gas emitted through human activities, which contributes to global warming. The main human activity that emits CO₂ is the combustion of coal for electricity production and transportation. Concurrently, global climate change has become an issue of concern and so reducing greenhouse gas emissions have also emerged as primary issues to be addressed as the world searches for a sustainable energy future.

The project is using natural gas direct from the gas distribution line in the center of the economic zone, where natural gas contains very little sulfur and nitrogen to produce Sox and NOx. Electricity produced using gas based captive power plant emits no greenhouse gases (GHGs) or other pollutants. This is a huge step towards reducing the human impact of climate change.

8.3.3 Impact on climate due to Green House Gas Emissions

The Kyoto Protocol – United Nations Framework Convention on Climate Change nominates the following GHGs:

- Carbon dioxide (CO₂);
- Methane (CH₄);
- Nitrous Oxide (N₂O);
- Hydrofluorocarbons (HFCs); and
- Perfluorocarbons (PFCs).

Using known emission factors, inventories of GHG emissions can be calculated. Varied gases have different greenhouse warming effects (called warming potentials), and emission factors take the Global Warming Potentials (GWP) of the gases produced during combustion into consideration. Greenhouse gas emissions are often measured in units of carbon dioxide equivalent (CO₂e). Gases are transformed to CO₂e by multiplying their global warming potential by a factor of two (GWP). The following are the GWPs of gases¹:

- GWP for CO₂ = 1
- GWP for CH₄ = 21
- GWP for N₂O = 310

¹ Source: Intergovernmental Panel on Climate Change (IPCC) (1995), Second Assessment Report

² http://www.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/CB_Home/Measuring

When the global warming potentials are applied to the estimated emissions then the resulting estimate is referred in terms of CO₂-equivalent (CO₂e) emissions.

GHG Estimation and Impact

The combustion of natural gas produces GHGs. The amount of GHGs emitted by a power plant is a measure of its contribution to global warming and can be estimated based on fuel consumption. In order to estimate GHG emissions, the IFC recommended Carbon Emission Estimation Tool² has been used as set out below.

Table 8-1: Estimated GHG Emissions from the Plant SN Particular Value Unit

Sl.	Particular	Value	Unit
A*	Net Heat Rate (Natural Gas Engine)	6468	KJ/KWH
B*	Gross Generation Capacity (Engine)	22000	KW
C	Operating Days	350	days
D	Daily Operating Hours	24	Hours/day
E	Total Annual Output(B x C x D)	184600000	KWH
F	Annual Fuel Consumption (E x A)	1.16e ¹²	KJ
		1155.2864	TJ
G*	Annual GHG Emission in Gas Engine	65,273.7	tCO ₂ e/year

It is evident from Table 8-1 that the estimated GHG emissions from the Plant while using natural gas as the primary fuel will exceed the threshold of ADB SPS (100,000 tons of CO₂e per year) and IFC PS3 (25,000 tons of CO₂e per year) that define them as important sources of GHG emissions. Therefore, the Project must report on annual GHG emissions. According to the latest report of GHG emissions submitted by Bangladesh to the United Nations Framework Convention on Climate Change (UNFCCC), the contribution of the electricity generation sector to GHG emissions in the year 2005 was 1,192 x 10⁷ tons of CO₂e and the projection of aggregate GHG emissions using the LEAP modeling program indicates that the annual GHG emissions of this sector in 2020 and 2030 will be 2,752 x 10⁷ tons of CO₂e and 5,9168 x 10⁷ tons of CO₂e, respectively. Taking this into account, the contribution to GHG emissions from the proposed Project in 2022 will be 0.19% of the electricity generation sector in Bangladesh. Taking this fact into account, the impact of GHG emissions will be medium low.

Impact	Impact on climate due to greenhouse gas emissions				
Impact Nature	Direct	Indirect		Induced	
Impact Scale	impact zone will be regional/national				
Frequency	operation phase				
Extent and location	Project Site	Local	Regional	National	Trans boundary

²http://www.ifc.org/wps/wcm/connect/Topics_Ext_Content/IFC_External_Corporate_Site/CB_Home/Measuring+Reporting/

Impact Duration	Short Term	Medium Term	Long-term	Permanent – Mitigated	Permanent – no mitigation	
Impact Intensity/severity	Insignificant	Low	Medium	High	Very High	
Potential for irreplaceable loss of resources	Low		Medium		High	
Magnitude	Insignificant	Low	Medium-low	Medium - high	High	Very High
Probability of Impact	Unlikely	Low	Medium low	High	Definite	
Impact Significance	Very low	Medium-Low	Medium-high	High	Very High	
	Significance of impact is considered as medium low					

Mitigation Measures:

The following mitigation measures will minimize GHG emissions to ALARP ("as low as reasonably practicable") levels:

- Ensure that all equipment and machinery is maintained in accordance with the manufacturer's specifications;
- Design of steam turbine blades of higher efficiency and

Improved efficiency of auxiliary drives.

8.3.4 Impact on Water Environment

Water is a very vital element for the power plant due to excessive heat generation and its cooling purpose. As we discussed before, the project is a gas-fired power plant and an exhaust gas boiler is also installed in the project area. The boiler capacity is 10 tons per hour, which means that on average 240 tons of water vapor is generated every day from the plant and a 500m³ / day capacity DM plant is also installed on site for treat the water that will be used for the boiler. and engine cooling purpose. 250 m³ of water is continuously required to cool the machine and this amount of water is cooled through the cooling tower that existed at the project site and a 10 m³ per day capacity chiller also installed in the project area that It is also used for central air conditioning purposes. Therefore, no liquid effluent is generated, except the rejected water from the DM (Demineralization) plant and an average of 1.5 m³ / h. Water is required as make-up water and this amount of water is required due to the loss of the system from the operating activities of the power plant.

If the total system required any maintenance, then, in the maintenance period, the total water is released into the central drainage line of the Economic Zone and goes to CETP for further treatment.

This total amount is collected from the ground water and an average of 250 m³ of water is required daily. The steam generated is used for the production of other factories. Ground aquifer will be impacted due to continuous extraction of water from underground. So following mitigation measures have taken at the project site to minimize the impacts.

Mitigation Measures

The excessive use of ground water and associated problems make it imperative to adopt a comprehensive ground water management program to minimize the social, economic, and environmental impacts of the deterioration of ground water quality). The negative and harmful consequences of the overdraft of ground water in many parts of developing countries should be taken seriously by those responsible for the management of water resources. A number of measures have been reported which should be taken so as to avoid the adverse effects of ground water exploitation. The most important are: -

1) Prevention from depletion of ground water:

To prevent depletion of ground water sources, safe yields of aquifers have to be determined and should not be exceed by pumping.

2) Tree Plantation

Tree roots increase water saturation into groundwater reducing water runoff. Flooding temporarily increases river bed permeability by moving clay soils downstream, and this increases aquifer recharge.

3) Reduction of subsidence:

In order to decrease and stop subsidence, demand for ground water must be reduced by using alternative sources and in some cases, ground water extraction may need to be stopped and replaced by other water sources.

4) Artificial recharge:

The primary goals of artificial recharge are:

(a) Increase the insufficient natural recharge of aquifers to meet the current and future demands of ground water sources, thus extending the life of these aquifers.

Groundwater can be artificially recharged by redirecting water across the land surface through canals, **infiltration** basins, or ponds; or sprinkler systems.

(b) The artificial recharge of aquifers may prove to be an important method for mitigating the adverse impacts of ground water degradation and depletion.

5) Water conservation:

Saving water is an efficient way of reducing the overuse of ground water resources. It is not only decreases the amount of the water withdrawn, but may also reduce the threat of pollution.

6) Storage and increasing uses of Rain water

Uses of rain water are an efficient way of reducing the overuse of ground water resources.

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

Impacts and Origin

During operation of the **City Edible Oil Captive Power Plant Ltd.** noise will be likely to be generated from the following activities:

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

In order to assess the present sound quality sound quality monitoring was conducted at **City Edible Oil Captive Power Plant Ltd.** in following table, which shows at project sound level does not exceeds the allowable level of 60dBA for mixed area.

Mitigation Measures

In order to resist the noise generated due to plant activity and to uptake the waste water generated to some extent, it is recommended to develop green belt around the periphery of the plant road side area.

City Edible Oil Captive Power Plant Ltd will have responsible for Eco friendly eco system development around the project area by community cooperation.

Green Belt Development at the project site

Green Belt design and development has been attributed a great importance and became an essential element of planning policy. The main objective of the green belt is to provide a buffer / barrier between the sources of pollution and the surrounding areas. The green belt helps to capture the fugitive emissions and attenuate the noise apart from improving the aesthetics quality of the region. Greenbelt will be developed by using appropriate plant species as suggested by Ministry of Forest and Environment and DOE guidelines to mitigate air pollution and to improve biodiversity status of the study area.

Greenbelt Designing

Selection of Plant Species

Facts considered during selection of plant species for greenbelt development are:

- Type of pollutant (mainly air) likely to disperse from project
- Agro-climatic zone and sub-zone of the project area (Meghna Flood Plain)
- Biological–filter Efficiency: Absorption of gases, Dust capturing and Noise control

Recommendation of Green Belt Periphery of the Project Location

S. No	Scientific Name	Common Name	Ecological performance	Type
1	Aegle marmelos	Bel	CN, DC	Evergreen
2	Azadirachta indica	Neem	CN, OGE, DC	Evergreen
3	Butea monosperma	Palas	CN, OGE, DC	Evergreen
4	Ficus bengalensis	Banyan	CN, DC	Evergreen
5	Ficus religiosa	Peepal	CN, OGE, DC	Evergreen
6	Terminalia arjuna	Arjun	CN, OGE, DC	Evergreen

Ecological performance: CN –Control Noise level, AGE – Absorb Gas Emission (Sexena 1991) and (Abbasi & Khan 2000), DC - Dust Controller (CPCB 2007), Environmental Adaptation (DR - Drought resistance, SR - Salinity resistance, FR - Fire Resistance, T- Tolerant to Air Pollution).

Plantation Technique and Care

Plantation Technique

Following basic procedures need to be followed for greening the area.

- Plantation of tree species required approx. 1m³ pit for soil enrichment
- Pit should be filled with imported soil with 3:1:1 the ratio of sand, silt and farm yard manure
- Procure well grown saplings of recommended species from the nearby Forest Department nursery
- Make 1m diameter ring bund around the planted saplings for water retention
- Watering of sapling is species specific, therefore watering need to be done once in 2 or 3 days for a period
- of two years
- Soil work and weeding need to be done once in a two months

Monitoring Protocol

- The plantations need to be managed by regular watering, soil enrichment work, applying manure, weeding and provide proper protection.
- Replacement of sapling (replanting) required whenever mortality occurs in the plantation during the growth stage.
- Plantation requires after care for a period of minimum five years till the saplings attain matured tree stage.
- Any damage to the developed greenbelt due to any natural or cattle activity should be redeveloped and maintained by the agency.

8.3.6 Impact due to Solid Waste Generation

Impacts and Origin

Varieties of solid waste will be generated from daily operation of the **City Edible Oil Captive Power Plant Ltd.**, which mainly include the following:

- Papers, poly bags, water bottles etc. from the daily activities (Minor)
- Electrical and mechanical wastes (Minor)
- Oil containers and Chemical containers/bags (Very small scale)

Mitigation measures

City Edible Oil Captive Power Plant Ltd. will have sufficient numbers of cleaners who regularly cleans and collects solid wastes generated in the projects.

- ✓ Sufficient numbers of dustbins and sign board will have been put in place to aware people in case of electro mechanical waste the amount will be very negligible and collected and stored in store room. These items have secondary demand and it is generally sold out.

8.3.7 Impact on Health and Safety

Impact Origin

There might be hazards to operators, employees and technical personnel from working at the utility sections, store rooms, & generator etc. Provisions need to be made by the project for protecting occupational health, including protection of workers from hazards, fires etc. as well as protection of workers' health and assurance of safe drinking water supply and sanitation.

Mitigating Measures

The supervisors and operators should be regularly given training regarding safe operation and maintenance works. The use of PPEs will be strict for the workers working in

dangerous zones and. First Aid boxes and firefighting equipment should be available at each section of the project.

8.3.8 Natural, Accidental Hazard and Fire

Impacts and Origin

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

- Accident due to operate machinery
- Accident from generator

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

Mitigation measures

To reduce impacts of Natural Hazards and accidental hazard **City Edible Oil Captive Power Plant Ltd.** has taken the following actions

- All the infrastructures have been designed and installed to withstand natural hazard
- The operators at generator are properly trained
- Sufficient fire extinguisher available in the project
- First Aid points are available with trained paramedics
- Fire alarm & fire training
- Information center is available at major locations
- Entering in the danger zone is strictly prohibited
- Safety instructions and rules are displayed at all machinery
- Trained supervisors and operators ensure proper implementations of safety rules.

As the project is just east bank of Shitalakshya River so the river is a big source of Water Body which meet the requirement of emergency firefighting water of this project.

8.3.9 Increase in vehicular traffic in the area

Impact Origin

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

- Personal vehicles belonging to employees;
- Service provision vehicles such as garbage collection trucks;

- Emergency service vehicles such as fire engines;

Potential negative impacts from increased vehicular traffic

- Possible traffic congestion of local roads and lanes;
- Possible of occasional experience of delays on the said local roads;
- Increased number of vehicles on roads will result in increased wear and tear of local roads thus reducing lifespan of affected roads;
- Cost of maintaining roads will increase;
- There will be more noise from increased vehicular traffic
- There will be an increase of exhaust emission from vehicles which will pollute local atmospheric air.

Mitigation measures

City Edible Oil Captive Power Plant Ltd. have readily available the parking facilities in front of main gate. In house traffic system is build up due to avoid the traffic jam surrounding the project. In addition, the following measures can be put in place to mitigate possible negative impacts likely to result from increase in vehicular traffic in the area:

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

8.4 Anticipated positive impacts of the Project

Potential Positive impacts

- Strengthening Local market.
- Job opportunity
- Support of local Business.
- Infrastructure development.
- Revenue to Local Municipal Council
- Increased Gaming Taxes

8.4.1 Job opportunities

Construction sites are a major source of employment opportunities. Although the jobs are not permanent, a considerable number of casuals and contracted people are able to get

employment opportunities. The project in future development phase will create employment opportunities for local youths. There are still vacant posts in **City Edible Oil Captive Power Plant Ltd.** which is a good opportunity for those who are looking for jobs. **City Edible Oil Captive Power Plant Ltd.** will recruit more staffs.

8.4.2 Infrastructure development

Local infrastructure like storm water drainage, parking spaces, pedestrian walkways within and, telephone, water pipeline, and electricity connectivity has been developed. Corporate social responsibility programs implemented **City Edible Oil Captive Power Plant Ltd.** may also lead to development of social amenities within the Area.

8.4.3 Revenue to Local Municipal Council

The project is a source of revenue for the Local Municipal Council of the Area.

8.4.4 Gains to the Economy

There will be gains to the economy due to the future construction or development in the project area.

- ✓ Creation of jobs will lead to improved livelihoods for the people within the area;
- ✓ Taxes revenues will increase commensurate with the enhanced production capacity; and
- ✓ Increase in Tourist visit will help earning foreign currency.

9 Environmental & Social Management Plan

9.1 General Consideration

Environmental Management Plan (EMP) for construction and operation phase is required to ensure that mitigation of adverse impacts and strengthening of positive impact resulting from the **City Edible Oil Captive Power Plant Ltd.** The objective of EMP is to identify the project specific environmental actions that will need to be undertaken, not only to mitigate impacts but also improve environmental aesthetics for the proposed plant.

Environmental protection and improvement measures must be taken at design stage itself so as to minimize impacts during construction & operation phase of augmented facilities. The impacts during the construction phase on the environment would be basically of transient nature and are expected to reduce gradually on completion of the construction activities. The Environment Management Plan (EMP) during the construction and operation phase endeavors to mitigate the adverse impacts and to encourage the positive benefits. EMP has been prepared to take into account the mitigation measures in order to synchronize the economic development of the study area with the environmental protection of the region.

9.2 Purpose and objectives

The purpose of the Environmental and Social Management Plan (EMP) is to provide a summary of the expected associated impacts, mitigation measures and monitoring actions in order to minimize possible negative impacts and improve the positive impacts of the Project. The EMP will provide a guide (almost a checklist) for the main stakeholders, i.e. the owner, and the contractor, on what mitigation measures should be taken and where and when they are needed. Therefore, it will help to improve the likelihood that the adverse impacts will be mitigated, the benefits of the project will be shown and standards of best environmentally beneficial practices will be provided to all involved. In particular, the EMP: the specific objectives of the EMP are:

- Define the roles and a responsibility for those involved in the implementation of the EMP and identifies areas where these roles and responsibilities can be shared with other stakeholders.
- To support and implement for the project to achieve environmental standards and to improve the methods of environmental management,

- Define the implementation mechanism for the mitigation measures identified during the present study.
- To promote green-belt development,
- Budgeting and allocation of funds for Environmental Management System,
- Provides concise instructions to project personnel and contractors regarding procedures for protecting the environment and minimizing environmental impact, making these legally binding through their inclusion in contract specifications.
- Define the monitoring mechanism and identify monitoring parameters in order to:
- Ensure the complete implementation of all mitigation measures, and
- Ensure the effectiveness of the mitigation measures.
- To reduce fire and accident hazards,
- To adopt cleaner technology and waste minimization program.
- Provide the mechanism for taking timely action in the face of unanticipated environmental or social situations,
- Identify environmental as well as social training requirements at various levels.

With the availability of cost effective advanced technology and innovative environment management practices, the EMP can act as an effective management tool to provide management solutions to all environmental pollution concerns including that of associated regulatory compliance.

9.3 Environmental Management System

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

9.4 Site Specific Environmental Management Plant

The Environmental Management Plan (EMP), which is a part of ESIA, is more general and broad and includes all possible impacts during the implementation of the project.

Consequently, before the construction begins, the Contractor is obliged to develop a Site Specific Environmental Management Plan (SSEMP). The project authority should

prepare the Specific Environmental Management Plan (SEMP), to ensure maximal mitigation of potential environmental impact during construction works of **City Seed Crushing Unit-2 Captive Power plant**. The main objective of the plan is to document, that during the implementation of the project, the environmental performance indicator will be relevant to the requirements envisaged in environmental protection documentations.

The Project is not expected to have any significant and irreversible adverse impacts on the human health and the natural environment. Modest and temporary negative environmental impacts may be caused both during implementation of construction works. The detailed SEMP based on the project activities is given below

9.4.1 Construction Activity

❖ Impact on Air:

Dust generation resulting from earthworks such as leveling, grading, excavation works and movement of vehicles across dirt/unpaved roads, especially during windy conditions.

Exhaust emissions will be attributed predominantly to the operation of the construction plant and road vehicles such as movement of vehicles during construction works. These emissions will be limited to the project area.

Mitigation Measures

- The technical regulations on exploitation/operation of equipment located in the construction camps will be prepared and agreed with the DoE.
- Comply with the Occupational Safety and Health Administration (OSHA) requirements and the Bangladesh Codes to ensure that for activities associated with high dust levels, workers are equipped with proper Personal Protective Equipment
- All equipment used on site will be regularly maintained so as to be in good working order at all times to minimize potentially polluting exhaust emissions.

❖ Impact on Noise

Generating noise and vibration

Mitigation Measures

- Limit working hours to 7 am – 7 pm, minimize the noise whenever possible

- Ensure that all equipment & vehicles used for construction activity are in good condition
- Carry out on site noise and vibration monitoring
- The Construction Company has to apply good equipment maintenance practice

❖ **Impact on Water Resource**

Mitigation Measures

- Technical regulations of water intake and water discharge will be prepared for construction camps and agreed with the Department of Environment.
- All hazardous liquids such as lubricants, paint etc. will be stored in the designated area at the workshops on an impervious base with run-off collection.

9.4.2 Institutional Framework of Contractors Responsibility

- ❖ Contractor's supervising team and environmental specialist implements the environmental mitigation measures and their related monitoring activities on a daily basis;
- ❖ Environmental specialist carries on site's visits and inspections on a weekly basis;
- ❖ The Contractor will have a duty to immediately report to the environmental specialist if any serious environmental breach has occurred during construction e.g. clearing of sensitive areas, serious oil spills etc. The ES provides monthly reports including review of the environmental and social aspects of the Contractor's performance, as well as HSE issues. In case of any serious accident or repeated violation requiring immediate reaction of the project authorities.

ADB's responsibilities in regard to implementation of environmental safeguards requirements for the project include: undertaking of occasional auditing of the SSEMP implementation and due diligence as part of an overall project review mission.

9.5 Personnel Responsible For the Implementation of the EMP

City Edible Oil Captive Power Plant Ltd shall be responsible for overall implementation of the EMP. The designated Environmental Management Officer/Environmental Manager will do a day to day follows. The Environmental Manager will also ensure that all employees at the project site have their environmental responsibilities and accountabilities clearly outlined. These descriptions will form part of the contractual obligations upon which individual employees are engaged. Specific

accountabilities and responsibilities outlined in the specific EMP will be communicated to responsible staffs.

The HSE Departmental staffs are appropriately qualified for discharging their assigned responsibilities effectively. In order to fulfill the requirement, the **City Edible Oil Captive Power Plant Ltd** shall put in place a training program. Typical duties and responsibilities for the HSE staffs including the Contractor Environmentalist will include, inter alia to:

- Ensure that environmental monitoring programs are carried out on schedule and correctly;
- Review environmental data and recommend appropriate actions;
- Monitor environmental compliance of all CPP operations;
- Train others in the team and general personnel on CPP environmental issues;
- Train and ensure readiness of the emergency response teams;
- Report on environmental data and incidents of significance as per regulations;
- Liaise with the appropriate regulatory authorities on incidences with environmental risks;
- Provide technical and environmental support to Contractors engaged at site; and,
- Ensure commitments listed in the project specific ESMP are met.
- Review (periodically) the existing ESMP and monitoring system and design updated system.

9.6 Comprehensive Environmental Management and Mitigation Plan

The Environmental Management Plan (EMP) prepared for the proposed project covers the anticipated impacts that may generate in the future of the proposed project, mitigation measures, management and monitoring plans during each of the phases:

- Construction,
- Operation and

The detailed EMP based on the project activities is seen in following Table.

Table 9-1: Environmental Management Plan

Aspect	Activity	Mitigation Measures	Responsible for		Parameter to monitoring	Frequency	Location	Remarks
			Implementatio n	Monitor				
Pre-Construction & Planning and Construction Phase								
Soil Quality	Site clearing and preparation, laying of gas pipeline, use of heavy loaders	• Establish project boundaries before sand fill; • Demarcation of routes for the movement of heavy vehicles; • Remove and place the soil when it is dry and not when it is wet; • Restrict the height of topsoil piles to minimize erosion and compaction	EPC Contractor	On site project managemen t team of project developer	-	Once	Within the demarcated project site boundary	
Visual Amenity	Visual impacts from construction activities such as materials lay down, infrastructure development, etc.	√ The contractor shall ensure general cleanliness and good housekeeping practice at the project site at all times.	All Contractors on site	Site EHS Manager / EHS Team	Good housekeeping and tidiness of work areas within the project site	Daily	Within the demarcated project site boundary	

Aspect	Activity	Mitigation Measures	Responsible for		Parameter to monitoring	Frequency	Location	Remarks
			Implementation	Monitor				
Water Resources	As the amount of water requirement is too little, the impact on water resources is not that significant.	√ Water conservation practice shall be done by recycling of treated water √ The Effluent water will be completely recycled in Plant to reduce the fresh water demand √ All reasonable measures will be taken to prevent the wastewater produced in construction	All Contractors on site	Site EHS Manager / EHS Team	Monitoring of pH, BOD, COD, TDS, DO	Quarterly	Within the 2 points, River site of the project area.	
Air Quality	√ Dust generation due to construction activities. √ Exhaust Emissions due to operation of construction plant and machinery √ Transportation of raw materials	√ Sprinkling of water which lead to dust suppression √ Unnecessary handling of dusty materials will be avoided √ Setting an appropriate site speed limit to reduce	All Contractors on site	Site EHS Manager / EHS Team	√ No visible dust plumes originating from construction sites. √ Regular machineries maintenance records.	√ Once a day during the Final Clearing of site √ During Transportation	Within the demarcated project site boundary	

Aspect	Activity	Mitigation Measures	Responsible for		Parameter to monitoring	Frequency	Location	Remarks
			Implementation	Monitor				
	and products.	dust generation from vehicles travelling over unmade surfaces.						
Soil	Soil disturbance due accidental spillage	√ A spill prevention and response plan shall be prepared by the contractor in order to control any inadvertent leakage or spillage. √ Any spilled chemical shall be immediately collected and disposed of in accordance with Spill Prevention and Response Plan and MSDS. √ Contractor shall ensure that a spill kit and adequate PPE is available at the site for emergency cleanup activities in	All Contractors on site	Site EHS Manager / EHS Team	√ Number of spills or incidents to be recorded during onsite audits. √ Training records of Personnel trained in spill response procedures must be filed	Weekly	Within the demarcated project site boundary	

Aspect	Activity	Mitigation Measures	Responsible for		Parameter to monitoring	Frequency	Location	Remarks
			Implementation	Monitor				
		case of chemical/oil spillage.						
Noise Quality	Increased noise levels during to construction & machinery	√ The contractor shall use heavy equipment, machinery, and fuels in compliance with national regulations. √ The contractor shall perform regular maintenance on all equipment, vehicle and machinery to prevent noise emissions. √ Tree planting around the power plant area that will also act as noise attenuation measure for the power plant √ Workers should be supplied with ear plugs	All Contractors on site	Site EHS Manager / EHS Team	Compliance with DoE and National guideline limits for Environmental noise at sensitive receptors.	Daily	Within the demarcated project site boundary	
Waste	Improper	√ The contractor	All	Site EHS	Complete	Daily	Within the	

Aspect	Activity	Mitigation Measures	Responsible for		Parameter to monitoring	Frequency	Location	Remarks
			Implementation	Monitor				
Generation	management and handling of hazardous and non-hazardous waste during construction.	shall provide a separate storage area for hazardous materials. The hazardous materials/products must be labeled with proper identification of its hazardous properties. √ Chemical waste shall be stored in accordance with the provisions of Material Safety Data Sheets (MSDS). The contractor shall keep MSDS onsite. √ The contractor shall establish regular intervals for waste collection and disposal as per contractor's waste management	Contractors on site	Manager / EHS Team	records of regular waste pickup and disposal.		demarcated project site boundary	

Aspect	Activity	Mitigation Measures	Responsible for		Parameter to monitoring	Frequency	Location	Remarks
			Implementation	Monitor				
		procedures.						
Health and Safety risks	√ Exposure to health events during construction activities such as manual handling, temporary or permanent hearing loss and heat stress.	√ All construction equipment used for the execution of the project works shall be fit for purpose and carry valid inspection certificates and insurance requirements. √ Set up a system to alert workers on site. This may be temporary or permanent mains operated fire alarm. √ Fire extinguishers should be located at identified fire points around the site.	All Contractors on site	Site EHS Manager / EHS Team	√ Total Recordable Incidence Rate (TRIR) √ Lost Time Incidence Frequency Fatal Accident Rate √ Number of safety Training performed	Continuously	Within the demarcated project site boundary	
Operation Phase								
Air Quality	Operation of Power Plant. Very low air emissions of air	√ The stack of the CPP shall be of enough heights	Project Authority	Site EHS Manager / EHS	PM ₁₀ , PM _{2.5} , CO, NO ₂ , SO ₂	Quarterly	Four point in project area	

Aspect	Activity	Mitigation Measures	Responsible for		Parameter to monitoring	Frequency	Location	Remarks
			Implementation	Monitor				
	pollutants such as sulfur dioxide, nitrogen oxides, carbon monoxide and carbon dioxide.	√ Adequate safety Measures and green belt development		Team				
Noise pollution and vibration	Noise will be generated from the generator, pump, cooling tower, chiller, heat recovery site transformer as component of the power plant.	√ Use noise reduction canopy to keep the environment free from sound pollution. √ Noise barrier should also be given around the generator room. √ The worker inside the project area should use earmuffs during the operation of diesel generator.	Project Authority	Site EHS Manager / EHS Team	Compliance with DoE and National guideline limits for Environmental noise at sensitive receptors.	Quarterly	Four point at the entrance of the factory (as receptor)	
Water Quality	Wastewater generated from the maintenance period of CPP	√ Wastewater generated from the proposed project shall be EZ central drainage line and it goes ETP for further	Project Authority	Site EHS Manager / EHS Team	pH, BOD, COD, TDS, DO	Quarterly	2 points, River site of the project area.	

Aspect	Activity	Mitigation Measures	Responsible for		Parameter to monitoring	Frequency	Location	Remarks
			Implementation	Monitor				
		better treatment						
Health and Safety	√ As a captive power plant, the plant has always some risks of fire hazards. Electrical equipment is the main source of a potential fire hazard.	√ Fire extinguishers should be located at identified fire points around the site √ Adequate first aiders shall be on site in accordance with Bangladesh Labour Law requirements	Project Authority	Site EHS Manager / EHS Team	√ Lost Time Incidence Frequency √ Number of safety Training performed	Continuously	Within the demarcated project site boundary	

9.6.1 Socio-Economic Environment

Implementation Arrangement: The social management plan proposes to improve the quality of life of inhabitants of potentially affected villages directly. The goal is “a pollution free area with improved quality of life and empowered community “and the three key pillars on which this would be developed are – social, health, infrastructure improvements with efforts on minimal disruptions present life style and any ensuing negative impacts.

Social – Awareness on project benefits, gender empowerment, increases livelihood opportunities during implementation of technical and social remediation plans and generating community participation.

Health - Awareness on health, hygiene, environmental sanitation and generic issues related to improving quality of life with specific emphasis on potable drinking water, HIV/AIDS/STI mitigation)

Infrastructure - Developing prioritized infrastructure facilities which are related to the continuum of project benefits to the local communities and area.

9.6.2 Monitoring and Evaluation

The social management plan and its activities will be implemented and monitored by the CSR division of the company.

9.6.3 Environmental and Social Trainings

Environmental and social training will help ensure that the requirements of the EIA and EMP are clearly understood and followed by all project staff throughout the project period. The main responsibility for providing training to all project personnel will be that of the ESMC.

The environmental and social training program will be finalized before the start of the project, during the detailed design phase. Training will be provided to **City Edible Oil Captive Power Plant Ltd.** personnel, construction contractors and other staff members hired for the project. The training will cover all levels of personnel, ranging from management and supervision to qualified and unqualified personnel. The scope of the training will cover the general environmental awareness and the requirements of the ESIA and EMP, with special emphasis on raising the awareness of the project's personnel to the environmental and social aspects of the area.

During the operation and maintenance phase of the project, ESMC will continue carrying out these trainings for all the relevant personnel of the company.

9.6.4 Grievance Redressal Mechanism

The implementation of an infrastructure project is a complex process that requires a lot of time and work and that involves a multitude of phases and life cycle processes. During the duration of the project, there are numerous instances of conflicts, complaints and dissatisfaction within the work and as associated human capital and its interactions. Some of these problems could be related to the payment of compensation, incorrect estimation of the affected assets, non-fulfillment of commitments, mismanagement of construction activities, accidents due to improper planning of the movement of vehicles and cultural conflicts among migrant workers. and local communities, etc., among others. Most conflicts and allegations may not appear to be serious in nature, but if not handled properly from the start, they can snowball into a bigger problem. To manage these risks, an internal mechanism is required to be in place where the aggrieved parties can present their complaints and resolve them amicably before approaching the formal mode of resolution available to them, that is, access to the legal system through of courts. In order to provide a formal forum for aggrieved parties to address issues arising from the project, it is proposed that a joint grievance mechanism be instituted for environmental and social issues.

The proposed Grievance Redress Mechanism (GRM) will be developed for the Project in order to resolve as many disputes as possible through mutual consultation, negotiation and agreement. This mechanism is important, as most, if not all, cases are expected to be resolved amicably; and the process, as a whole, will promote dispute resolution through mediation to reduce litigation. However, legal recourse options will not be restricted in any way by the project proponent.

City Edible Oil Captive Power Plant Ltd. shall have a standard mechanism to

1. inform the affected people (AP) about GRM and its functions,
2. set the procedures and mechanisms adopted for making the complaints,
3. support the complainants in communicating their grievance and attending the GRM meetings and
4. Implement compliance with a GRMs' decision, its monitoring and communication to the people.

Objectives of Grievance Redress Mechanism

The basic objective of the GRM will be to provide an accessible mechanism for affected people, the community or any interested party who has an interest in the project to raise their problems and complaints, as well as their concerns. The Extrajudicial Complaint

will seek to resolve the extrajudicial controversies that arise from various matters related to the implementation of the PGAS, as well as other aspects of the project, which it deems appropriate to raise before the GRC.

The fundamental objective of GRM is to resolve locally any social (including work, contractor, community, among others) and environmental-related claims in consultation with the aggrieved party to facilitate the smooth implementation of work activities related to the draft. The other important objective is to democratize the development process at the local level and establish accountability towards stakeholders.

Composition of GRC

Keeping into context that the project is mostly void of any significant impact, it is suggested to have only one single level of grievance redress mechanism or agency for the project. This agency shall be called as the Grievance Redress Cell (GRC).

The GRC will be driven internally by City group and shall have the following representation to ensure fair and timely solution to the grievances:

- Site personnel serving as the EHS/Community relations officer shall also serve as the Grievance Officer. The City Group EHS Officer can take this role and responsibility;
- Senior Representative on behalf of City Group and part of the site level project management team. In most cases, this individual shall be of an authority Site Manager is not available, this role may be deputed to his immediate deputy or any individual with that level of authority;
- Any other concerned person with decision making authority in relevance to the grievance or aggrieved party. For Senior contractor personnel as a part of the GRC in case of a contractor labor dispute or issue;

A grieved party shall register their grievances with the GRC. The GRC shall be empowered to take a decision which is to be considered final and binding on Lance. However, the decision of the GRC is not binding on the aggrieved person and he or she may take the grievance to the administrative setup in case any grievance channel is available at that level or take a legal course, in case not satisfied with the outcome of GRC decision.

Functional Premises of GRC for Grievance Redress

The GRC meetings will be held in Lance project office at site and the same will be widely publicized in project area for the knowledge of general public. The key responsibilities of GRC are as follows:

- Review, consider and resolve grievances related to social and environmental aspects received by the Lance Field Office having the GRC; Entertain grievances of indirectly affected persons and/or persons affected during project implementation;
- Resolve grievances within a period of two weeks at the GRC level and communication of the resolution to the aggrieved party;
- The GRC shall not engage in any review of the legal standing of an —awardee nor shall deal with any matters pending in the court of law;
- Arrive at decisions through consensus, failing which resolution will be based on majority vote. Any decision made by the GRC must be within the purview of Environmental Management Plan, Corporate EHS and Social Policies or any such documents of relevance of that matter;
- In case the grievance relates to environmental monitoring results or engineering matters, the GRC will validate the information available to it, as provided by Lance Project management team/ environmental monitoring team. However, GRC will not be in a position to question the validity of the data provided to it. The GRC team shall meet at least twice a month for review of grievances registered and the resolution vetted out to the concerned parties. The frequency of meeting may increase or decrease depending on the number grievances received.
- If needed, may undertake field visits to verify and review the issues, dispute or other relevant matters.

Disclosure of the Grievance Redress Mechanism

Some of the important points regarding disclosure of the grievance e redress mechanism are:

- The grievance redress process shall be disclosed and the procedures mentioned therein shall be properly disseminated to the identified stakeholders.

- City Group shall integrate it as a part of the training programmed especially those conducted for self-employees and those of the contractors. For the rest of the stakeholders including the community, it can be displayed at important places such as town centers, at site gates and on the website.
- The disclosure and the display shall clearly mention the name and designation of the grievance redress officials, office location and their respective contact numbers.
- GRM procedures and operational rules will be publicized widely through community meetings and pamphlets in the local language (Bangle) so that people are aware of their rights and obligations, and procedure of grievance redress.

Grievance Reporting Procedure under GRM

An aggrieved person, a group of people or a community may file complaints without fear or intimidation. Complaints may be submitted in writing or may be submitted orally or by phone to the GRC; The whole purpose is to make the GRM easily accessible to the affected population. Once the complaint is received, the complainant will be acknowledged and a tentative date for the hearing may be communicated in advance. The complainant may be represented by him / her or a designated agent for the hearing of the complaint. The decision made by GRC will be communicated to the person / group / community in question in writing. If they are not satisfied with the decision of the GRC, the person / group / community can register the complaint at the administrative level in case the necessary channels exist for the same or take a legal course.

Grievance Redress Process of GRC

The grievance redress procedure will include the stepwise procedure, to deal with any grievance that comes for redress before the GRC. A schematic representation of the grievance redresses procedure to be followed by City Group is being shown in follows figure.

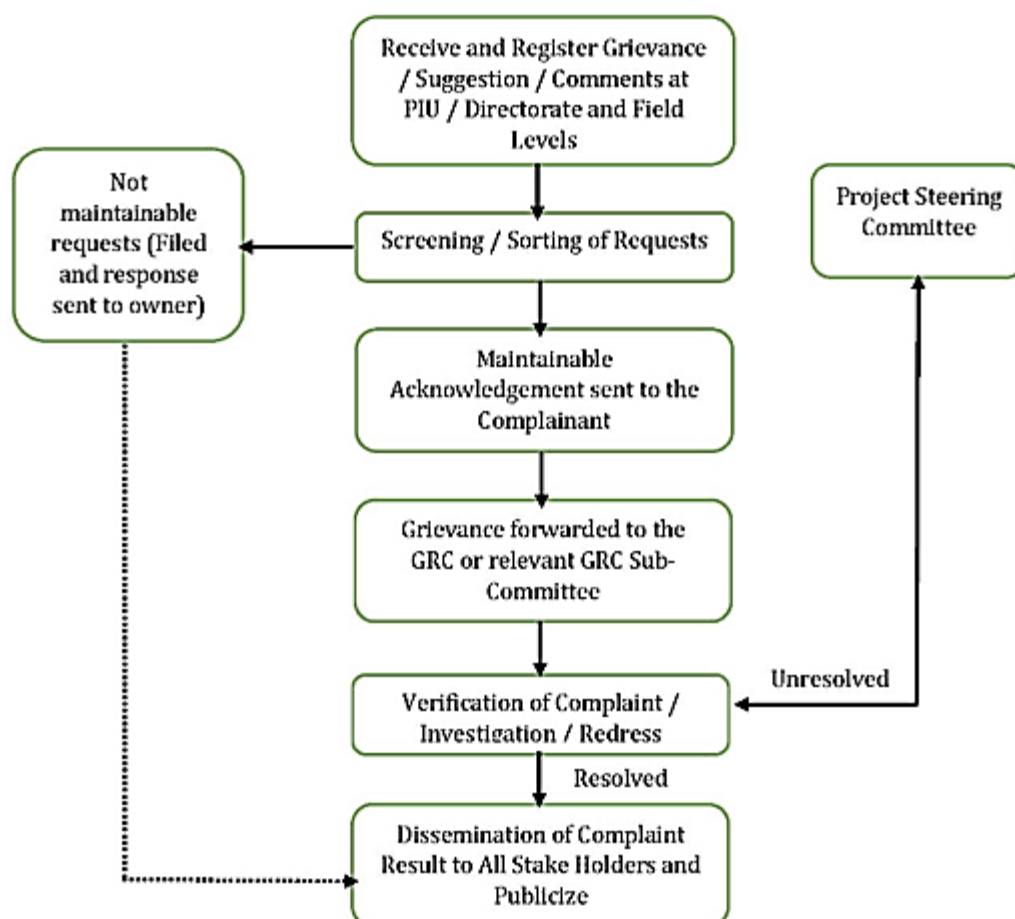


Figure: Grievance Redress Process for the Project

Grievances primarily related to any serious event such as accidents involving the community, labor related major disputes such as non-payment of wages or work related injuries or fatalities, major intrusion of project on any community resource, and other issues for which the aggrieved party in his or her free will wants to register a grievance or complaint.

The process followed will follow the following steps:

- On receipt of complaint the GRC shall give an acknowledgement to the complainant with date, time and venue of hearing of his/her grievance.
- The GRC shall prepare a brief note on the grievance for discussion on scheduled date. On the given date, the GRC shall hear the complainant and give its decision. A written copy of decision shall be provided to the complainant. If the complainant is satisfied with the decision, an acknowledgement of same shall be obtained from him on the decision copy and the case shall be closed.

- If the complainant is not satisfied with the outcome of GRC 's decision, he or she can opt for any grievance redress forum available at the administrative level or undertake the course of law available to him/her. However, every effort shall be made to resolve the case amicably without resorting to legal course of action. While the process continues, a proper documentation of the records shall be maintained by City Group, pertaining to each of the grievance in a proper grievance register or record.

Monitoring and Evaluation

Like the other components of the project, the GRM should be monitored to ensure that stakeholders do not have problems with the project or are limited and, if there are concerns, are being adequately addressed according to the mandate. In order to monitor the effectiveness of GRM, it is the responsibility of the City Group Environment and Social team to compile and maintain a database of complaints for periodic review. The mechanism will be based on two components, internal monitoring and reporting and external monitoring and reporting, which will run concurrently. For the most part, this should be aligned with simultaneous process monitoring rather than separately all the time.

Budgeting

The City Group administration shall ensure adequate budgeting and resource allocation for implementing the grievance redress mechanism.

Sample Grievance Form

Reference No.:		Date:	
Full Name:			
Father's Name:			
Mother's Name:			
Address			
Phone No.			
Date, time & Venue of GRC meeting			
Description of Incitement or Grievance			

Date of incident	
What is you like to see happen to resolve the problem	
Signature of Complaint/ Thump impressionof Complaints	Signature of person filling the form (City Group Representative)

9.6.5 Occupational Health of the Workers

Detail of Occupational Health Check Up

Health of an individual is multi factorial. The factors which influence health lie both within the individual and externally in the society. The term environment implies all the external factors.

Occupational Health Centre

Full-fledged Occupational Health Centre is available at factory and Doctor with Diploma Industrial Health has been arranged to visit the factory on daily basis. Medical records of workmen and contract workmen are made available with the doctor.

Pre-employment medical checkup:

All the employees are eligible for pre-employment medical checkup. Employees are expected to complete their mandatory checkup in an approved hospital before joining to

the organization. Periodical medical examination being carried out as per Factories Act and Rules.

9.7 Environment Management Cell

In addition to preparing an EMP, it is also necessary to have a permanent organizational set up to ensure its effective implementation. Hence, **City Edible Oil Captive Power Plant Ltd** will create a team consisting of officers from various departments to coordinate the activities concerned with management and implementation of the environmental control measures. This team will undertake the activity of monitoring the stack emissions, ambient air quality, noise level etc. either departmentally or by appointing external agencies wherever necessary. Regular monitoring of environmental parameters will be carried out to find out any deterioration in environmental quality and also to take corrective steps, if required, through respective internal departments.

An environment management cell shall be created which shall perform the following functions:

- Achieve objectives of the ‘Environment Protection Policy’ of the management.
- Collect information from regular monitoring and create a database.
- Analyze the data and decide thrust area.
- Based on the data collected, decide target for each thrust area.
- Carry out ‘Projects’ in each thrust area to arrive at practical solutions to environmental problems.
- Discuss the reports of study on environment and disseminate the information.
- Work out ‘Action plan’ for implementation of the recommendations made in the reports.
- Prepare Management Information System (MIS) reports and budget for environment management program.

The works Manager will be responsible for environmental issues at plant.

9.8 Monitoring Plan

The mitigation plan is a key component of the ESMP. It lists all the potential effects of each activity of the project and their associated mitigation measures identified in the ESIA. For each project activity, the following information is presented in the plan:

- A listing of the potential impact associated with that project activity
- A comprehensive listing of mitigation measures (actions)
- The person(s) responsible for ensuring the full implementation of the action

- The person(s) responsible for monitoring the action
- The timing of the implementation of the action to ensure that the objectives of mitigation are fully met.
- It should be emphasized that the mitigation measures will have to be translated into environmental as well as social requirements and specifications to be made part of the contracts for the construction activities, with legal binding.

The objective of environmental and social monitoring during the various phases of the

Proposed project will be as follows:

- Ensuring that the mitigation measures included in the ESIA are being implemented completely.
- Ensuring the effectiveness of the mitigation measures in minimizing the project's impacts on social and environmental resources.

Table 9-2: Environmental Monitoring Plan (operation phase only because the project construction work already have completed and now the project is running stage)

Construction Phase						
Aspect	Parameter	Standard	Duration	Location	Implementation	Supervision
Ambient air quality	PM ₁₀ , PM _{2.5} , CO, NO ₂ , SO ₂	Mentioned in Chapter-2, Section-2.8	Quarterly	Four point in project area	Contractor or Consultant	Project Manager / ADB
Noise level and vibration	Equivalent noise level dB(A)	Mentioned in Chapter-2, Section-2.11	Quarterly	Four point at the entrance of the factory (as receptor)	Contractor or Consultant	Project Manager / ADB
Ground Water Quality	pH, TDS, As, Fe, Hardness, Total Coliform.	Mentioned in Chapter-2, Section-2.10	Quarterly	2 points, Tube wells of the project site and residential area	Contractor or Consultant	Project Manager / ADB
Surface Water Quality	pH, BOD, COD, TDS, DO	Mentioned in Chapter-2, Section-2.10	Quarterly	2 points, River site of the project area.	Contractor or Consultant	Project Manager / ADB
Operation Phase						
Ambient air quality	SPM, PM ₁₀ , PM _{2.5} , CO, NO ₂ , SO ₂ .	Mentioned in Chapter-2, Section-2.8	Quarterly	Four point in project area	Project EHS Team or Consultant	Project Manager / ADB
Noise level and vibration	Equivalent noise level dB(A)	Mentioned in Chapter-2, Section-2.11	Quarterly	Four point at the entrance of the factory (as receptor)	Project EHS Team or Consultant	Project Manager / ADB
Ground Water Quality	pH, TDS, As, Fe, Hardness, Total Coliform.	Mentioned in Chapter-2, Section-2.10	Quarterly	Treated water output from water Colling tower.	Project EHS Team or Consultant	Project Manager / ADB
Surface Water Quality	pH, BOD, COD, TDS, DO	Mentioned in Chapter-2, Section-2.10	Quarterly	2 points, River site of the project area.	Contractor or Consultant	Project Manager / ADB

10 Occupational Health & Safety

10.1 Occupational Health

City Edible Oil Captive Power Plant Ltd. will have adopted a detailed “safety policy” for ensuring occupational safety for all working within the industry premises. The safety policy covers precautionary measures related to working anywhere within the factory, use of any machinery, working with or near machinery in motion, stacking packing and storing materials, and carrying of excessive weight by individual factory employee. Smoking within the factory is strictly prohibited. Carrying of cigarettes and matches within the working area is also prohibited.

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

It is necessary to inform that the project belongs to City Group and City Group itself has a Health Safety Policy for the entire plant. During the Covid-19 pandemic, the factory authorities have taken all necessary steps to avoid the effects of Covid-19, and are also complying with the World Health Organization's recommendations as well as the Bangladesh government's health recommendations.

10.2 Emergency Responses

Provisions for emergency responses will have been elaborate in the” safety policy” adopted by the industry. All areas within the factory are equipped with portable fire extinguishers. These fire extinguishers have been placed in easily accessible areas and have been especially marked for easy identification. All types of fire extinguishers are labeled with user instruction and effective use period, as per recommendations of the local fire service and civil defense authority. Fire alarms with lights have also been placed at appropriate locations.

Fire emergency exit plans have been fixed at easily visible place on every production floor. The entry and exit routes to the project have been well marked and have been fitted with emergency lights. There is provision for emergency staircase for emergency evacuation, besides the regular staircase. One vehicle will be engaged full time for any emergency to carry the patient or victims to the hospital.

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

10.3 Health and Environmental Hygiene

City Edible Oil Captive Power Plant Ltd. has adopted a “health and environment policy” for ensuring sanitary condition within the project premises and for providing healthcare support to the construction workers. The policy deals with cleanliness within the project premises, disposal of solid wastes, maintenance of latrines, urinals, and drains, and lighting of project premises. Potable water in sufficient volumes is made available to all employees working on every unit. As mentioned earlier, a team of one doctor and two nurses work full-time in the project to help the employee with their medical needs.

Health and Environment Policy-

- Maintenance of Drains: Washroom wastewater drains has been constructed properly maintaining required slope, so that nothing can be accumulated in system.
- Drinking Water Provision: There are sufficient volume of fresh natural drinking water kept in Hot and Cold water stands at convenient locations of every unit. It is our business goal to keep sound health to enhance the productivity.

Safety Policy-

- Safety Precaution: All machinery and equipment are designed considering the safety well as per local laws well as international safety guidelines.
- Building and Structure: Building machines and equipment are well protected to ensure workers safety. Proper safety notice & Instruction in Bi-lingual (Bangle & English) are set to required equipment. Under no circumstances no one will be allowed to use any pains in the factory. There is no machinery or equipment that is un-protected in the project which may endanger the workers.
- Fire Fighting Equipment: In factory area sufficient number of different types & size portable fire extinguishers have been placed and defined by special mark and easily located while kin emergency. Periodically local fire-service and civil defense dept. will inspect the production floor to give the certificate. All fire extinguishers have been colored as per type, details of usability as mentioned in EU standard notice which has been placed in every unit. All fire extinguishers

have been labeled with effective use period and replace of dry powder, foam at regular interval and label as per recommendation of local civil defense fire service. Fire alarm with light has been placed in easily visible range and alarm switch has been marked with proper graphic and Symbol notation with wordings. Also a 36,000 Liter (6m x 3m x 2m) Open Water Body remains near the chemical storage area for emergency firefighting.

11 Cost Estimation for Environmental Mitigation Measures and Monitoring

11.1 Overview

This section describes the budget plans for the environmental management and environmental monitoring by the Project Proponent. On the other hand, the tenants will take necessary environmental mitigation measures and its expenses for the environmental management not only at the construction and operation phases but also at the closing, termination, and after termination phases in accordance with their ESIA study. However, the budget plan for environmental management of each work cannot be estimated at this stage because there is no certain information on industrial sectors of tenants.

11.2 Budget Plan for Environmental Monitoring

In terms of budget for environmental monitoring before/during construction and operation phases, main monitoring cost related with field measurements such as air, water, and noise quality. Annual costs for field measurements in the construction phase by contractor and in the operation phase by the Proponent are estimated, respectively, as shown in the following table.

Table 11-1: Estimated Annual Costs for Monitoring in the Construction and Operation Phases

SN	Name of Parameters	No of Parameter	Frequency in a year	Total parameter	Unit cost @ (BDT)	Total cost (BDT)/year
1	Ambient air quality (PM ₁₀ , PM _{2.5} , CO, NO ₂ , SO ₂)	5	4	20	5000.00	100,000.00
2	Surface water quality (pH, BOD, COD, TDS, DO)	5	4	20	3000.00	60,000.00
3	Ground water quality (pH, TDS, As, Fe, Hardness, TC, FC.	7	4	28	3000.00	84,000.00
4	Noise level (5 points)	5	4	20	1000.00	20,000.00
5	Training of Occupational Health Safety	1	2	2	50000.00	100,000.00
6	Establishment of	1	2000	2000	100.00	200,000.00

SN	Name of Parameters	No of Parameter	Frequency in a year	Total parameter	Unit cost @ (BDT)	Total cost (BDT)/year
	Greenbelt					
7	Quality of Effluent (quality (pH, BOD, COD, TDS, DO)	5	4	20	3000.00	60000.00
Total cost per year					624,000.00	

Table 11-2: Estimated Annual Cost for Manpower for Supervising Environmental Management and Monitoring Activities

Sl	Designation	Number	Cost BDT. (per month)	Cost BDT. (per year)
1.	Manager (EHS)	1.00	50,000	600,000.00
Total				600,000.00

12 Emergency Response and Disaster Management Plan

12.1 Disaster Impact Assessment

12.1.1 Introduction

Accidental risk involves the occurrence or potential occurrence of some accident consisting of an event or sequence of events resulting into fire, natural calamities like flood and cyclone, explosion or toxic hazards to human health and environment. Risk Assessment (RA) provides a numerical measure of the risk that a particular facility poses to the public. It begins with the identification of probable potential hazardous events at an industry and categorization as per the predetermined criteria. The consequences of major credible events are calculated for different combinations of weather conditions to simulate worst possible scenario. These consequence predictions are combined to provide numerical measures of the risk for the entire facility. MCA stands for Maximum Credible Accident or in other words, an accident with maximum damage distance, which is believed to be probable. MCA analysis does not include quantification of the probability of occurrence of an accident. In practice the selection of accident scenarios for MCA analysis is carried out on the basis of Engineering judgment and expertise in the field of risk analysis especially in accident analysis. Detailed study helps in plotting the damage contours on the detailed plot plan in order to assess the magnitude of a particular event. A disastrous situation is the outcome of fire, natural calamities and explosion or toxic hazards in addition to other natural causes that eventually lead to loss of life, property and ecological imbalances.

12.1.2 Methodology of MCA Analysis

The MCA analysis involves ordering and ranking of various sections in terms of potential vulnerability. The data requirements for MCA analysis are:

- Operating manual
- Flow diagram and P&I diagrams
- Detailed design parameters
- Physical and chemical properties of all the chemicals
- Detailed plant layout
- Detailed area layout
- Past accident data

Following steps are involved in the MCA analysis:

- Identification of potential hazardous sections and representative failure cases.

- Visualization of release scenarios considering type and the quantity of the hazardous material.
- Damage distance computations for the released cases at different wind velocities and atmospheric stability classes for heat radiations and pressure waves.
- Drawing of damage contours on plot plan to show the effect due to the accidental release of chemicals.

12.1.3 Past Accident Data Analysis

Analysis of events arising out of the unsafe conditions is one of the basic requirements for ensuring safety in any facility. The data required for such an analysis has either to be generated by monitoring and/or collected from the records of the past occurrences. This data, when analyzed, helps in formulation of the steps towards mitigation of hazards faced commonly. Trends in safety of various activities can be evaluated and actions can be planned accordingly, to improve the safety.

12.1.4 Hazard Identification

Identification of hazards is an important step in Risk Assessment as it leads to the generation of accidental scenarios. The merits of including the hazard for further investigation are subsequently determined by its significance, normally using a cut-off or threshold quantity. Once a hazard has been identified, it is necessary to evaluate it in terms of the risk it presents to the employees and the neighboring community. In principle, both probability and consequences should be considered, but there are occasions where either the probability or the consequence can show to be sufficiently low or sufficiently high, decisions can be made on just one factor. During the hazard identification component, the following considerations are taken into account.

- Chemical identities
- Location of process unit facilities for hazardous materials.
- The types and design of process units
- The quantity of material that could be involved in an airborne release and
- The nature of the hazard (e.g. airborne toxic vapor's or mists, fire, explosion, large quantities stored or processed handling conditions) most likely to accompany hazardous materials spills or releases.

12.1.5 Fire and Explosion Index (FEI)

Fire and Explosion Index (FEI) is useful in identification of areas in which the potential risk reaches a certain level. It estimates the global risk associated with a process unit and classifies the units according to their general level of risk. FEI covers aspects related to the intrinsic hazard of materials, the quantities handled and operating conditions. This factor gives index value for the area which could be affected by an accident, the damage to property within the area and the working days lost due to accidents.

12.1.6 MCA Analysis

MCA analysis encompasses defined techniques to identify the hazards and compute the consequent effects in terms of damage distances due to heat radiation, toxic releases, vapor cloud explosion etc. A list of probable or potential accidents of the major units in the complex arising due to use, storage and handling of the hazardous materials are examined to establish their credibility. Depending upon the effective hazardous attributes and their impact on the event, the maximum effect on the surrounding environment and the respective damage caused can be assessed. Hazardous substance, on release can cause damage on a large scale. The extent of the damage is dependent upon the nature of the release and the physical state of the material. In the present report the consequences for flammable hazards are considered and the damages caused due to such releases are assessed with recourse to MCA analysis.

Flammable substances on release may cause Jet fire and less likely unconfined vapor cloud explosion causing possible damage to the surrounding area. The extent of damage depends upon the nature of the release. The release of flammable materials and subsequent ignition result in heat radiation wave or vapor cloud depending upon the flammability and its physical state. Damage distances due to release of hazardous materials depend on atmospheric stability and wind speed. It is important to visualize the consequence of the release of such substances and the damage caused to the surrounding areas.

12.1.7 Fire and Explosion Scenarios

Combustible materials within their flammable limits may ignite and burn if exposed to an ignition source of sufficient energy. On process plants, this normally occurs as a result of a leakage or spillage. Depending on the physical properties of the material and the operating parameters, the combustion of material in a plant may take on a number of forms like jet fire, flash fire and pool fire.

12.1.8 Flash Fire

A flash fire is the non-explosive combustion of a vapor cloud resulting from a release of flammable material into the open air, which after mixing with air, ignites. A flash fire results from the ignition of a released flammable cloud in which there is essentially no increase in combustion rate. The ignition source could be electric spark, a hot surface, and friction between moving parts of a machine or an open fire. Flash fire may occur due to its less vapor temperature than ambient temperature. Hence, as a result of a spill, they are dispersed initially by the negative buoyancy of cold vapors and subsequently by the atmospheric turbulence. After the release and dispersion of the flammable fuel the resulting vapor cloud is ignited and when the fuel vapor is not mixed with sufficient air prior to ignition, it results in diffusion fire burning. Therefore, the rate at which the fuel vapor and air are mixed together during combustion determines the rate of burning in the flash fire.

The main dangers of flash fire are radiation and direct flame contact. The size of the flammable cloud determines the area of possible direct flame contact effects.

Radiation effects on a target depend on several factors including its distance from the flames, flame height, flame emissive power, local atmospheric transitivity and cloud size.

Most of the time, flash combustion lasts for no more than a few seconds.

12.1.9 Natural Calamities

Natural calamities like tropical cyclones, flood, earthquakes etc. can occur within the zone. The project site falls under the earthquake zone II which indicate medium intensity of earthquake.

12.2 Disaster Management Plan (DMP)

12.2.1 Approach to Disaster Management Plan

Onsite Emergency or disaster is an unpleasant sudden event of such a magnitude which may cause extensive damage to life and property, due to in-plant emergencies resulting from deficiencies in operation, maintenance, design and human error; natural calamities like flood, cyclone and earthquake; and deliberate and other acts of man like sabotage, riot, war etc. It is important for every industry to have a well-documented Emergency Plan to meet any major untoward incident or disaster. In view of this, an approach to Disaster Management Plan (DMP) to tackle the emergencies, Proposed Project has been

delineated in the following sections. Roles and responsibilities of key personnel have also been defined in the plan.

12.2.2 Formulation of DMP and Emergency Services

Proposed **City Edible Oil Captive Power Plant Ltd.** will formulate a Disaster Management Plan for better and safe management of their plants. The DMP is related to the final assessment and it is the responsibility of the plant management document including the following elements.

- Assessment of the size and nature of the events foreseen and the probability of their occurrence;
- Formulation of the plan and liaison with authorities, including the emergency services.
- Procedures for raising the alarm and communications both within and outside the works;
- Appointment of key personnel and their duties and responsibilities, especially for works incident controller and works main controller;
- Emergency control center;
- Action on-site;
- Action off-site;

The plan is prepared to set out the way in which designated people at the site of the incident can initiate supplementary action both inside and outside the works at an appropriate time. An essential element of the plan must be the provision for attempting to make safe the affected unit, for example by shutting it down. On a complex site, the plan includes the full sequence of key personnel to be called in from other sections or from off site.

12.2.3 Need for Disaster Management Plan

The petroleum and petrochemical complex will produce lot of toxic, highly reactive, explosive or inflammable chemicals which are potentially hazardous not only to the human beings, flora and fauna but also to all forms of property and our environment as a whole. Thus, extreme care is essential in handling such chemicals in any form and at all stages of manufacture, processing, treatment, package, storage, transportation, use, collection, destruction, conversion or sale. Several agencies of the Government are entrusted with the responsibility of ensuring safe handling and management of hazardous chemicals under acts and rules made for the purpose. In spite of these measures, the

possibility of accidents cannot be ruled out. Human errors and mechanical, electrical, instrumental or system failures have, on occasions, led to severe disasters. Accidents occurred at Bhopal, Mexico and other parts of the world have made people concerned with the dangers of chemical accidents. Occurrence of such accidents makes it essential that the Central and State Governments as well as the local authorities are fully prepared to mitigate the sufferings and meet the eventualities resulting from any unfortunate occurrence of chemical accidents in our country.

Following are the general types of Emergency /Disaster which lead to preparation of disaster management plan:

- Fire in tank farm area
- Large oil spillage which may escape outside the plant boundary.
- Major fire / explosion in unit area
- Toxic gas release
- Major Earthquake above 7 Richter Scale
- Tropical Cyclones/Tornado

12.2.4 Objectives of Disaster Management Plan

The purpose of DMP is to give an approach to detail organizational responsibilities, actions, reporting requirements and support resources available to ensure effective and timely management of emergencies associated to production and operations in the site.

The overall objectives of DMP are to:

- Ensure safety of people, protect the environment and safeguard commercial considerations
- Immediate response to emergency scene with effective communication network and organized procedures
- Obtain early warning of emergency conditions so as to prevent impact on personnel, assets and environment
- Safeguard personnel to prevent injuries or loss of life by protecting personnel from the hazard and evacuating personnel from an installation when necessary.
- Minimize the impact of the event on the installation and the environment, by:
 - ✓ Minimizing the hazard as far as possible
 - ✓ Minimizing the potential for escalation
 - ✓ Containing any release

- To provide guidance to help stack holders take appropriate action to prevent accidents involving hazardous substances and to mitigate adverse effects of accidents that do nevertheless occur.

12.2.5 Different Phases of Disaster

Warning Phase

Emergencies/disasters are generally preceded by warnings during which preventive measures may be initiated. For example, release of light hydrocarbons, uncontrollable build-up of pressure in process equipment, weather forecast give warning about formation of vapor cloud, cyclones, equipment failure etc. This is the phase when emergency/disaster actually strikes and preventive measures may hardly be taken. However, control measures to minimize the effects may be taken through a well-planned and ready-to-act disaster management plan. The duration may be from seconds to days.

Rescue Phase

This is the phase when impact is almost over and efforts are concentrated on rescue and relief measures.

Relief Phase

In this phase, apart from organization and relief measures internally, depending on severity of the disaster, external help should also be summoned to provide relief measures (like evacuations to a safe place and providing medical help, food clothing etc.). This phase will continue till normalcy is restored.

Rehabilitation Phase

This is the final and longest phase. During which measures required to put the situation back to normal as far as possible are taken. Checking the systems, estimating the damages, repair of equipment's and putting them again into service are taken up. Help from revenue/insurance authorities need to be obtained to assess the damage, quantum of compensation to be paid etc.

Key Elements

Following are the key elements of Disaster Management Plan:

- Basis of the plan
- Accident/emergency response planning procedures
- On-site Disaster Management Plan
- Off-site Disaster Management Plan

12.2.6 Basis of the Plan

Identification and assessment of hazards is crucial for on-site emergency planning and it is therefore necessary to identify what emergencies could arise in production of various products and their storage. Hazard analysis or consequence analysis gives the following results.

- Hazards from spread of fire or release of flammable and toxic chemicals from storage and production units.
- Hazards due to formation of pressure waves due to vapour cloud explosion of flammable gases and oil spill hazards.

12.2.7 Emergency Planning and Response Procedures

Emergency rarely occurs; therefore, activities during emergencies require coordination of higher order than for planned activities carried out according to fixed time schedule or on a routine day-to-day basis. To effectively coordinate emergency response activities, an organizational approach to planning is required. The important areas of emergency planning are Organization and Responsibilities, Procedures, Communication, Transport, Resource requirements and Control Centre. Offsite emergency requires additional planning over and above those considered under onsite plans, which should be properly integrated to ensure better coordination. The emergency planning includes anticipatory action for emergency, maintenance and streamlining of emergency preparedness and ability for sudden mobilization of all forces to meet any calamity.

12.2.8 On-site Disaster Management Plan

Onsite Emergency/disaster is an unpleasant event of such magnitude which may cause extensive damage to life and property due to plant emergencies resulting from deficiencies in Operation, Maintenance, design and human error, natural calamities like flood, cyclone and earthquake; and deliberate and other acts of man like sabotage, riot and war etc. An Onsite Disaster may occur all of a sudden or proceeded by a major fire. Purpose for the on-site disaster management plan is-

- To protect persons and property of processing equipment's in case of all kinds of accidents, emergencies and disasters
- To inform people and surroundings about emergency if it is likely to adversely affect them

- To inform authorities including helping agencies (doctors, hospitals, fire, police transport etc.) in advance, and also at the time of actual happening
- To identify, assess, foresee and work out various kinds of possible hazards, their places, potential and damaging capacity and area in case of above happenings. Review, revise, redesign, replace or reconstruct the process, plant, vessels and control measures if so assessed.

In order to handle disaster / emergency situations, an organizational chart entrusting responsibility to various personnel of the plant and showing their specific roles should be available. Following fire protection facilities are available to combat the emergencies and depending upon the type of emergencies any one or combination of the facilities are applied.

- Fire Water System
- Carbon Dioxide System
- Foam System
- First Aid Fire Fighting Equipment
- Mobile Fire Fighting Equipment
- Gas / Fire Detection and Alarm System.

Before Crisis

- Prepare a plan of the storage, handling and pumping stations premises and surroundings showing therein the areas of various hazards like fire, explosion, toxic releases and also location of assembly points, fire station or equipment's room, telephone room, first aid or ambulance room, emergency control room, main gate, emergency gates, normal wind direction, outside fire station, hospital and other services. Mention their distances from proposed activities.
- The fire protection equipment shall be kept in good operating condition at all the time and firefighting system should be periodically tested for people functioning logged for record and corrective action.
- The firefighting training shall be provided to all officers, truck drivers and other employees who are likely to be present in installation
- There should be regular mock fire drills once a month record of such drills shall be maintained

- Every employee or authorized person working in the production shall be familiarized with the fire alarm signal and shall know the location of fire alarm point nearest to place of work
- Assign key personnel and alternate responsible for site safety
- Describe risk associated with each operation conducted.

During Crisis

- Monitor the behavior of entrant for any effects that suggests they should be evacuated
- Evacuate the space if any hazard that could danger the entrant is detected
- Perform no other duties that may interfere with their primary responsibilities
- Notify the attendant if they experience any warning signs or symptoms of exposures or detect a dangerous condition.
- Exit the permit space when instructed by attendant
- Reporting Procedure

In the event of fire from accidental release of flammable gas or liquid, a person seeing the incident will follow the laid down procedure in the plant and report as follows:

- Will dial the nearest telephone
- Will state his name and exact location of emergency
- Will contact affected officers on duty
- People reporting the accident will remain near the location to guide emergency crew arriving at the scene

In case fire emergency person should activate the nearest available push button type instrument which will automatically sound an alarm in fire control room indicating the location of fire.

After Crisis

- Report injuries or blood or body fluid exposures to the appropriate supervisor immediately
- Assembly points:

Assembly points shall be set up farthest from the location of likely hazardous events, where pre-designed persons from the works, contractors and visitors would assemble in case of emergency. Up-to date list of pre-designed employees shift wise must be available at these points so that roll call could be taken. Pre-designated persons would take charge of these points and mark presence as the people come into it.

- Wash wounds and skin sites that have been affected with soap & water
- Workers should be seen as soon as possible by a health professional
- Provide information to the relevant public authority and community including other closely located facilities regarding the nature of hazard and emergency procedure in event of major accident
- Record and discuss the lessons learned and the analysis of major accidents and misses with employees and employee representative

12.2.9 Emergency Organization Structure

Following are the key personnel and the units in the plant which are responsible to take appropriate actions during emergencies.

Site Main Controller

President/SSM - (the senior most functionary available at site).

The President/Site Shift Manager (SSM) will be designated as the Site Main Controller at the time of an emergency and report at the Emergency Control Centre (ECC) which will be the Primary Command Post. He will be the Chief Co-coordinator and take overall command of the emergency management. He will be assisted by other coordinators as designated for various functions. The Site Main Controller will provide all decisions support and resources support to the Site Incident Controller at the incident site for initiating appropriate actions for emergency control. He will also liaise with mutual aid members and all outside agencies including Local Crisis Management Committee, District Contingency Plan Committee (District Collector), Police, Civil Defence, Factories Inspectorate, etc. to seek assistance/help and provide necessary information to them. Normally, the SSM is available on round the clock duty at the site to coordinate overall manufacturing activities and management of emergency (if any). In the event of an emergency, the Site Shift Manager (SSM) will assume the charge of the Site Main Controller till the Executive or the President arrives.

Site Incident Controller

AVP/GM/DGM/Sr. Mgr. /Mgr. - (next lower to the senior most functionary of operation available at site).

The next lower to senior most functionary of operation available at site will be Site Incident Controller. On receiving information about the emergency, he will report at the

incident site and take over from the Deputy Incident Controller (shift-in-charge). He will take overall command of the emergency control operation as the Site Incident Controller and will take decisions in co-ordinations with Site Main Controller for controlling emergency situation. He will co-ordinate with all the key personnel, firefighting and rescue team leaders and other support services and provide necessary information and advice to them for effectively managing control measures / actions.

Deputy Incident Controller

The shift-in-charge is available on round the clock duty in every plant. He is competent for plant operation and responsible for all activities related to production / maintenance including prevention / control of incidents and handling emergencies (if any) in the plant. He will be designated as the Deputy Incident Controller. In the event of an emergency in the plant, he will immediately assume the charge of the site Incident Controller and take decisions in consultation with the Site Main Controller. To initiate immediate actions for controlling/mitigating emergency situation at the incident site till the Site Incident Controller (next senior personnel in production) arrives.

Coordinators

(The senior most functionaries available in the respective services)

The senior most functionaries available at site in the respective services will be the coordinators at the time of an emergency. They will report at the Emergency Control Centre (ECC), known as the Primary Command Post, unless and otherwise instructed by the Chief Coordinator (The Site Main Controller). They will assist and advise the Site Main Controller in all matters for effectively managing control measures and mitigating operations.

Emergency Control Centre (ECC) (The Primary Command Post)

In the event of an emergency, SSM Office will be designated as the Emergency Control Centre, which will be known as the Primary Command Post. If, the SSM office is likely to be affected due to unfavorable wind direction or any other reasons, the Emergency Control Centre will be shifted to the Construction Conference Room which will be having necessary facilities to connect communication links as provided in the SSM Office.

Field Command Post (Incident Site)

- An emergency requires co-ordination of numerous activities beyond spill containment and countermeasure efforts from a safe location at the incident

scene. The Field Command Post will be established in the "Cold Zone" for staging deployed apparatus, resources and equipment with means of communications and manning to effectively co-ordinate control efforts.

Assembly Points

- Two alternate locations for safe assembly points have been earmarked at all the operating plants. These locations are designated for assembling non-essential workers, visitors, and other persons who are not required in the plant site at the time of emergency but they are to be moved to safe places. These locations have been provided with sign boards displaying "Assembly Points" for easy identification.
- The persons required to be assembled at the assembly point should choose safer assembly point out of the two, considering the wind direction at that time. The plant control room will also announce the same on the plant PA system, if possible
- The person assembled at the assembly point shall follow the instruction for evacuation of the plant area and move to safe locations as directed. They should move in the cross wind direction or up-wind direction, whichever is safer.

12.2.10 Role and Responsibilities**Site Main Controller**

The Site Main Controller will be the chief coordinator and shall be assisted by other coordinators (senior most functionaries in the respective disciplines). He will take overall command of the emergency management and his duties and the responsibilities are as below:

He will:

- Report at the Emergency Control Centre as soon as he gets information about the emergency at site and will assume overall responsibility if taking decisions and directing actions as necessary for mitigating the situation and managing the emergency effectively with due consideration and priorities for personnel safety, safety to the company's property and the environment
- Assess the magnitude of the situation in co-ordination with the Incident Controller / Dy. Incident Controller and decide whether major emergency exists or is likely to develop, requiring external assistance. Accordingly, he will decide to inform Local/District emergency Chief and other emergency control groups for

help and the nature of help required including assistance from mutual aid members and declare on-site emergency

- Decide the safe route of entry for external assistance/help to reach at site of the incident considering wind direction and the place of the incident and also the place of reporting such assistance. He will also direct the security to guide them properly
- Ensure that the Key Personnel and Co-coordinators are called in
- Ensure that all non-essential workers, visitors, contractors are safely moved to assembly points and direct for search and rescue operation within the affected areas, if necessary
- Be in constant communication with the Site Incident Controller to continuously review and assess the situation and possible developments
- Direct actions for safe shut down of plant(s) or section of the plant and evacuation of plant personnel and other necessary action is in consultation with the other coordinators
- Exercise direct operational control over areas in the complex other than those affected in consultation with other coordinators
- To liaise with the local meteorological office to receive early notification of changes in wind direction and weather conditions
- Liaise with the senior officials of Police, Fire Brigade, Medical and Factories Inspectorate and pass on information on possible effects to the surrounding areas outside the factory premises and necessity of evacuating the area and moving the people to safe places.
- Liaise with various coordinators to ensure that various team are functioning well, casualties are receiving attention and traffic movement within the works is well regulated.
- Arrange for a log of the emergency to be maintained in the Primary Command Post
- Release authorized information to press through the media coordinator
- Control rehabilitation of the affected persons and the affected areas after cessation of the emergency

Site Incident Controller

The Site Incident Controller is the Key Personnel for operations function reporting at the incident site and will take the overall command of actions for emergency control operation on his arrival at the incident site. He will be supported by other key personnel representing various emergency services and initiate emergency control actions under the direction of the Site Main Controller (Primary Command Post). The duties and the responsibilities of the Site Incident Controller include the following:

He will:

- Report at the incident site immediately after getting information about an emergency. Upon his arrival at the site, he will assess the scale of emergency in consultation with the Deputy Incident Controller and evaluate, if a major emergency exists or is likely to develop and inform Emergency Control Centre (primary Command Post) accordingly asking for assistance and indicating kind of support needed
- Take overall control of handling the emergency at site and take action for isolation of source of containment loss to the extent feasible. Simultaneously, in case of fire organize appropriate fire response in coordination with Key personnel (Fire & Safety) to get the situation under control and to prevent its escalation
- Set up communication point (Field Command Post) and establish contact with Site Main Controller (Primary Command Post) and keep him informed about the development
- Keep on assessing the emergency situation at the site and communicate to the Site Main Controller (Primary Command Post) and keep him informed about the development
- Co-ordinate the activities of other key personnel reporting at the Field
- Command Post, under his overall command
- Direct all operation with the affected areas giving due priorities for safety of personnel and to minimize damage to environment, plant and property
- Provide advice and information to Firefighting and rescue personnel, external fire services and other emergency services/teams as and when they arrive at the incident site and co-ordinate with them for effective control actions.
- Ensure that all non-essential workers and staff within the affected area are evacuated to appropriate assembly points and that areas are searched for casualties

- Organize rescue teams for search of casualties in the affected areas (if any) and send them to safe areas / medical center for first aid and medical relief
- Seek additional support and resources as may be needed through Primary Command Post.
- Send decision support from the Primary Command Post for decision such as precautionary shut down of neighboring facilities, precautionary evacuation of people in the neighboring facilities, activating mutual aid plan, etc.
- Be in constant liaison with the Site Main Controller and keep him informed about the situation at the incident site
- Preserve all evidences so as to facilitate any inquiry into the cause and circumstances, which caused or escalated the emergency (to arrange photographs, video, etc.)
- Arrange for head count after the emergency is over with respect to the personnel on duty in the affected areas

Deputy Incident Controller

Normally, the Shift-in-charge of a plant being always available at the plant site and well aware of the plant operating conditions at all times will be designated as the Deputy Incident Controller and assume the charge of the Site Incident Controller at the time of an emergency till the Site Incident Controller arrives at the incident site, he will assist the Site Incident Controller on his arrival and work under his direction in emergency control operation.

The responsibilities and duties of the Deputy Incident Controller will be as defined for the Site Incident Controller. In addition he will ensure the following:

He will:

- In the event of an emergency, caused due to any incident in the plant, he will immediately actuate plant level emergency siren (hooter) to warn the field personnel, contractors' employees, etc. and also arrange for announcement about the emergency and necessary instruction for them for assembling at the safe assembly point or evacuation, etc.
- Ensure that the SSM and senior plant personnel have been informed about the emergency

Fire Services Personnel

Main role of Fire Services personnel is firefighting and rescue operations, helping in operations like, prevention of loss of containment of hydrocarbon, spill/leak containment, etc. Their main responsibilities and duties are described specifically as below:

Chief of Fire (or next senior most fire personnel available)

- He will be the Key Personnel for the Fire and Safety Services at the incident scene and coordinating and commanding all the related operations in consultation with the Site Incident Controller
- He will report at the Field command Post (Incident Site) immediately after receiving the information about an emergency at site, contact the Site Incident Controller and the first turn out leader for necessary information/advice to decide control strategies
- He will take overall command of firefighting/rescue operations and other measures as necessary to control and mitigate the situation and lead the firefighting crew including outside / mutual aid firefighting teams.
- He will assess the severity/magnitude of the situation and decide the level of the emergency in consultation with the Site Incident Controller and inform the Site Main Controller (Primary Command Post) at ECC. He will also advise him for declaring on-site emergency (if necessary)
- He will call for additional resources/help from other Depts. (AFS personnel), mutual aid members, etc. through Primary Command Post as necessary and deploy them appropriately for firefighting and rescue operation at the incident scene. He will also co-ordinate with other key personnel
- He will ensure that sufficient personnel protective equipment, masks, Breathing Air sets, Spare Breathing Air, Cylinders etc. are available at the field Command Post for use by the crew members and ensure that no one access the "Hot Zone" without adequate personnel protection. He will call for logistic support (mobilizing additional supplies through Primary Command Post (Site Main Controller/HSE&F Coordinator))
- He will keep constant contact with Primary Command Post and seek decision support from the Site Main Controller in critical matters/operations and also inform him, if other plants in the complex or surrounding population are likely to be affected

- He will co-ordinate with Security Key Personnel for access control and barricading the affected area in order to prevent vehicular movement
- He will assist in rescue and first aid operations

Shift Fire Officer (Riding Officers)

- Upon receiving emergency call/alarm, he will quickly prepare for the fire turn out and mount the leading fire tender along with the crew members and rush to the incident site taking a safe route of entry considering the wind direction.
- Report to the Dy. Incident Controller/the Incident Controller and Position the Fire Tender strategically at a location in consultation with the Dy. Incident Controller/the Incident Controller
- He will decide the line of action for firefighting and/or other control actions at the scene in consultation with the Dy. Incident Controller/Incident Controller and take appropriate actions for firefighting and control Measures
- He will guide and lead the firefighting crew in firefighting and rescue operation till the arrival of F&S Key person (the Chief of Fire or next senior most person)
- He will ensure the safety of the crew members and that crew members are fully equipped with necessary personnel protection prior to enter "Hot Zone"
- He will assess the severity of the situation and may call for second turnout/additional help through the Dy. Incident Controller/Incident Controller (Field Command Post)
- He will keep constant contact with the key personnel (F&S) at the Field
- Command Post and inform about the situation and probable developments

Firemen on Duty at the Fire Control Room

The fireman on duty at the Fire Control Room will acknowledge the emergency alarm received on the panel and promptly note the plant area/where the incident occurred

- He will note down the information, if emergency call is received through telephone, hot line or messenger
- He will sound the fire bell to inform the fire crew to get ready and take their positions, simultaneously brief the Shift Fire Officer about the emergency message
- He will intimate the Site Shift Manager and the Security Dept. about the emergency giving short description about the occurrence (if known)

- He will actuate emergency siren after receiving instruction from Primary Command Post (Site Main Controller/HSE&F Coordinator)
- He will ask telephone operator to pass on to the communication about the emergency to the Auxiliary Fire Squad of all the plants/selected plants on receiving the instruction from HSE&F Coordinator/Site Main Controller
- He will always be ready and alert for receiving any message / instructions from Primary Command Post/Field Command Post

Auxiliary Fire Squad Members

AFS Members shall be ready on hearing emergency siren and will report to site incident controller at site (Field Command Post) on receiving message from ECC

- They will do the firefighting under the instruction of Shift Officer. Help to bring firefighting equipment from nearby plants
- AFS Members of the plant under emergency will immediately go to the emergency site and will start first aid firefighting.
- As per the emergency situation they will use the fixed firefighting equipment to protect plant equipment from heat exposure.
- They will guide non-essential personnel in case of evacuation
- They will do monitoring/closing of storm water drains if required
- They will help key personnel for taking action on site. Help to Security Personnel for traffic Control

Non-essential Personnel

The plant employees, contractors' employees, visitors, etc., (other than emergency response personnel) present at the incident site are not required to be present at the incident site during the emergency at the site. In the event of declaration of an emergency in the plant/area, these persons shall quickly assemble at the safe assembly point of the plant/area and shall respond as instructed by the Site Incident Controller.

Instruction to the Non-essential Personnel

- Do not panic. Ensure that persons in your immediate vicinity are warned
- Remain alert for announcement from the Control Room, such "Proceed to Safe Assembly Point" and act accordingly
- Do not rush to the scene to be a spectator

- Await instructions at the Assembly Point, report your presence to the superiors/ or the Site Incident controller, inform his whereabouts of your colleagues if they have not arrived
- Do not engage telephone/talk back system and other communication channels, unnecessarily
- Do not approach Control Centers without urgent/or important reasons
- If you are not assigned any specific role, move away as directed
- Do not offer non-authentic information/unconfirmed facts/fact/or conjecture

Telephone Operator

At the time of emergency, communications both inwards as well as outward are very essential and telephone operator's swift action becomes very important. He plays very important part in communicating information/messages to the concerned personnel/outside agencies/mutual aid members/staff members etc. and also receiving a large numbers of outside calls. His main responsibilities and duties are as below:

- He will keep the board free to the extent possible for incoming calls
- He will immediately convey message to the "Key Personnel" and the "Coordinator" about the emergency as per the instruction of the Site main controller.
- The telephone operator will follow instructions from the Site Main Controller/or Media Coordinator only, for passing on any information to outside agency about the emergency or direct all such queries to the media Coordinator for appropriate reply.
- As far as possible he should not entertain unknown/unimportant outside calls/inquiries during initial few hours of the emergency

HSE & F Coordinator

- He will report at the Emergency Control Centre (Primary Command Post) immediately after receiving information about the emergency. He will assist the Site Main Controller for taking critical decisions and provide necessary advice and information
- He will co-ordinate with Key Person (Fire & Safety) and will assist the Site Main Controller for providing decision support and resources support to the Key Persons (F&S), as may be necessary

- He will arrange for mobilizing off-duty fire personnel from their residence; and call other members of the staff for assistance
- He will ensure that the AFS members have been called for assistance and liaise with mutual aid members / Fire Brigade for mobilization of additional resources
- He will co-ordinate with the materials/stores Coordinator and mobilize additional resources, viz., spillage containment equipment/firefighting equipment/material, personal protective equipment, spare breathing air cylinders, etc., as may be required at the incident site for control measures
- He will liaise with Factory Inspectorate / Pollution Control authorities in consultation with the Site Main Controller and provide necessary information. He will also ask for the help, if necessary to evacuate neighboring area outside the complex as advised by the Site Main Controller
- He will organize relieving groups for fire fighting
- He will also initiate necessary actions to minimize impact on Environment

Medical Coordinator

The Chief Medical Officer (or the next in command available at site) will be the Medical Coordinator and perform the following duties:

- He will contact the Site Main Controller immediately after receiving the information about the emergency
- He will report immediately at the Emergency Control Centre (Primary Command Post) or OHC as instructed by the Site Main Controller and contact the Key personnel (Medical) and take stock of the situation
- He will assist and advise the Site Main Controller in all critical decisions in the area of health/medical services to the affected persons and keep constant liaisons with him
- Organize rescue and first aid arrangements for the affected persons at the site in the "cold Zone", as may be necessary with essential staff/equipment and post additional ambulance for transporting seriously injured persons
- Ensure that adequate paramedical staff, equipment and medicines are available at the OHC. He will mobilize additional resources from neighboring industries, if necessary
- To liaise with the Local Medical Authorities and City Hospitals, if the casualties are more and situation demands treatment at additional medical centers

- To co-ordinate with the Transport Coordinator for transporting victims to various hospitals
- To arrange for additional ambulances from other hospitals/ Municipal Corporation
- The Medical Coordinator should ensure the upkeep of agreed medical supplies, antidotes and equipment that should always be kept in stock for treating victims of burns and hazardous chemicals. The medical authorities should be aware of the type of treatment to be administered.
- He will liaise with the media Coordinator for release of news to the press

Security Co-coordinator

The Chief of Security or the next in command available at site shall be the Security Co-coordinator. He will have the following duties / responsibilities:

- He will instruct and deploy plant security personnel to ensure that the law and order is maintained; and unnecessary gathering of the personnel at the scene of emergency is prevented and ensure control of traffic movement in and out of the factory areas
- He will instruct the security personnel / Security Gates to direct and guide external emergency vehicles (Fire tenders/ambulances etc.) called for assistance/help from neighboring industries/Local administration, to the scene of incident
- He will instruct security personnel who could be spared to assist Site Incident Controller/Key Personnel (fire and Safety) in firefighting and evacuation of personnel, at the Incident Site
- He will take action to regulate traffic movement and prevention of traffic jams inside the works as well as outside the factory gates for proper and speedy movement of the emergency vehicles, ambulances, other vehicles carrying outside resources, etc.
- He will mobilize additional security force for help, as necessary
- He will liaise with the police and other local authorities for external help, a necessary for evacuation of the neighboring areas outside the factory premises in consultation with the Site Main Controller

- If necessary, he will arrange for announcement through the mobile P.A. system for alerting and instructing the population in the surrounding areas as directed by the Site Main Controller

Engineering Co-coordinator

- He will report to the Site Main Controller at the Emergency Control Centre
- (Primary Command Post) immediately after receiving information about Onsite emergency.
- He will take stock of the situation and assist/advise the Site Main Controller in deciding control strategies.
- He will mobilize the team from the Maintenance Dept. to assist the Site Incident Controller in control operation at the Field Command Post.
- Arrange isolation of electrical lines from distribution point/substations as required by the Site Incident Controller by calling the Electrical Engineer / Electricians.
- Provide all other engineering support, as may be required.
- Liaise with Key Personnel (Eng. /Maintenance) and co-ordinate with other groups.

Communication Coordinator

Communication Coordinator plays very important part at the time of an emergency particularly when extensive disruption of services takes place. He has the following duties and responsibilities:

- To ensure all available communications links remain functional.
- To quickly establish communication links between the Field Command Post and (if this happens to be in remote off site area) and the Primary Command Post.
- To arrange for announcement on the public address system and maintain contacts with congregation points like canteen, main gate, control rooms etc.
- To ensure that previously agreed inventory of various types of communication equipment is maintained in working condition and frequent checks are carried out and records maintained.
- To maintain voice record of significant communications with timings received/passed from the Primary Command Post.
- To provide additional/alternate communication facilities as required at the site.

P&A Coordinator

He will report at the Primary Command Post (ECC) immediately after getting information about an emergency at the site and assist/advise the Site Main Controller in taking important decisions in the matters related to welfare/necessities/of emergency personnel at site, care/needs of the affected persons. His duties and responsibilities include the following:

- He will ensure that a record of affected personnel is prepared with their local/permanent addresses and telephone numbers
- He will ensure that the relatives of the affected personnel have been informed
- Assign officials at the hospitals to look after the needs of the affected personnel under medical treatment
- Co-ordinate with the Finance Coordinator for necessary funds required to cater the needs of affected personnel, emergency purchases and for other requirements
- To arrange for refreshments, snacks, food, and other needs as may be required for the emergency personnel from time to time
- Co-ordinate with the Purchase Coordinator for necessary emergency procurement of necessary items
- Ensure that staff personnel as necessary for assistance and help are informed/called from their residences
- He will co-ordinate with the instruct Key Personnel transport/welfare & canteen for mobilizing additional resources, as may be required
- To co-ordinate with the neighboring industries for additional vehicles/ambulances and other resources as may be required
- To liaise with the Local Administration for additional assistance/help as may be needed

Transport Coordinator

The Transport Coordinator shall perform the following duties, mobilize all available company's vehicles for emergency use along with the drivers:

- Arrange for transport of victims to hospitals/dispensaries
- Arrange for duty rotation of the drivers to meet the emergency situation
- To direct re-fueling of the vehicles
- To co-ordinate with the neighboring industries for additional vehicles / ambulances as may be required

- To co-ordinate with the neighboring industries for additional vehicles / ambulances as may be required
- To arrange for vehicles from outside local transport agencies, if required
- To keep in contact with the Site Main Controller for evacuation of personnel and transportation of victims

The Welfare / Canteen Coordinator

The Welfare Coordinator will have the following responsibilities:

- Ensure that casualties receive adequate attention and arrange additional help (ex-gratia payment etc.), if required with consultation with the Chief Coordinator
- Inform the relatives of the victims
- When emergency is prolonged, he will arrange for relieving personnel and organize refreshment / catering facilities and arrangements for their rest (bedding, and other necessities)
- He will arrange to procure and keep stocks of necessary food items and other necessary supplies as may be required for the personnel working round-the-clock
- He will arrange for hot drinks /snacks and food and other necessary items for emergency response personnel, as required

Media Coordinator

The Media Coordinator will co-ordinate the following under the direction of the Site Main Controller (The Chief Coordinator):

- He will liaise with various media and release written statements to the press through prior concurrence of the Chief Co-ordinate
- He will handle media interview with various media groups make arrangements for televising the information about the incident, the number of casualties, etc.
- He will inform State and Central Government and the statutory bodies of the nature and magnitude of the incident, the number of casualties, etc.
- He will locate himself such that media persons/third parties do not need to go past the complex security gates and that adequate communication links exists.
- Media personnel often insist on visiting incident scene. He will escort media team(s) If such visits are approved by the Chief Coordinator
- He will be in constant contact with the Medical Coordinator, and other coordinators to be aware of latest development and closely liaise with the Chief Coordinator

Finance Coordinator

- He will report at the Emergency Control Centre immediately after getting information about the emergency at site
- He will release finance (cash / checks, etc.) as directed by the Site Main Controller (Chief Coordinator)
- He will assist the Purchase Coordinator for emergency procurement.
- He will liaise with Insurance Company personnel as directed by the Site Main Controller.
- Purchase Coordinator
- The Purchase Coordinator will report at the Emergency Control Centre as soon as he is informed about an emergency at site
- He will assist the Site Main Controller and arrange for emergency purchase of necessary items as may be required during the emergency.
- He will co-ordinate with the Materials Coordinator and other coordinator for necessary emergency items to be procured
- He will mobilize necessary manpower as may be required, etc.

Materials Coordinator

The Materials Coordinator will ensure:

- Availability of the materials required by the Site Incident Controller
- Arrange issues of materials from the General Stores round-the-clock during an emergency
- Arrange emergency procurements from local dealers / vendors or from neighboring industries
- Arrange transportation of materials from General Store to the Incident Site in co-ordination with the Transport Coordinator

12.2.11 Off-site Disaster Management Plan

Emergency is a sudden unexpected event, which can cause serious damage to personnel life, property and environment outside the boundary wall of the refinery as a whole, which necessitate evolving Off-site Emergency Plan to combat any such eventuality. In Offsite disaster management plan, many agencies like Revenue, Public Health, Fire Services, Police, Civil Defence, Home Guards, Medical Services and other Voluntary organization are involved. Thus, handling of such emergencies requires an organized multidisciplinary approach.

Evacuation of people, if required, can be done in orderly way. The different agencies involved in evacuation of people are Civil Administration (both state and central), non Govt. organizations, factory Inspectorate and Police authorities.

Fire

Effects of fire on population will be mainly due to thermal radiation. In such cases, houses situated to the proximity of disaster need to be evacuated, although a severe smoke hazard due to fire is to be reviewed periodically.

Explosion

An explosion will give a very little time to warn population and areas affected may be much longer than that in case of fire. The effects of explosion on population will be mainly due to shock waves, flying splinters, collapse of structures and exposure to thermal radiation.

Toxic gas/vapor release

A toxic gas release will generally threat much larger area and population, exposed to the drifting cloud of toxic gases and vapor's. The time available for warning population will depend on the point of release, wind direction and velocity.

Huge oil spillage may lead to escape of Oil out-side the factory premises and take the route of our effluent discharge channel. People outside the complex may be warned not to collect oil and provide any source of ignition to create fire in the effluent discharge channel.

The purpose of the off-site disaster management plan is:

- To save lives and injuries and to prevent or reduce property losses
- To provide for quick resumption of normal situation or operation
- To make explicit the inter related be suggested if necessary
- To make explicit inter related set of actions to be undertaken in the event of an industrial accident posing hazards to the community
- To inform people and surrounding about emergency and disaster if it is likely to adversely affect machinery will be established for this purpose to guide the people in proper way
- To plan for rescue and recuperation of casualties and injuries. To plan for relief and rehabilitation
- To plan for prevention of harms, total loss and recurrence of disaster. It will be ensured that absolute safety and security is achieved within the shortest time

Before Crisis

This will include the safety procedure to be followed during an emergency through posters, talks and mass media in different languages including local language. Leaflets containing dos/ don'ts before and during emergency should be circulated to educate the people in vicinity.

- People in vicinity of hazardous installation, and others who are potentially affected in the event of an accident, should be aware of the risks of accidents, know where to obtain information concerning the installation, and understand what to do in the event of an accident
- Non-governmental Organizations (NGO's) (Such as environmental, humanitarian and consumer group) should motivate their constituents and others, to be involved in risk reduction and accident prevention efforts.
- They should help to identify specific concerns and priorities regarding risk reduction and prevention, preparedness and response activities.
- NGO's should facilitate efforts to inform the public and should provide technical assistance to help the public analyze and understand information that is made available
- Public authorities (at all levels) and management of hazardous installation should established emergency planning activities/program's for accidents involving the hazardous substance.
- All parties who will be involved in emergency planning process. In this respect public health authorities, including experts from information centers should be involved in relevant aspects of offsite emergency planning
- Emergency warning alert system should be in place to warn the potentially affected public, or there is an imminent threat of an accident.
- The system chosen should be effective and provide timely warning. Suitable warning system could include or a combination of for e.g.: sirens, automatic telephone message, and mobile public address system.

During Crisis

Central Control Committee: As the off-site plan is to be prepared by the government a central control committee shall be formed under the chairmanship of area head. Other officers from police, fire, factory, medical, engineering, social welfare, publicity,

railway, transport and requisite departments shall be incorporated as members. Some experts will also be included for guidance. The functions of committee should be:

- To work as main co-coordinating body constituted of necessary district heads and other authorities with overall command, coordination, guidance, supervision, policy and doing all necessary things to control disaster in shortest times
- To prepare, review, alter or cancel this plan and to keep it a complete document with all details
- To take advice and assistance from experts in fields to make plan more successful
- To set in motion all machineries to this plan in event of disaster causing or likely to cause severe damage to public, property or environment
- The incident control committee, traffic control committee and press publicity committee will first be informed, as they are needed first.
- **Medical Help, Ambulance and Hospital Committee:** This committee consisted of doctors for medical help to the injured persons because of disaster. Injuries may be of many types. As such doctors are rarely available we have to mobilize and utilize all available doctors in the area.
 - Functions and duties of the committee include:
 - To give medical help to all injured as early as possible
 - Civil surgeon is the secretary who will organize his team
 - On receiving information to rush to spot he will immediately inform his team and will proceed with all necessary equipment's.
 - First aid and possible treatment shall be provided at the spot or at some convenient place and patients may be requested to shift to hospitals for further treatment.
- All efforts shall be made on war basis to save maximum lives and to treat maximum injuries.
- Continuity of the treatment shall be maintained till the disaster is controlled.
 - **Traffic Control, Law and Order:** The committee is headed by District Superintendent of Police. Functions and duties of this committee should be:
 - To control traffic towards and near disaster, to maintain law and order
 - To evacuate the places badly affected or likely to be affected
 - To shift the evacuated people to safe assembly points
 - To rehabilitate them after disaster is over.

- Necessary vehicles, wireless sets and instruments for quick communications shall be maintained and used as per need

After Crisis

At the time of disaster, many people may badly be affected. Injured people shall be treated by medical help, ambulance and hospital committee, but those not injured but displaced kept at assembly points, whose relative or property is lost, houses collapsed and in need of any kind of help shall be treated by this welfare and restoration committee. Functions and duties of this committee are:

- To find out persons in need of human help owing to disastrous effect.
- They may give first aid if medical team is not available
- They will serve the evacuated people kept at assembly points. They will arrange for their food, water, shelter, clothing, sanitation, and guidelines to reach any needful places
- They will look for removal and disposal of dead bodies, for help of sick, weak, children and needy persons for their essential requirements - The team will also work for restoration of detached people, lost articles, essential commodities etc.
- - The team will also look after the restoration of government articles
- - The team will also ensure that the original activities, services and systems are resumed again as they were functioning before the disaster

Police Department

- The police should assist in controlling of the accident site, organizing evacuation and removing of any seriously injured people to hospitals.
- Co-ordination with the transport authorities, civil defense and home guards
- Co-ordination with army, navy, air force and state fire services
- Arrange for post mortem of dead bodies
- Establish communication center
- Fire Brigade
- The fire brigade shall organize to put out fires and provide assistance as required.

Hospitals and Doctors

- Hospitals and doctors must be ready to treat any injuries.
- Co-ordinate the activities of Primary Health Centers and Municipal
- Dispensaries to ensure required quantities of drugs and equipment's
- Securing assistance of medical and paramedical personnel from nearby hospitals/institutions

- Temporary mortuary and identification of dead bodies
- Media
- The media should have ready and continuous access to designated officials with relevant information, as well as to other sources in order to provide essential and accurate information to public throughout the emergency and to help avoid confusion
- Efforts should be made to check the clarity and reliability of information as it becomes available, and before it is communicated to public.
- Public health authorities should be consulted when issuing statements to the media concerning health aspects of chemical accidents.
- Members of the media should facilitate response efforts by providing means for informing the public with credible information about accidents involving hazardous substances.

Non-governmental organizations (NGOs)

- NGO's could provide a valuable source of expertise and information to support emergency response efforts. Members of NGOs could assist response personnel by performing specified tasks, as planned during the emergency planning process. Such tasks could include providing humanitarian, psychological & social assistance to members of community and response personnel.

Duties of NGOs are listed below:

- Evacuation of personnel from the affected area
- Arrangements at rallying posts and parking yards
- Rehabilitation of evacuated persons
- Co-ordination with other agencies such as police, medical, animal husbandry, agriculture, electricity board, fire services, home guards and civil defense.
- Establishing shelters for rescue, medical, firefighting personnel.
- Evacuation of personnel from the affected area
- Arrangements at rallying posts and parking yards
- Rehabilitation of evacuated persons
- Co-ordination with other agencies such as police, medical, animal husbandry, agriculture, electricity board, fire services, home guards and civil defense.
- Establishing shelters for rescue, medical, firefighting personnel.

12.2.12 Mock Drills

As per the Industrial Major Accident Hazard Rules,

(a) The occupier shall ensure that a mock drill of the on-site emergency plan is conducted every six months.

(b) A detail report of the mock drill conducted shall be made immediately available to the concerned authority.

Accordingly, Onsite Disaster Mock Drills are conducted once in six months.

Also, Major Fire and Minor Fire mock drills are conducted once in three months and one month respectively.

Lessons Learned System for Mock Drills

Performances during the mock drills are reviewed by CEC Coordinators and other involved persons including observers. Observations/shortcomings are reviewed and recommendations are made for improvements which are followed by F&S for compliance. The action points from the mock drill observations should be circulated to all concerned for liquidation.

All Clear / Re-entry Procedures

Chief Emergency Controller (CEC) will declare “All Clear” after control of the Incident and arrange measures required for post Disaster control period and ask Fire Station to Blow 2 minutes straight run siren.

After incident normalization, CEC would ask Unit in-charge to visit and check the incident site along with representatives of Inspection and F&S and also Maintenance (Electrical / Mechanical / Civil/ Instrumentation/ Rotary) as needed. Standard Checks particular to a unit will be provided by respective Area Managers. Based on feedback of the team, CEC would allow re-entry / resumption of operations at the incident site.

Evacuation Plan**Purpose**

To establish method of systematic, safe and orderly evacuation of all the occupants in case of fire or any emergency, in the least possible time, to a safe assembly point through nearest safe means of escape. Additionally to use available fire appliances provided for controlling or extinguishing fire and safeguarding of human life.

Fire Escape Drill Procedure

- In the event of fire condition or on hearing the fire alarm all the occupants of the building shall immediately leave the work area and proceed towards nearest safe

escape route. A care should be taken before leaving the workplace so that the escape route shall not be blocked due to chairs or other similar object.

- Security In-charge will ensure the access control system is defeated for safe evacuation of all the occupants from the affected building.
- The occupants will have to leave the affected area / block / building in a speedy and orderly manner.
- Before leaving the workplace occupants will switch off electrical gadgets such as AC, Computers, Water heaters, etc. The area owner of the building will ensure electric supply cut off to the affected building.
- The emergency exit / normal exit if not affected due to fire and / or smoke shall be used for speedy evacuation.
- All occupants will follow in a row while escaping from the block / building. Unnecessary haste and crowding shall be avoided on the escape route. Panic actions of the occupants will definitely delay the evacuation.
- The occupants having visitors shall ensure the safe evacuation of the visitor along with them to the safe assembly point.
- Efforts shall be made to control or extinguish the fire with the help of available fire extinguishers in that area.
- Building / block in-charge shall ensure the safe escape and orderly evacuation of all the occupants.
- All occupants after being evacuated shall assemble at designate safe assembly point. Block/building in-charge will arrange for head count to ensure that all the occupants have been safely evacuated.
- Security in-charge shall ensure that all the visitors have been evacuated as per visitor entry register/gate pass register. The visitors shall evacuate from the building / block along with the occupants and report to security in charge.
- The missing/suspected trapped occupants will be searched and rescued by the fire crew.
- Upon All-Clear signal from the incident controller, occupants can go back to their work place.

Do's

- Leave your workplace immediately and rush through safe escape route.
- Evacuate in a speedy but orderly manner.

- Help elderly and handicapped persons for evacuation.
- Assemble at safe assembly point and report to your floor coordinator.
- Don'ts
- Panic.
- Re-enter in the affected building.

Training

On job training to the engineers on various facets of risk analysis would go a long way in improving their horizon which in turn is expected to reflect in the operation of plant, especially from the safety stand point. In order to combat with emergency situations arising out of accident release of hazardous chemicals, it is necessary for industries to prepare an exhaustive offsite and onsite emergency preparedness plan. The fire crew belonging to the firefighting department shall be given intensive training for the use of all equipment and in various firefighting methods for handling different types of fires.

12.2.13 Checklist for Capability Assessment

The checklist will help in assessing the preparedness, prevention and response resources capabilities. The points included in the checklist are only indicative and there is a need to closely examine the local requirements while preparing the checklist.

For good control and management of an incident, there are three important requisites.

- Defined Organization
- Effective means
- Trained people

The organization has to be properly structured for routine as well as emergency purposes with clear understanding of duties and responsibilities. The structure has to consider an execution and speedy implementation of the response plans; while at the same time, it should be flexible enough to tune itself to the fast changing situations. All plans and procedures for emergency handling should be established. Checklists in the form of Do's and Don'ts of preventive maintenance, strengthening of HSE, manufacturing utility staff are listed in the subsequent subsections. Work permit check list is described below:

Table 12-1: Work permit check list is described below:

Sl. No.	Precaution to be taken	Yes	No
1	Electrically isolated and fuse removed. Lock out-Tag out (LOTO) followed		

2	Flow isolated by closing valves		
3	De-pressurized – vacuum released		
4	Vessel cooled		
5	Drained fully and drain kept open		
6	Vent kept open		
7	Manhole kept open		
8	Vessel purged with steam		
9	Vessel purged with water		
10	Vessel purged with nitrogen/ air		
11	Vessel free from toxic gases/vapor's/ flammable substances		
12	Gas test shows > 20% oxygen inside vessel		
13	Safety tags card placed wherever required		
14	Personal PPE's provided		
15	Exhaust / ventilation inside vessel is sufficient		
16	Caution boards placed		
17	Tools and tackles checked as per specifications		
18	Head count of the area known to relevant persons		
19	Trained Site supervisor nominated		
20	Safety measures such as hydrant, alarms, sensors checked		

13 Conclusion & Recommendation

13.1 Conclusion

This ESIA, including the ESMP, should be used as a basis for an environmental compliance program and be included as an Appendix to the contract. The ESIA shall be reviewed at the detailed design stage. Therefore, continued monitoring of the implementation of mitigation measures, the implementation of the environmental conditions for work and environmental clearance, and monitoring of the environmental impact related to the project should be properly carried out.

All potential impacts were identified in relation to preconstruction, construction, and operation phases. Planning principles and design considerations have been reviewed and incorporated into the site planning process whenever possible; thus, environmental impacts as being due to the project design or location were not significant. However, the social impacts (access disruptions) due to construction activities are unavoidable, as the commercial establishments exist along the project corridor.

Pollution of water from domestic activities and noise pollution was predicted as major impacts. The STP facilities are sufficient to reduce environmental impact. In addition, by implementing all necessary protection and regulatory measures as suggested here in ESIA, the proposed plant is expected to meet the National Environmental Quality Standards.

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

The proposed plant will be constructed within an Economic Zone area. So there is no need for land acquisition. Additionally, there is no settlement in this area, and the area is not used for any income generation activities.

Therefore, no population will be displaced and no resettlement will be required; and no loss of income is associated with the proposed project.

During public consultations people welcomed the proposed plant project at North Rupshi. However, they recommended installing a plant of good quality, which will be able to keep anticipated water, air and noise pollution to a minimum level.

Finally, it can be concluded that the location of **City Edible Oil Captive Power Plant Ltd.** is environmentally acceptable and it is expected that **City Edible Oil Captive Power Plant Ltd.** will follow all environmental compatible steps during construction,

operation and maintenance by which it sets a positive example as an environment friendly area.

13.2 Recommendations

The following recommendations have been made for efficient and effective implementation of environmental conservation, health & safety, social responsibilities measure through the lifespan of the proposed resort.

- Abide environmental policy, laws, rules and instructions of the Department of Environment.
- Once ESIA is approved by concerned authorities, strict implementation is essential
- For full and proper implementation of EMP, well understanding and support by resort owner and its administrative authority is deeming necessity
- Fully implement Corporate Social Responsibility (CSR) Plan as an ethical business obligation, so as to be regarded as good neighbor/investor in the neighborhood
- Well experienced and knowledgeable HSE Coordinator and HSE assistants shall be selected and appointed

13.3 References

List of secondary data used for carrying out ESIA study and preparation of ESIA report is given at the following table.

Table 13-1: Reference Used for ESIA Study

S. No.	Reference
Government Departments	
1.	Bangladesh Economic Zones Authority (BEZA)
2.	Department of Environment (DoE)
3.	Bangladesh Agriculture Research Council (BARC)
4.	Bangladesh Water Development Board (BWDB)
5.	Bangladesh Meteorological Department (BMD)
6.	Bangladesh Forest Department (DoF)
7.	Bangladesh Bureau of Statistics (BBS)
8.	Bangladesh Food & Agriculture Department (FAO, Bangladesh)
9.	Geological Survey of Bangladesh (GSB)
10.	Disaster Management Bureau (DMB)
11.	Department of Disaster Management (DDM)
12.	Department of Agriculture Extension (DAE)
13.	Bangladesh Rice Research Institute (BRRI)
14.	Department of Fisheries (DOF)
15.	Power Grid Company of Bangladesh (PGCB)
16.	Land & Revenue Department, Munshigonj
Journals, Books & Existing Studies	
17.	Geological Settings Of The Areas Of Arsenic Safe Aquifers, Md. Munir Hussain And SKM Abdullah, Ground Water Task Force, October, 2001
18.	Hasan MA, Bhattacharya P, Sracek O, Ahmed KM, Bromssen M and Jacks G (2009). Geological controls on groundwater chemistry and arsenic mobilization: Hydrogeochemical study along an E–W transect in the Meghna basin. Bangladesh Journal of Hydrology 318(1-2): 105-118.
19.	Nuruzzaman M (2011). A Study of Co-operative Floodplain Aquaculture: Daudkandi Model. M.S thesis dissertation. Brac development institute, Brac University. pp. 1-174.
20.	Nishat A, Huq SMI, Barua SP, Khan AHM and Moniruzzaman AS (2002). Bio ecological zones of Bangladesh. IUCN, Bangladesh Country Office, Bangladesh, Dhaka, p.141.
21.	Ramassar Convention (1971). List of Wetlands of international importance. Ramassar, Iran.
22.	HIES (The Household income and expenditure survey) (2010). Bangladesh Bureau of Statistics, Ministry of Planning, Dhaka, Bangladesh.
23.	SRDI (Soil research development institute) (1999). Thana Instruction Guide, p. 54.
24.	SRDI (Soil research development institute) (1997). Agricultural land use of Bangladesh. Soil resources development institute, Dhaka
25.	Statistical Yearbook (2012-2013). Fisheries resources survey system (FRSS), Department of Fisheries, Bangladesh. Volume 29: p. 44.
26.	BBS (Bangladesh Bureau of Statistics) (2011). District statistics. Statistics and informatics division (SID) Ministry of planning, Government of the people's

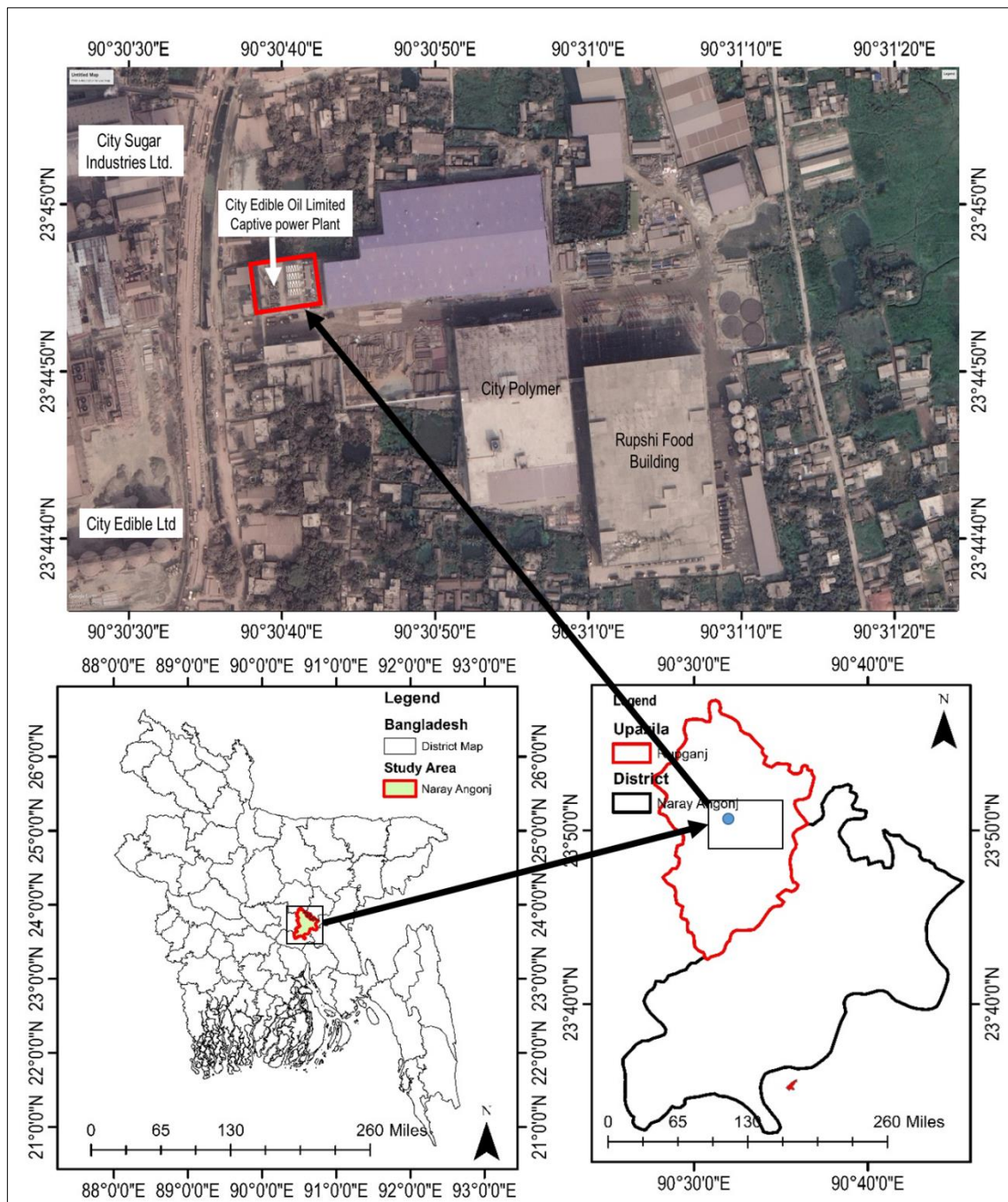
S. No.	Reference
	republic of Bangladesh, pp. 1-149.
27.	Banglapedia (2017). Agro-ecological zones of Bangladesh. Available online at: http://en.banglapedia.org/index.php?title=Agroecological_Zone
28.	Banglapedia (2017). Flood plain of Bangladesh. Available online at: http://en.banglapedia.org/index.php?title=Floodplain
29.	Wikipedia (2017). Inceptisols. Available online at: https://en.wikipedia.org/wiki/Inceptisol
30.	Ahmed A (2011). Agricultural adjustment in flood-prone areas in Comilla of Bangladesh: A geographical study. Journal of Development and Agricultural Economics Vol. 3(12): 602-609.
Website	
31.	Wikipedia
32.	Google maps
33.	http://www.bangladeshtourismdirectory.com/bangladesh-archaeological-sites-list.html
34.	Google earth imageries
35.	http://www.saarc-sadkn.org/countries/bangladesh/disaster_mgt.aspx (Bangladesh Disaster Knowledge Network)
36.	http://www.livingwiththejamuna.com/essayintroduction.html
37.	http://www.fao.org/docrep/field/003/AC360E/AC360E03.htm#anxA
Others	
38.	Site visits
39.	Feasibility Report of the Economic zone

1. Annex-1: Trade License

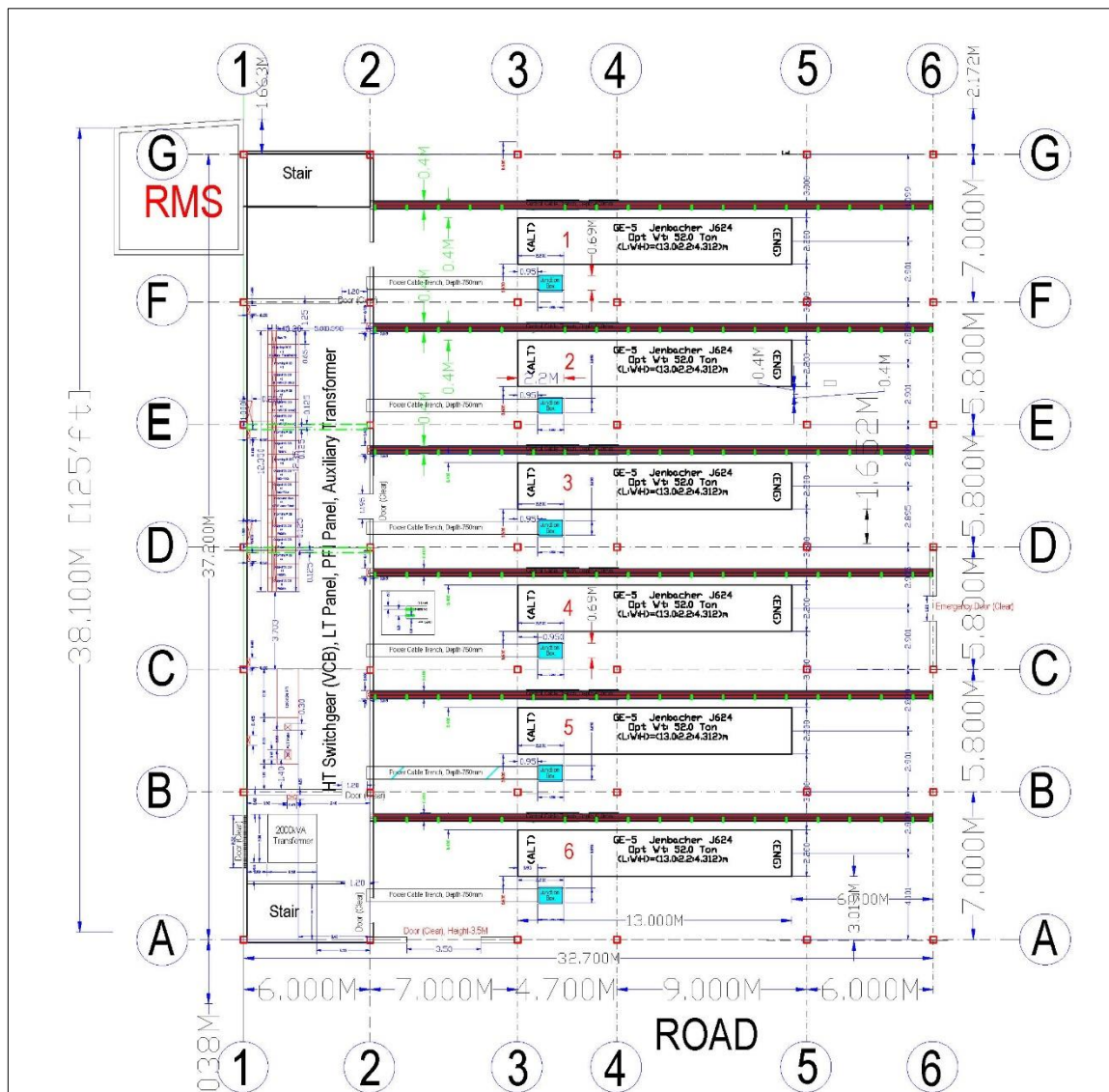
2. Annex-2: VAT Registration Certificate

3. Annex-3: TIN Certificate

4. Annex-4: Project Location Map



5. Annex-5: Project layout plan



6. Annex-6: Environmental Clearance Certificate



গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
পরিবেশ অধিদপ্তর
নারায়ণগঞ্জ জেলা কার্যালয়
মা আমেনা স্বপ্ন টাওয়ার (চতুর্থ তলা)
পূর্ব লামাপাড়া, ফতুল্লা, নারায়ণগঞ্জ
www.doe.gov.bd

পরিবেশগত ছাড়পত্র নবায়ন

ছাড়পত্র নং: ২১-৫৪৫৬৩

পরিবেশগত ব্যবস্থাপনা নিশ্চিতকরণ সাপেক্ষে সংযুক্ত শর্তে নিম্নবর্ণিত প্রতিষ্ঠান/প্রকল্পের অনুকূলে পরিবেশগত ছাড়পত্র নবায়ন প্রদান করা হলো :

প্রতিষ্ঠান/প্রকল্পের নাম	: সিটি এডিবল অয়েল লিমিটেড
উদ্যোক্তার নাম	: ফজলুর রহমান
সনাক্তকরণ নং	: ১০৫৮৬৬
প্রতিষ্ঠান/প্রকল্পের কার্যক্রম	: সয়াবিন, পাম, সানফ্লাওয়ার, বনস্পতি, রাইস ব্রান তৈল পরিশোধন
প্রতিষ্ঠান/প্রকল্পের শ্রেণী	: Orange-B
প্রতিষ্ঠান/প্রকল্পের ঠিকানা	: উত্তর রূপসী, রূপগঞ্জ, নারায়ণগঞ্জ।
প্রদানের তারিখ	: ০৯ ফেব্রুয়ারি ২০২১
মেয়াদ উত্তীর্ণের তারিখ	: ০৯ জুন ২০২১



এ ছাড়পত্র সনদের সাথে পৃথকভাবে সংযুক্ত প্রদত্ত শর্তাবলী যথাযথভাবে প্রতিপালন করতে হবে, অন্যথায় ছাড়পত্র বাতিল/কর্তিপূরণ আদায়সহ যে কোন আইনানুগ ব্যবস্থা গ্রহণ করা হবে।

বিঃদ্রঃ এটি একটি সিস্টেম জেনারেটেড ছাড়পত্র এবং এতে কোনোরূপ স্বাক্ষরের প্রয়োজন নেই।

ছাড়পত্রটি যাচাই করতে ভিজিট করুন: http://ecc.doe.gov.bd/certificate_verification

7. Annex-7: Surface Water & Ground Water Quality Test Report



Controlling Engineering Laboratory

Safe water, Secure the future

Project : City Edible Oil Captive Power Plant Ltd
 Project Consultant : Water Technology BD Limited
 Sample ID : 25(A). CEL No: 101190025/CEL

Project Location : City Economic Zone, Rupshi, Narayanganj, Dhaka.
 Test Done By : Control Engineering Laboratory (CEL)
 Date of Test : 02/11/2020-10/11/2020
 A unit of Water Technology BD Limited

Table: Surface Water Quality Analysis Result

SN	Parameters	November		Bangladesh Standard (mg/l)
		SW1	SW2	
		Nov-2020	Nov-2020	
01	COD (mg/l)	40	40	≤ 200
02	DO (mg/l)	7.62	7.47	4.5-8.5
03	pH	8.3	8.3	6.5-8.5
04	Alkalinity (mg/l)	120	120	150
05	Hardness (mg/l)	78	80	200-500
06	Iron (mg/l)	Nil	Nil	2
07	TDS (ppm)	110	120	≤ 2100
08	Temperature (°C)	26.9	27.1	Summer-40 Winter-45



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Lab Analyst



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Technical Manager



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 Mobile: +88-01713565696; +88-01713273156; Email: info@wtbl.com.bd; website: www.wtbl.com.bd



Controlling Engineering Laboratory

Safe water, Secure the future

Project : City Edible Oil Captive Power Plant Ltd
 Project Location : City Economic Zone, Rupshi, Narayanganj, Dhaka.
 Project Consultant : Water Technology BD Limited
 Test Done By : Control Engineering Laboratory (CEL)
 Sample ID : 25(A). CEL No: 101190025/CEL
 Date of Test : 02/11/2020-10/11/2020
 A unit of Water Technology BD Limited

Table: Ground Water Quality Analysis Result

SN	Parameters	November		Bangladesh Standard (mg/l)
		GW1	GW2	
		Nov-2020	Nov-2020	
01	Arsenic (As)	-	-	0.05 mg/l
02	Iron (Fe)	0.2	0.1	0.3-1.0 mg/l
03	Lead (Pb)	-	-	0.05 mg/l
04	pH	7.4	7.8	6.5-8.5
05	Temperature	27.1	27.0	20-30 °C
06	Total Coliform	-	-	0 mg/l
07	TDS	890	240	≤1000 mg/l
08	Hardness	498	129	200-500



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8. Annex-8: Air Quality Test Report


Controlling Engineering Laboratory
Safe water, Secure the future

Project : City Edible Oil Captive Power Plant Ltd	Project Location : City Economic Zone, Rupshi, Narayanganj, Dhaka.
Project Consultant : Water Technology BD Limited	Test Done By : Control Engineering Laboratory (CEL) A unit of Water Technology BD Limited
Sample ID : 25(A). CEL No: 101190025/CEL	Date of Test : 02/11/2020-10/11/2020

Table: Air Quality Analysis Result

Sl. No.	Sampling Locations	SPM	PM _{2.5}	PM ₁₀	CO	SO ₂	NO _x
01	North-west corner	105	25	82	0.5	05	05
02	South-west corner	115	33	72	1.0	19	09
03	North-east corner	197	49	147	0.7	07	18
04	South-east corner	176	29	133	0.4	13	14
DoE Standards		200	65	150	9	365	100


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9. Annex-9: Noise Quality Test Report



Controlling Engineering Laboratory

Safe water, Secure the future

Project : City Edible Oil Captive Power Plant Ltd
 Project Location : City Economic Zone, Rupshi, Narayanganj, Dhaka.
 Project Consultant : Water Technology BD Limited
 Test Done By : Control Engineering Laboratory (CEL)
 A unit of Water Technology BD Limited
 Sample ID : 25(A). CEL No: 101190025/CEL
 Date of Test : 02/11/2020-10/11/2020

Table: Noise Quality Analysis Result

Sl. No.	Area Status	Sampling Locations	Average Noise Level (dB(A))				Applicable Standard* (dB(A))	
			Leq _{day}	Leq _{night}	Leq _{max}	L _{min}	Day	Night
01	Industrial Area	NS 1	55.5	43.5	67.33	41	75	70
02	Industrial Area	NS 2	50.5	39	59	42	75	70
03	Industrial Area	NS 3	56.5	44.5	69.67	41.67	75	70
04	Industrial Area	NS 4	57.5	47	71	45	75	70



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 Mobile: +88-01713565696; +88-01713273156; Email: info@wtbl.com.bd; website: www.wtbl.com.bd

10. Details FGD with Attendant List

SN	Date	Name of the Stakeholders and designation	Suggestion	Impact +/-/0
1	02/11/2020	Mr. Alhaj Abdur Matin, Farmer, Gazaria	- Water and Sound pollution should be restricted. - Meeting with details lay out Plan - t with the concerned engineers	+
2	02/11/2020	Md. Sirajul Islam, Manager Local Brickfield.	- Precautions are to be taken against environmental pollution. - No objection against proposed factory.	+
3	02/11/2020	Jafrin Akther Housewife, Local area.	Traffic congestion occur.	-
4	02/11/2020	MD, Rezaul Maksud Jahidi, School Teacher,	- Positive impact on overall socio-economic condition. - No impact on environment. - Precautionary measure should be taken. - Ensure social welfare from the plant - Firefighting must ensure	+
5	02/11/2020	Md. Shah Alam, R.E office, REB.	No comment	0
6	02/11/2020	Mr. Bayjidul Islam, Retired teacher,	No effect	0
7	02/11/2020	Md. Momin Mia, Van Driver,	Positive impact on employment.	+
8	02/11/2020	Mr. Abu Baker Siddique, Officer, Kamil Madrasa.	Employment facility will be increased.	+
9	02/11/2020	Md. Johirul Islam, Retired School Primary School Headmaster,	Positive impact on overall socio-economic condition	+
10	02/11/2020	Md. Nurul Islam,	Request for controlling to the minimum limit of sound	+

		Owner near factory,	pollution and vibration	
11	02/11/2020	Md. Ruhul Amin Local businessman,	Negative impact, water, sound pollution and vibration.	-
12	02/11/2020	Moulana Ahmed Karim Local mosque Imam	No comments	
13	02/11/2020	Md Solaiman, Student,	Positive impact on overall socio-economic condition	+