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FINAL REPORT

ENVIRONMENTAL and SOCIAL IMPACT ASSESSMENT (ESIA)

PROPOSED VERTICAL ROLLER MILL of Meghna Cement Mills Limited at Industrial Area, Mongla Port, Mongla, Bagerhat

Prepared By



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ABBREVIATIONS

APHA	American Public Health Association
ASTM	American Society for Testing and Materials
AASHTO	American Association and State Highway and Transportation Officials
BOD	Biochemical Oxygen Demand
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
DO	Dissolve Oxygen
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
ECR	Environment Conservation Rules
EIA	Environmental Impact Assessment
ESAM	Environmental and Social Assessment Manual
FGD	Focus Group Discussion
GoB	Government of Bangladesh
IDCOL	Infrastructure Development Company Limited
IUCN	International Union for Conservation of Nature
IFC	International Finance Corporation
KII	Key Informant Interview
MCML	Meghna Cement Mills Limited
MT	Metric Ton
NO _x	Nitrogen Oxides
POC	Penta-Ocean Construction Co. Ltd.
SO _x	Sulphur Oxides
SPM	Suspended Particulate Matter
TPD	Ton per day
VRM	Vertical Roller Mill
WB	World Bank

SECTION 1 INTRODUCTION

1.1 Background

Meghna Cement Mills Ltd (MCML)- the first Cement manufacturing industrial unit of **Bashundhara Group** is established in 1992 and came into commercial production on 15th January 1996 with production capacity of 1000 MT/day. Growing demand of Portland cement in Bangladesh created further scope for Meghna Cement Mills Ltd (MCML) to set-up its second Unit in 1999 with production capacity of 1680 MT/day. At present collective production capacity of MCML is approx 0.9 million MT/year. It should mention that Clinker Grinding process of both unit-1 and unit-2 of MCML had been established with Ball Mill technology.

The Meghna Cement Mills Ltd has achieved International Standard Organization (ISO) certificate 9001:2008 with accreditation for manufacturing of Portland cement products for both domestic and international markets and 14001:2015. Since 1996, MCML markets its product under the registered trade mark "**King Brand Cement**".

In 2016, entrepreneurs of Meghna Cement Mills Ltd (MCML) recognized a set of challenging issues that led to make decision regarding establishment of the Proposed "VRM (Vertical Roller Mill) Cement Grinding Plant", which includes replacement of existing ball mills of Unit-1 with target to produce 8000 MT/day (2.4 million MT/year) Ordinary Portland Cement (OPC). Collective production capacity that includes existing Unit-2 (1680 MT/day) and Proposed VRM (8000 MT/day) of MCML shall be approx 2.9 million MT/year. Therefore upon commencement of VRM operation, MCML shall become one of the largest cement producing industry (Clinker Grinding and Packaging Plant) in Bangladesh.

To implement the Proposed "VRM (Vertical Roller Mill) Cement Grinding Plant", entrepreneur of Meghna Cement Mills Ltd (MCML) intends to seek necessary finance from 'Infrastructure Development Company Limited (IDCOL)'.

1.2 Project Location

Existing Clinker Grinding and packaging plants of Meghna Cement Mills Ltd is located at Industrial Area of Mongla Port authority, which lays at Plot No 1-3, Buridanga union of Mongla Upazila under Bagerhat District of Khulna Division. Figure-1 shows the location of existing MCML site.

1.3 Purpose of the ESIA Study

Purpose of this Environment and Social Impact Assessment (ESIA) study includes the followings aspects-

- In 1991, Meghna Cement Mills Ltd (MCML) has obtained 'Environmental Clearance Certificate (ECC)' from Department of Environment (DOE).

In 1999, to comply with condition no-8 of ECC, 'Environment Conservation Act 1995 and Environment Conservation Rules 1997' respectively, MCML had obtained prior approval from DOE upon submission of EIA report (1999) to set-up Unit-2.

According to the condition of ECC, obtaining of prior approval of DOE is must in case of any modification of production process or increase of production capacity of existing plant.

Again to comply with the condition no-8 of ECC and condition no-2 Renewal Certificate of ECC , authority of MCML has prepared this 'Environment and Social Impact Assessment (ESIA) Study' according to the suggestion made by authority of Department of Environment of Khulna divisional office. Copies of original 'Environmental Clearance Certificate', 1991 and Latest 'Environmental Clearance Renewal Certificate', 2015 are enclosed in **Annex-1**.

- On the other hand, IDCOL- the potential project financier also advised to conduct an 'Environment and Social Impact Assessment (ESIA) Study' and to submit the report according to the TOR refer to the contents of the ESIA study report for review and approval that shall lead decision in financing the proposed project UNIT-2 of Meghna Cement Mills Ltd (MCML) at Mongla Industrial area, Mongla port, Bagerhat. Khulna. And
- To develop a realistic and implementable Environmental Management Plan to construct and operate the proposed plant with efficient and effective environmental management system.

1.4 Scope of Study

SGS Bangladesh Limited has conducted and prepared this 'Environment and Social Impact Assessment (ESIA)' report to meet the specific requirement of client following the Scope of Work refer to the 'contents of the ESIA report', which suggested by IDCOL (**See Annex-2**). Study also considered the project related technical document/information as basis document provided by client. Major Scope of ESIA Study includes-

- Literature review of Project related technical document, legislative requirement, and available published secondary information related to baseline aspects;
- Preparation of details about the proposed project and legislative framework;
- Conduct and establishment of baseline condition that includes administrative context, settings of surrounding, present physical, biological and socioeconomic conditions of the study areas;
- Identification and prediction of potential impacts that would be generated due to intervention of construction activities and operation of proposed VRM Unit;
- Formulation of mitigation measure to mitigate and enhance project impacts and development of Environmental Management Plan (EMP) with participation of various stakeholders. EMP shall include emergency response plan, grievance redress mechanism, monitoring plan, implementation arrangement with budget, etc; and
- All suggestions/recommendations of stakeholders on draft ESIA report shall be addressed in the final report

1.5 Study Methodology

The methodology used for this study is based on the procedures described in ESIA guidelines for industries published by DOE of the GOB as well as the guidelines embodied in WB and IFC's Environmental and Social Safeguards Policies.

The main procedures of ESIA are to:

- Identify the project or activity and the environment in which it will be implemented i.e. describe proposed new activities;
- Predict the impacts of each activity on the different components of the environment i.e. relate the activities to planning regulations;
- Evaluate the significance of predicted impacts and develop alternatives i.e. analyse primary and secondary environmental impacts: These are physical, ecological , social as listed in the standard 'Checklist of Environmental Parameters and Impact Matrix Tables';
- Formulate the basis for Environmental management Plan together with monitoring program and controlling mechanism to protect local environment i.e. ESIA methodology enables a participatory planning activity between industrial enterprise, government and community.
- Communicate these impacts to decision –makers and affected communities and generate courses of action to reduce the impacts; And
- Specific activities under the aforesaid procedures of ESIA methodology include the following work plan:

Activity 1: Kick -Off Meeting with Client

Immediately after getting the contract agreement, the Project Coordinator finalized the study team with briefing notes outlining the scope of work and outputs required from each of the team members. A kickoff meeting held between study team of SGS and concerned officials of MCML in order to get appraise of the project background, technology, interventions and, etc.

Activity 2: Literature Review

- Reviewed the applicable National environmental policy, act, rules & regulations, EIA Guidelines, etc and safeguard policy & guideline of IDCOL/World Bank/IFC;
- Reviewed the technical data/information/parameters of proposed project including design specifications that are provided by the Project Proponent.

Activity 3: Reconnaissance

The ESIA team undertook a rapid reconnaissance and field visit to the study area at Mongla Industrial Area to observe the site-specific environment concern and to get perception within and vicinity of the Site. During site visits, the ESIA team has been observed and carried out investigation on following aspects:

- present status of existing and proposed VRM Cement Grinding plant
- settings of site and surroundings
- Ecosystem
- Hydrological features
- Identification of Project Influential Areas
- Presence of sensitive features, reserve forest, wildlife sanctuary, religious structures etc. within and along the proposed site

Activity 4: Baseline Survey

- Environmental and Social Screening
- Collection of Ambient air, noise, surface and ground water samples
- Identification Potential impact receptors, Community resources, Social network, etc
- Conducted Stakeholder Consultations: The ESIA team randomly held consultation with
 - Representatives of Local Administrative- Mongla Upazila
 - Respective authorities of Mongla Port
 - And surrounding resident members

Activity 5: Impact Identification, Evaluation and Formulation of mitigation measures

Key environmental and social impact issues that are identified through screening process have been further studied to determine mitigation measures and to develop Environmental Management Plan for the Proposed VRM Cement Grinding Plant of MCML.

1.6 Limitation

The ESIA has been conducted by SGS Bangladesh Limited within a limited time frame following the report contents suggested by IDCOL. However, the present ESIA study report keeps it into consideration and delineates the important environmental issues, indicates the environmental impacts and concludes its recommendations for pollution control measures from its practical point of view.

1.7 ESIA Study Team

A group of experts of the consulting firm- SGS Bangladesh Limited consisting following positions have been performed different activities for completing this Environmental and Social Impact Assessment (ESIA) Study project:

Table 1 ESIA Study Team of SGS Bangladesh Limited

SL NO	Name of Resource Person	Position
1	Mr. Md. Zakir Hossain Khan	Team Leader- Environmental Engineer
2	Mr. Shabbir Ahmed Jewel	Environment and Social Development Expert
3	Mr. MD Abdul Halim	Ecologist
4	Mr. Bablu Mia	Sociologist
5	Mr. Alamgir	GIS Expert

The Team thankfully acknowledges the guidance received from IDCOL and also appreciates cooperation and assistance of Management of Meghna Cement Mills Ltd during the preparation of this ESIA Study Report.

MCML authority also acknowledges prompt response, guidance and suggestion received from the Department of Environment (DOE) to comply with legislative requirement and preparation of ESIA study report.

**UPAZILA MAP
UPAZILA MONGLA
DISTRICT BAGERHAT**

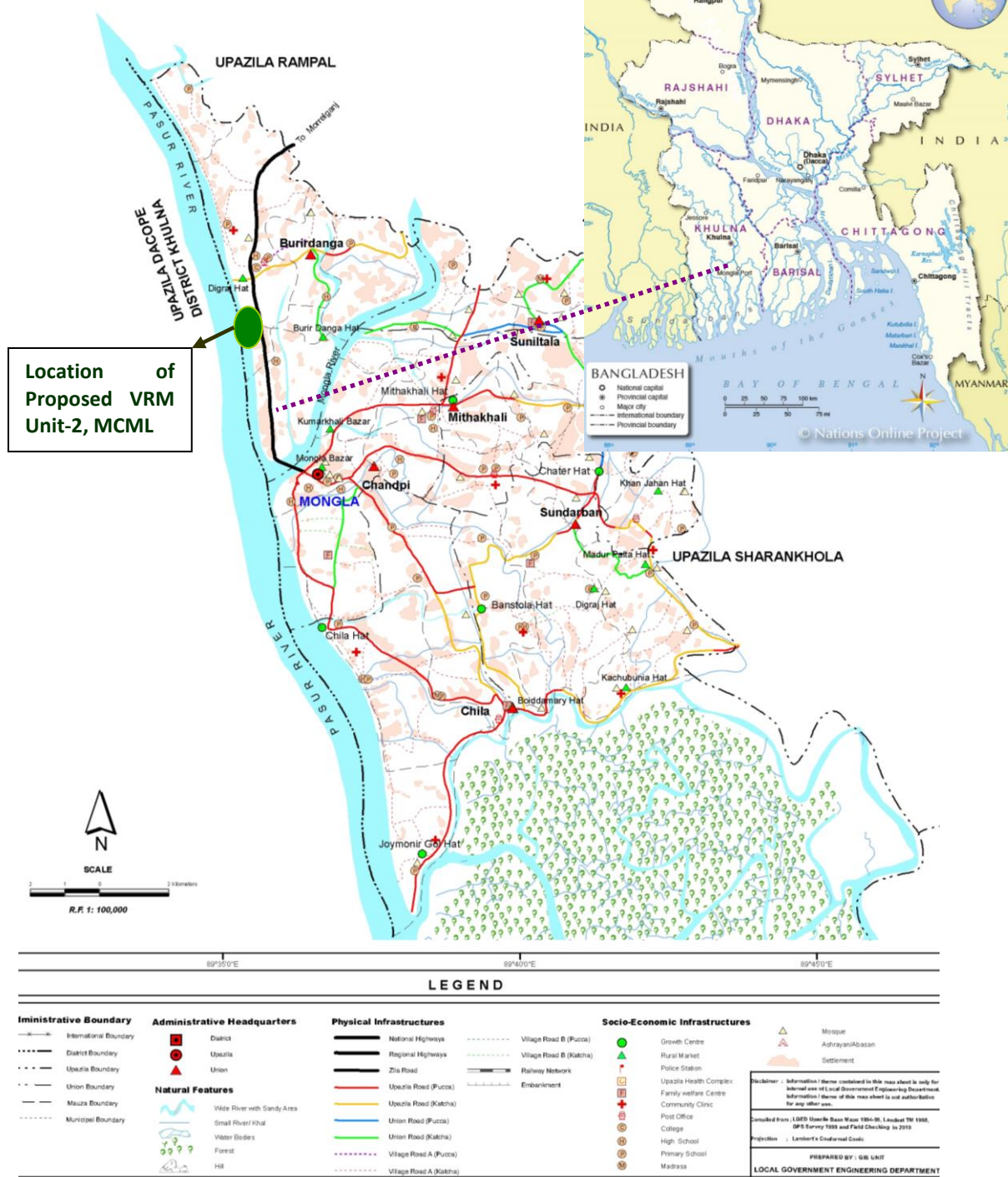


Figure-1 Shows the Location of Existing and Proposed Project site of MCML

SECTION 2 THE PROJECT

Generally in a full-fledged cement industry, production process starts from procurement of minerals as basic raw materials such as clay, lime, silica etc. to produce slurry for cement clinker which is then burnt for making clinker in a rotary kiln. Produced clinkers may pack and sale to Clinker grinding plant to produce finish product by adding gypsum and other additives.

Whether, proposed VRM project Meghna Cement Mills Ltd. shall be a simple clinker grinding and packaging plant. VRM unit shall replace the existing ball mills of Mill house-1 and shall be coupled with existing facilities and infrastructures of MCML.

Proposed VRM project shall enhance product quality and overall production capacity of MCML and thus the VRM project is considerable as expansion of MCML.

2.1 Site History

In 1991, Bashundhara Group selects the existing site and through a series of activities, MCML has signed a land lease agreement with Mongla Port Authority in 1993 for a period of 30 years with provision of extension for 10 years each time. Existing site covers 9.83 acres of land area.

2.2 Existing production Line of MCML

Existing production line of MCML consists of two separate units having production capacity of 2680 MT/ day of which production capacities of unit-1 and unit-2 are 1000 MT/ day and 1680 MT/ day respectively.

It should mention that the grinding section of Mill House-1 having two ball mills with production capacity of 1000 MT/ day has been shut down on 2nd May 2017. Therefore at present, MCML is producing 1680 MT cement product (PCC/OPC) per day.

2.2.1 Existing Settings of Site

Existing onsite infrastructures and associate facilities of MCML have been occupied approx 67% of total land area that include 6 nos of Clinker Silo, 4 nos of Cement Silo, 2 nos of clinker grinding Mill house, pack house 1 & 2, Workshop (Mechanical and electrical), Central General Store, Sub-station 11 & 33 KVA, Raw Material shed (Gypsum, slag, Empty Cement sack), approx 2.5 line km conveyor belt, Ball mill mini lab, central QA lab, admin building, guard house, mosque, drive way, and other.

Offsite infrastructure includes a 160 meter long own jetty that equipped with modern facility where the sea going vessel can berth easily.

2.2.2 Raw material Unload & Storage Facilities

Existing jetty facility of MCML is equipped with modern facility for berthing sea going vessel and unloading of raw materials. There are 02 nos. of hydraulic crane of modern technology of German origin having unloading capacity of 250 MT/hr each of which contribute a lot to faster unloading.

Storage facilities include 6 nos of Clinker Silo, 4 nos of Cement Silo, Raw Material shed (Gypsum, slag, and empty Cement sack). Cement silos for cement storing of which each of the 02 silo have storage capacity of 3500 MT and 5000 MT respectively.

For easy and faster conveying raw materials from one to another department, a substantial numbers of belt conveyors are existing covering approx 2 km in length.

2.2.3 Packaging Facilities

Cement is extracted from the cement silo through extraction system which consists of roots blower, inlet box, pneumatic shut off valve, flow control valve etc. which are controlled from the control room of the pack house. There are 2 nos. of rotor packer having packing capacity of 180 MT / Hr. and 120 MT / Hr. respectively. These packers are the equipments of modern technology where weighing system of the delivered cement sack is fully electronic based to ensure proper weight of every sack of cement.

Mainly paper made cement sacks is preferred for filling purpose. Although small percentage of poly sack are also used based on the consumers' demand. The following Google image shows the existing settings of MCML site.

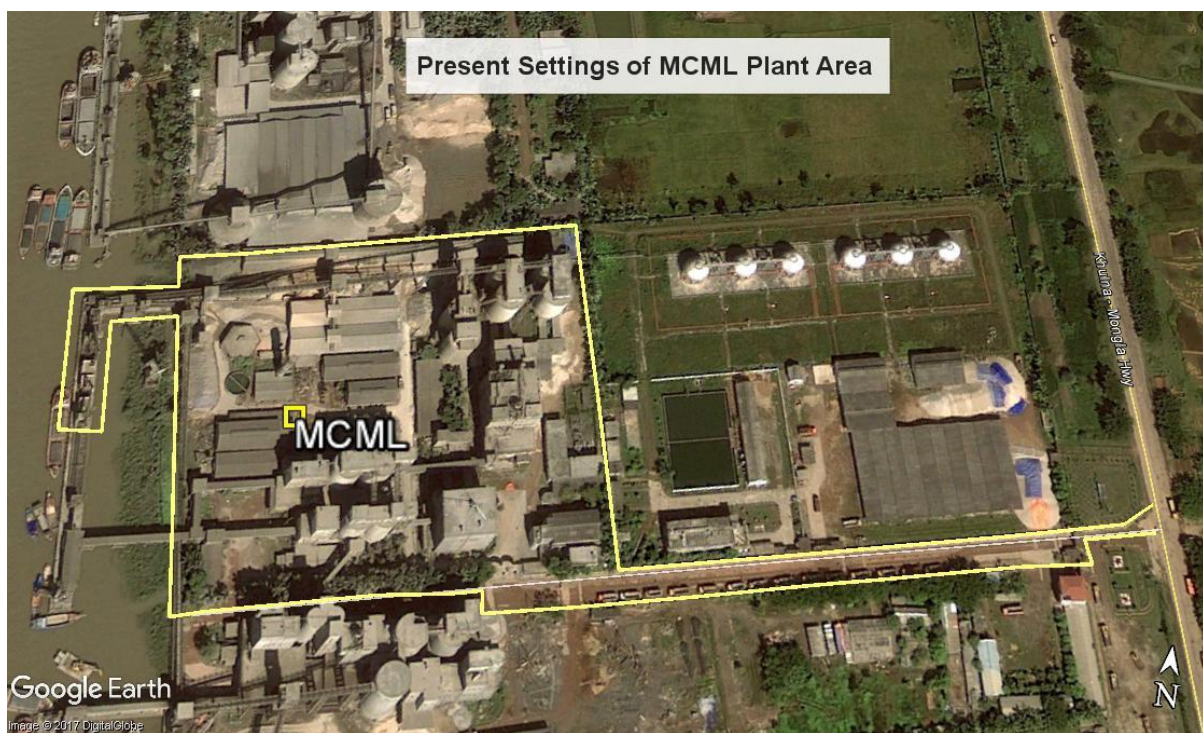


Figure-2 Current status of MCML plant area

2.2.4 Delivery System & Capacity

There exists 02 modes of cement delivery system i.e. road delivery and vessel delivery available in this plant. To prevent bag bursting while loading in vessel one spiral chute has been designed with the barge loader.

To ensure smooth delivery of cement sacks, MCML has its own Transport department that includes following vehicle and vessels:

Type of Transport	Total Numbers
Truck- ten wheeler	19
six wheeler	16
Own Barge	55
Mother vessels	7
Lighter vessels	36

2.2.5 Quality Control Facilities

To ensure the product quality, the **Quality Assurance (Q.A.)** department collects samples from different areas of mill house every after 1hrs to evaluate quality of the crushed product and thus feed back to the production department. Based on the quality report determined by **Q.A** department, Production department acts accordingly.

2.3 About Proposed VRM Project

Proposed VRM Unit shall replace the existing Clinker Grinding section of Unit-1 that had been established in 1996 to produce 1000 MT finished cement product /Day with two Ball Mills of Mill House-1.

2.3.1 Production Capacity

Proposed VRM Unit shall produce 2.4 million MT cement per year (8000 MT/day) of which 0.36 million MT will be Ordinary Portland Cement (OPC) and 2.04 million MT will be Portland Composite Cement (PCC). To achieve the production target, VRM unit shall be operated 20hr/day and 300 days/year.

2.3.2 Vertical Roller Mill (VRM) Technology

Proposed VRM technology combines the drying, grinding and separation processes into just one unit, which simplifies the plant layout. And because it operates at a low noise level, outdoor installation is feasible – substantially reducing civil construction costs and improving the working environment.

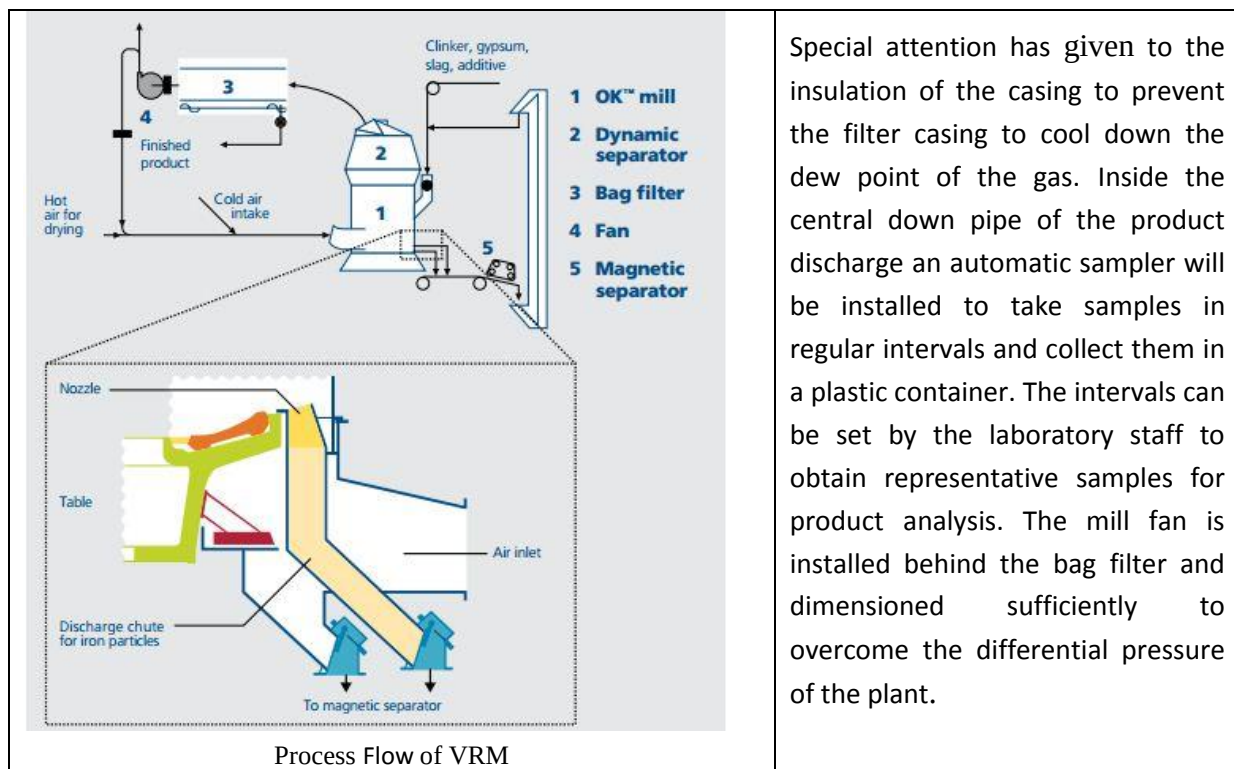
2.3.2.1 VRM Working Principal

Vertical Roller Mill is a vertically placed large sized machine which is equipped with some rollers used for grinding raw material. It also consists of one table which is rotated by electrical motor & raw materials are fed on the table. Due to centrifugal force on the table, raw material goes below the rollers (a gap between roller & table has to be maintain) automatically & start getting grinded. The rollers are driven by the friction between table & raw materials. The grinding process is done by exposing a bed of material to a pressure sufficiently high created by rollers which causes fracture on the individual particles in the bed. Due to such grinding, fine particles pass through the separator as the final product to the silo due to huge negative pressure in the mill & course particles falling down (separated by highly efficient separator) on the table for further grinding.

2.3.2.2 Clinker Grinding Process in VRM

The cement grinding plant according OK 54-6 mill is equipped to produce PCC with fineness of 3800 cm^2/gm , blaine and $\leq 4\%$ Residue on 45 μm sieve at a capacity of 415 ton/hr from clinker, gypsum, limestone, fly ash and GBFS or OPC with fineness of 3800 cm^2/gm blaine, $\leq 3.5\%$ Residue on 45 μm sieve at a capacity of 380 ton/hr from clinker, gypsum. The components are discharged with its proper ratio from their individual storage bins via weighing feeder, dosed onto the feeding belt conveyor to be lifted above the level of the feed inlet chute. Discharge and feeding will be performed with variable speed and controlled in accordance to the parameters set during the commissioning of the mill to assure optimum conditions at any time. The materials will enter the mill through the rotary gate and fall to the center of the grinding table, being transported by centrifugal forces between the grinding elements where they are pulverized. For that purpose six rollers are used. This arrangement of rollers will result in a very stable grinding bed and a grinding process with extreme low vibration. A mixture of hot gas and recirculation gas is fed to the mill through a louver ring which dries the materials during the grinding process so that only residual moisture remains. The ground and dried materials powder is caught up and lifted by the flow of the gas. The mixture powder and gas leaves the mill and enters the classifier mounted directly on top the mill.

The finished product flows up out of the top of the classifier whilst oversized particles are rejected by the rotating cage of the classifier back to the grinding table of the mill. Additional heat produced by the grinding of the material itself and hot gas generator, can heat up the material and evaporating the moisture. This mixture enters the bag filter where the finished ground cement powder is separated and then conveyed to the cement silo. This jet pulse filter has been specially designed under consideration of the properties and fineness of the product to be separated from the gas flow.



2.3.2.3 Overall Production Process

- Unload and Transport of Raw Materials

The raw material unloads from jetty and sort out by different conveyor except fly ash. The raw material of vessel is berthed at jetty & then these vessels are unloaded by the hydraulic balance cranes of the jetty and dumped into jetty hoppers. The raw material then conveys to the raw material silos, gypsum shed and slag shed. All the conveyors carrying raw material are equipped with sufficient dust collector to protect the dust emission during raw material transportation.

For pulverized fly ash the loaded fly ash vessel is unloaded by pneumatic fly ash unloading plant, conveyed pneumatically to fly ash silo for starting from where the fly ash is proportionately fed to the grinding mill.

- Grinding

Clinker is extracted from clinker silo via vibrating feeder and conveyed to the feed belt conveyor via an electronic weighing scale belt. Gypsum is thrown to the belt conveyor via a chute by an electronic weighing scale belt. Limestone and granulated slag is proportionally mixed at the yard as per requirement and instruction from quality control. Fly ash fed to mill feed proportionally through rotary feeder. All the raw materials are fed into the mill and after crushing the grounded material are transported by discharge bucket elevator via air slides and then fed to the classifier. The classifier classifies the fine product from coarse product that are re-feed to the mill via an air slide for regrinding and the product material then goes to product silo.

- Packaging Area

There are two numbers of packaging plants. Cement is stored in the cement silo and flow controlled by the screw gate and electromagnetic flow control valve during its conveying to the packing plant. The conveyed cement from bucket elevator is feed to the vibrating screen where the last residue and foreign particles are screen out from the flow of cement which is connected to the constant volume bin which helps to control the level the cement for uninterrupted packaging.

Figure 3 Shows the Detail Production process of VRM unit at next page.

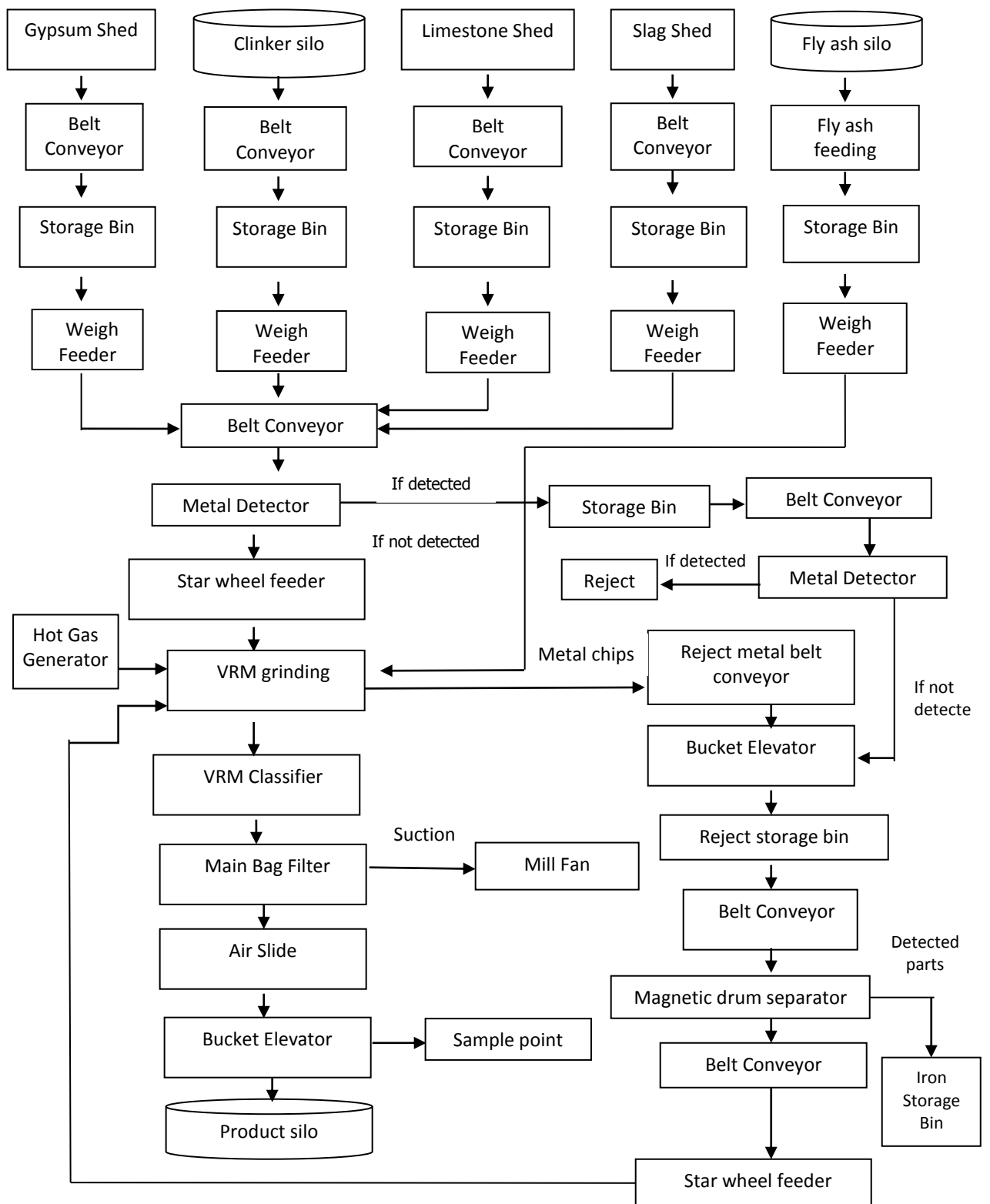


Figure-3 Overall Process Flow Diagram of Proposed VRM Unit

2.3.3 Equipment and Machinery

Proposed VRM shall be equipped with OK™ 54-6 grinding mill of FLSmidth. Compared to ball mills, the OK™ mill can produce better or equivalent cement quality. Technical specification of OK 54-6 grinding mill is detailed in **Annex-3**, which also included the lists of all mechanical and electrical equipment and machineries that are to be coupled with the proposed production line with VRM.

2.3.4 Environment and Social Issues

2.3.4.1 Pollutants and Pollution Sources

- Dust

The main raw material for cement is imported clinker and gypsum is an additive for the cement, which will be procured from other country and ground in grinding mills and packed in paper bags in closed circuit system in the cement plant. No by-product or any unwanted material will be generated in this plant which will need disposal system. In fact the plant will have no solid or liquid effluents for disposal. However though the process will work in closed circuit system yet the fugitive fine dusts of cement will escape from the grinding system of the cement mill and will become air borne which will be responsible for air pollution in and around the factory premise. This air pollution problem may create some impact on the environment and on the health of the people working in this industry and those living nearby.

Other probable sources of air pollution from this cement industry will be the unloading section for clinker, cement silo and clinker storage silo, cement packing and delivery house. Dust from other sections of the cement plant will not be continuous but grinding section is the main source of continuous dust emission. Fugitive dust emitted during handling of clinker and cement from other sections during loading unloading operations will be partly responsible for air pollution. So adequate number of dust collectors in appropriate places of these sections will be installed to arrest the escaping cement dust to reduce the expected air pollution problem of the cement plant. The grinding mill will work in a continuous basis and the feeding of clinker in the grinding mill will also be continuous. The finely ground cement will be classified in the closed circuit system in a dynamic cyclone separator for separating the oversized particles for recycling those into the grinder again for refinement up to the desired fineness. The exhaust air passing through the cyclone separator after classification operation will carry some escaping cement dust, which may affect the ambient air quality of surrounding vicinity.

- Noise

VRM produces less than 85 dB sound while in production. This modern technology does not release fine particles to the air. So there is no possibility of environment pollution.

2.3.4.2 Employment Generation

Construction phase

The civil Engineering works including piling, foundation works, super-structure for the buildings, silos and packing house and erection of the machinery & equipment will create an employment opportunity for nearly 500 hundred people during pick construction period.

Operation phase

Proposed project shall create employment opportunity for approx 325 persons. MCML intend to fill up the positions with maximum local residents.

2.3.5 Requirements of Proposed VRM Project

2.3.5.1 Land

Proposed VRM Unit along with additional infrastructure facilities shall require approx 1.03 Acres of land. Till there is approx 33% land area of existing MCML site remain vacant. Along with removal of infrastructure of Mill house-1 shall create adequate free space to meet the land requirement of proposed project. No additional land is required

2.3.5.2 Infrastructure

Installation of proposed clinker grinding VRM unit shall require a new mill house, which is to be constructed in place of existing Mill House-1.

Existing facilities of MCML those are found inadequate to complete the proposed production line with target capacity shall require construction of additional and expansion of existing infrastructure that include:

Dept. No.	Dept. Name
212	Additive transport
245	Fly ash feeding
461	Coal Mill
465	Coal dosing
481	Clinker transport 1&2
482	Clinker transport 3&4
511	Cement mill feed
531	Cement mill
541	Cement transport
591	Load center(Below Feed bins)

2.3.5.3 Utilities

Table 2.3 Utility Requirement for the proposed project

VRM Production Capacity	Utilities	Consumption / Year	Source
2.4 million MT/Year (8000 MT/day)	Electricity	90,000Mw-h	Electricity shall be sourced from West Zone Power Distribution Company Ltd.
	Coal (as fuel-HGG)	15,000 MT	Shall be imported
	Water	36,000 M ³	Rain Water Storage system available, ground water and river water used when the saline level is

			in acceptable condition.
	Lubricant	8000 liter	Shall be sourced from local market

2.3.5.4 Raw Materials

Clinker, Gypsum (natural), Limestone, Slag and Fly ash are the raw materials of OPC and PCC product. Raw Material requirement by product and sources (country of origin) are described in following tables 2.1 and 2.2 respectively:

Table 2.1 Requirement Raw Material by product

Finished Product	Production Targeted	Raw Materials Require	Quantity Proportionate
Ordinary Portland Cement (OPC)	0.36 million MT/Year, which is 15% of total Production Capacity	Clinker	95%
		Gypsum (natural)	5%
Portland Composite Cement (PCC)	2.04 million MT/Year, which is 85% of total Production Capacity	Clinker	65-79%
		Gypsum (natural)	0-5%
		slag + fly ash + limestone	21-35%

Table 2.2 Source (country of origin) of Raw Materials

SL #	Raw Materials	Origin Country
1	Clinker	Japan, Korea, Vietnam
2	Gypsum (Natural)	Oman, Thailand
3	Slag	Japan, China, Taiwan
4	Limestone	Vietnam
5	Fly ash	India

2.4 Proposed Plant Layout

Master Plan Layout of proposed VRM unit shows the settings of existing and proposed onsite and offsite infrastructure and associate facilities. Layout Map is attached in **Annex-4**.

2.5 Overview of Project Stages

Implementation stages/ life cycle of the proposed expansion of Unit-1 with VRM include pre-construction (detail design and planning of procurement, transportation, etc.), construction, and operation stages. Details of VRM project implementation activities and schedule attached in **Annex-5**.

A. Detail Design and planning (Pre-construction Stage)

Design and planning is a multi-step process that will include pre-construction preliminary works such as:

- Assigning of detail design technical consultant
- Conduct of necessary site survey
- Commencement of civil works design
- Procurement of long lead time equipment (Pre-construction);
- Dismantle of existing Ball Mills and Demolish of Mill House-1 infrastructure; etc

B. Construction Stage

Construction phase will include the following main phases/activities:

- Procurement and transportation;
- Civil and building construction;
- Mechanical and electrical erection; and
- Testing and commissioning of the plant.

2.6 Estimated cost of Proposed VRM Unit

Total cost to procure equipment and machinery, civil construction along with other infrastructure facilities is estimated Tk 2311.28 million. The cost for land development will not be required as the land is already developed.

Entrepreneur of Meghna Cement Mills Ltd. is intended to seek necessary project's finance from IDCOL.

Details of Cost Estimated for Proposed VRM Project

SL NO	ITEM	Estimated Cost (in million TK)
1	Building and civil works	312.96
2	Imported Machineries	1265.73
3	Local machinery	186.00
4	Duty, Insurance, Clearing, Carrying	63.29
5	Furniture and fixtures	10.00
6	Preliminary Expenses	5.06
7	Vehicles	250.00
8	Consultancy	100.00
9	IDCP	111.91
10	Contingency	6.33
TOTAL ESTIMATED VRM PROJECT COST (in mill TK)		TK 2311.28

SECTION 3 LEGAL CONSIDERATIONS

Environmental approval for the re-construction and operation of Unit-1 with Vertical Roller Mills technology with replacement of Ball Mills technology of Meghna Cement Mills Ltd at Mongla Upazila under Bagerhat District of Khulna Division falls under the jurisdiction of the DOE, a department under the Ministry of Environment and Forest (MEF). This ESIA study is also required to address the environmental and social review requirements of the Project Sponsor's lenders and their partners. Consequently, this section discusses the applicable legislative and regulatory requirements of the Government of Bangladesh (GOB) and the relevant guidelines of IDCOL and WBG. In that context, this chapter outlines the key legislative, regulatory and policy considerations applicable to the project.

3.1 Policy Considerations

The GOB has developed a policy framework that requires environmental issues to be incorporated into economic development planning. The key policies are the National Environmental Policy of 1992, the National Environmental Management Action Plan (NEMAP) of 1995, and the National Conservation Strategy of 1992.

3.1.1 National Environmental Policy, 1992

The Bangladesh National Environmental Policy was approved in May 1992. It sets out the basic framework for environmental action together with a set of broad sector guidelines.

Key elements of the Policy are:

- Maintenance of the ecological balance and overall progress and development of the country through protection and improvement of the environment;
- Protection of the country's assets, properties and resources against natural disasters;
- Identification and regulation of all types of activities that pollute and degrade the environment;
- Ensuring sustainable development and utilization of all natural resources; and
- Promoting active association with all environment-related international initiatives.

The Environmental Policy requires the following specific actions with respect to the 'Industrial' sector:

- To phase-in corrective measures in polluting industries;
- To conduct Environmental Impact Assessments (ESIAs) for all new public and private industrial developments;
- To ban, or find environmentally sound alternatives for, the production of goods that cause environmental pollution; and
- To minimize waste and ensure sustainable use of resources by industry.

Under the National Environmental Policy, the Department of Environment is directed to review and approve all Environmental Impact Assessments.

3.1.2 National Environment Management Action Plan, 1995

The National Environmental Management Action Plan (NEMAP) is a wide-ranging and multi-faceted

plan, which builds on and extends the statements set out in the National Environmental Policy. NEMAP was developed to address issues and management requirements during the period 1995 to 2005, and set out the framework within which the recommendations of the National Conservation Strategy are to be implemented.

NEMAP has the following broad objectives:

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

3.1.3 National Conservation Strategy, 1992

The National Conservation Strategy provides recommendations for sustainable development in the industrial sector as follows:

- All industries shall be subject to ESIA and adoption of pollution prevention/control technologies shall be enforced;
- Hazardous or toxic materials/wastes shall not be imported as raw materials for industry;
- Import of appropriate and environmentally-sound technology shall be ensured; and
- Dependence on imported technology and machinery should gradually be reduced in favour of sustainable local skills and resources.

3.1.4 Relevant Legislative Regime of Bangladesh

Table 2.1 presents an outline of the national legal instruments that will have relevance to the proposed projects with respect to the conduct of environmental impact assessment, formulation of mitigation measures and management plan.

Table 3.1 National Legal Instruments

Act/Rule/Law/Ordinance	Responsible Agency-Ministry/Authority	Key Features-Potential Applicability
The Environment Conservation Act, 1995 and subsequent amendments in 2000 and 2002	Ministry of Environment and Forest Department of Environment	Declaration of Ecologically Critical Areas; Obtaining Environmental Clearance Certificate; Regulation with respect to vehicles emitting smoke harmful for the environment; Regulation of development activities from environmental perspective; Promulgation of standards for quality of air, water, noise, and soils for different areas and for different purposes; Promulgation of acceptable limits for discharging and emitting waste; Formulation of environmental guidelines relating to control and mitigation of environmental pollution, conservation and improvement of environment
AMENDMENT 2010 of The Environment Conservation Act, 1995	Ministry of Environment and Forest Department of Environment	This amendment of the act introduces new restriction on: -proper management of hazardous wastes to prevent environmental pollution and health risk -no remarked water body cannot be filled up/changed; in case of national interest; it can be done after getting clearance from the respective department; and -emitter of any activities/incident will be bound to control emission of environmental pollutants that exceeds the existing emission standards
Environment Conservation Rules, 1997 and subsequent amendments in 2002 and 2003	Department of Environment Bangladesh Road Transport Authority (BRTA)	Declaration of Ecologically Critical Area; Requirement of Environmental Clearance Certificate for various categories of projects; Requirement for IEE/EIA according

Act/Rule/Law/Ordinance	Responsible Agency-Ministry/Authority	Key Features-Potential Applicability
		to the appropriate category of the project; Renewal of the environmental clearance certificate within 30 days after the expiry; Provides standards for quality of air, water & sound; Impose use of Catalytic Converter Compulsory for all type of vehicles Establish acceptable limits for emission and noise from vehicles and vessels
NOTIFICATION, 13 th January 2015, Sundarban “Ecologically Critical Area (ECA)” authorized under ECA’95.	Ministry of Environment and Forest Department of Environment	Include a list of ‘mouzas’ towards the land area of Sundarban where undertaking of following activities are restricted: -Natural forest and tree can not be cut or collected -All type of hunting and wild animal killing -Catch or collect all types of wild animal -Destruction or creation of such activities that shall destroy natural habitat of flora and fauna. -All activities that may disrupt /alter the natural characteristic of land and water -Establishment of soil, water, air and noise polluting industry or organization -All activities that are harmful for fish and other aquatic fauna
Environment Court Act, 2000 and subsequent amendments 2002 and 2010	Judiciary Ministry of Environment & Forest	GOB has given highest priority to environment pollution and passed ‘Environment Court Act, 2000’ for completing environment related legal proceedings effectively. Bangladesh Environment Court Act amendment 2010 has been enacted to resolve the disputes and establishing justice over environmental and social damage

Act/Rule/Law/Ordinance	Responsible Agency-Ministry/Authority	Key Features-Potential Applicability
		raised due to any development activities. This act allows government to take necessary legal action against any parties who creates environmental hazards/ damage to environmentally sensitive areas as well as human society.
Sound Pollution Protection Rules, 2006	Ministry of Environment and Forest Department of Environment	Provides standards and acceptable limits of sound pollution at various categories of zone.
Bangladesh Labor Act, 2006 and subsequent amendment 2013 Bangladesh Labor Rules 2015	Ministry of Labour and Employment And Department of Environment	The main issues include compliance to the provisions: - Conditions of service and employment; - Prohibition of employment of adolescent; - Occupational health, safety, and hygiene; Working hours and leave; - minimum wages and payment; Workers compensation for injury by accident; Disputes, labour court, labor appellate; -Penalties and procedure, etc
The Bengal Motor Vehicle Rules, 1940 The Vehicle Act, 1927 The Motor Vehicles Ordinance, 1983	Bangladesh Road Transport Authority (BRTA)	Exhaust emission; Vehicular air and noise; Road safety Licensing.
The Removal of Wrecks and Obstructions in inland Navigable Water Ways Rules 1973	Bangladesh Water Transport Authority	Removal of Wrecks and Obstructions in inland Navigable Waterways
Water Supply and Sanitation Act, 1996	Ministry of Local Government, Development and Cooperatives	Management and Control of water supply and sanitation in urban areas.
The Forest Act, 1927 and subsequent amendments in 1989 and 2000	Ministry of Environment and Forest	Provides legal protection for wild flora and forest. The Act enables the government to declare any forest or waste land to be -Reserve Forests; -Protective Forests; -Village Forests

Act/Rule/Law/Ordinance	Responsible Agency-Ministry/Authority	Key Features-Potential Applicability
The Private Forests Ordinance Act, 1959	Regional Forest Officer, Forest Department	Conservation of private forests and for the afforestation on wastelands
Bangladesh Wild Life (Preservation) Act, 1974	Ministry of Environment and Forest Bangladesh Wild Life Advisory Board	Wildlife Sanctuaries, parks, reserves
The Protection and Conservation of Fish Act 1950 and subsequent amendments in 1982	Ministry of Fishery	Protection and Conservation of fish in Government owned water bodies
The Private Fisheries Protection Act, 1889 (Bengal Act II of 1889)	Ministry of Fishery	An Act for protection of the right of fishing in private waters.
Antiquities Act 1968	Ministry of Cultural Affairs	Governs preservation of the national cultural heritage, protects and controls ancient monuments, regulates antiquities as well as the maintenance, conservation and restoration of protected sites and monuments, controls planning, exploration and excavation of archaeological sites.
Natural Water Bodies Protection Act 2000	Rajdhani Unnayan Kartipakkha / Town Development Authority/ Municipalities	According to this Act, the character of water bodies, meaning rivers, canals, tanks, or floodplains identified as water bodies in the master plans or in the master plans formulated under the laws establishing municipalities in division and district towns shall not be changed without approval of the government in the concerned ministry.
Costal Zone Policy, 2005	Ministry of Food and Disaster Management (MoFDM)	The policy provides general guidance so that the coastal people can pursue their livelihoods under secured conditions in a sustainable manner without impairing the integrity of the natural environment. The policy framework underscores sustainable management of natural resources. Also emphasis on conservation and enhancement of critical ecosystem

Act/Rule/Law/Ordinance	Responsible Agency-Ministry/Authority	Key Features-Potential Applicability
		(Mangrove, coral reef, tidal wetland, estuary, closed water body, etc).
Costal Development Strategy, 2006	Approved by the Inter-Ministerial Steering Committee	The strategy has 9 strategic priorities and the following 3 are relevant priorities with the proposed VRM Cement Grinding project's interventions: -Safety from man-made and natural hazards -Sustainable management of natural resources, and -Environmental conservation

3.1.5 Environmentally Sensitive Areas (ESA)

Environmentally sensitive areas are defined by the World Bank (OP 4.04; see also World Bank, 1993a) as being "areas that are of significant value in their natural state", or areas that are of socio-cultural significance or sensitivity. Cultural or historical sites and densely populated urban centers are examples of the latter category. In such areas, impacts tend to be more severe than elsewhere, and therefore, extra precautions must be taken to avoid significant environmental impacts. In many cases, this will mean extra investments in mitigation measures, while in some cases, these areas will simply have to be avoided, resulting, for example, in the abandonment of a project or the re-alignment of a section of road. For all projects that will potentially affect environmentally sensitive areas, an EIA is likely to be required.

Ecologically Sensitive Areas as defined by the World Bank (OP 4.04) are areas that may contain unique features, maintain key natural processes, support endangered, endemic or threatened plants or animals and their habitats, or provide important breeding areas for wildlife. Some Ecologically Sensitive Areas are natural, while others may have been significantly altered by certain human activities. In terms of management, some Ecologically Sensitive Areas will prosper through "benign neglect" while others will require intensive management to restore or maintain their natural values.

Criteria given by the World Bank for Ecologically Sensitive Areas, and corresponding areas in Bangladesh, are listed in the table below under categories A-E. Areas that are socio-culturally sensitive are listed under categories F and G. The Environment Conservation Act, 1995 and the Environment Conservation Rules, 1997, also refer to Environmentally Sensitive Areas (called Ecologically Critical Areas in the legislation). According to this legislation, environmental protection is deemed particularly relevant in Ecologically Critical Areas, which are defined by the Government as areas where degradation of the environment has reached or threatens to reach a critical state. Specifically, under the Environment Conservation Act and Rules, the Government will take into special consideration areas such as human settlements, ancient monuments, archeological sites, forest sanctuaries, national parks, game reserves, wildlife habitats, wetlands, mangroves, forested areas, biodiversity areas, and other similar areas.

3.1.6 Protected Areas of Bangladesh

'Protected Area' of Bangladesh covers an area of 2,43'435 ha. which accounts for 16% of the total area managed by the Forest Department and almost 2% of total area of Bangladesh. It includes 8 National Parks, 7 Wildlife Sanctuaries, 1 Game Reserve and 5 other conservation sites. The details of 16 notified 'Protected Areas' of Bangladesh are mentioned in Table 3.2 and the figure 3.1 shows the 'Protected Areas' in Bangladesh map.

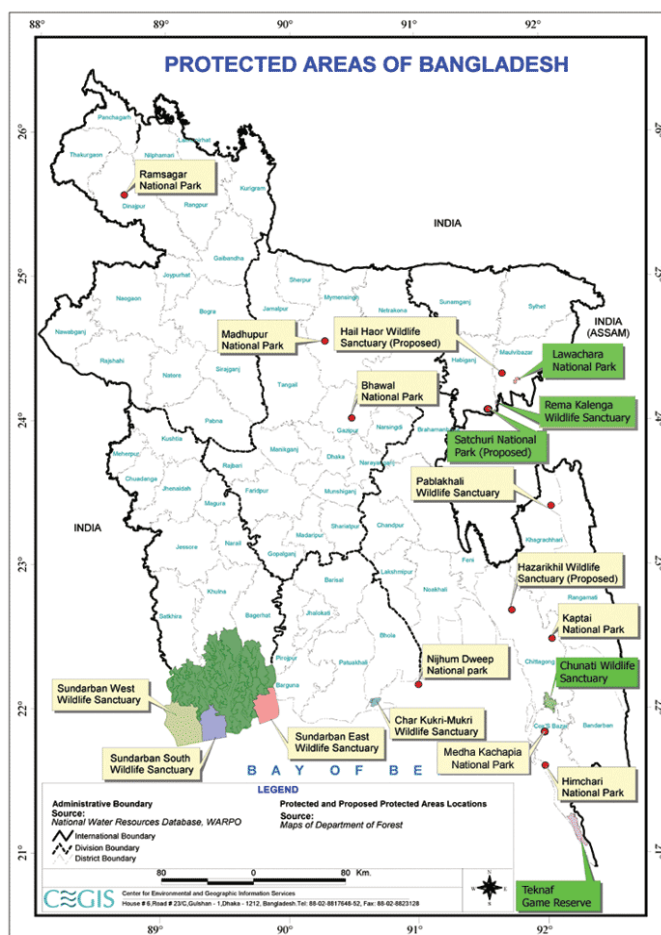


Figure 3.1 'Protected Areas' in Bangladesh

Table 2.3: Notified & Protected Areas of Bangladesh

A	National Parks	Location	Area (ha)	Established
1	Bhawal	Gazipur	5,022	1974 / 1982
2	Modhupur	Tangail / Mymensingh	8,436	1962 / 1982
3	Ramsagar	Dinajpur	27.75	2001
4	Himchari	Cox's Bazar	1,729	1980
5	Lawachara	Moulavibazar	1,250	1996
6	Kaptai	Ctg Hill Tracts	5,464	1999
7	Nijhum Dweep	Noakhali	16352.23	2001
8	Medha Kassapia	Cox's Bazar	395.92	2004
B	Wildlife Sanctuaries	Location	Area (ha)	Established
9	Rema-Kelenga	Hobiganj	1795.54	1996
10	Char Kukri-Mukri	Bhola	40	1981
11	Sundarban (East)	Bagerhat	31226.94	1960/1996
12	Sundarban (West)	Satkhira	71502.10	1996
13	Sundarban (South)	Khulna	36970.45	1996
14	Pabla Khali	Ctg Hill Tracts	42087	1962/1983
15	Chunati	Chittagong	7761	1986
C	Game Reserve	Location	Area (ha)	Established
16	Teknaf	Cox's Bazar	11615	1983

The 5 other conservation sites are National Botanical Garden, Dhaka, Baldha Garden, Dhaka, Madhabkunda Eco-Park, Moulavibazar, Sitakunda Botanical Garden and Eco-Park, Chittagong and Dulahazara Safari Parks, Cox's Bazar. Protected Areas include Wildlife Sanctuary, National Park and Game Reserve. Their definitions in the Bangladesh Wildlife (Preservation) Order, 1973 (henceforth Wildlife Order) is as follows:

"Wildlife Sanctuary means an area closed to hunting, shooting or trapping of wild animals and declared as such under Article 23 by the government as undisturbed breeding ground primarily for

the protection of wildlife inclusive of all natural resources such as vegetation soil and water” (paragraph) (p) of Article 2).

“Game Reserve means areas declared by the government as such for the protection of wildlife and increase in the population of important species wherein capturing of wild animals shall be unlawful (paragraph) C of Article 2)”.

Article 23 of the Wildlife Order has provisions for declaration of Protected Areas and also has regulations prohibiting activities in the Protected Areas.

3.1.7 Ecologically Critical Areas

The Environment Conservation Rules, 1997 were issued by the Government of Bangladesh in exercise of the power conferred under the Environment Conservation Act (Section 20), 1995. Under these Rules, the following aspects, among others, are covered:

- Declaration of ecologically critical areas;
- Classification of industries and projects into four categories;
- Procedures for issuing the Environmental Clearance Certificate;
- Determination of environmental standards;

The Rule 3 defines the factors to be considered in declaring an area ‘ecologically critical area’ (ECA) as per Section 5 of ECA’95. It empowers the Government to declare an area ‘ECA’, if it is satisfied that the ecosystem of the area has reached or is threatened to reach a critical state or condition due to environmental degradation. The Government is also empowered to specify which of the operations or processes shall be carried out or shall not be initiated in the ecologically critical area. Under this mandate, MOEF has declared Sundarban, Cox’s Bazar-Tekhnaf Sea Shore, Saint Martin Island, Sonadia Island, Hakaluki Haor, Tanguar Haor, Marzat Baor and Gulshan-Baridhara Lake as ecologically critical areas and prohibited certain activities in those areas. Figure 2.3 shows the ecologically critical areas in Bangladesh Map.

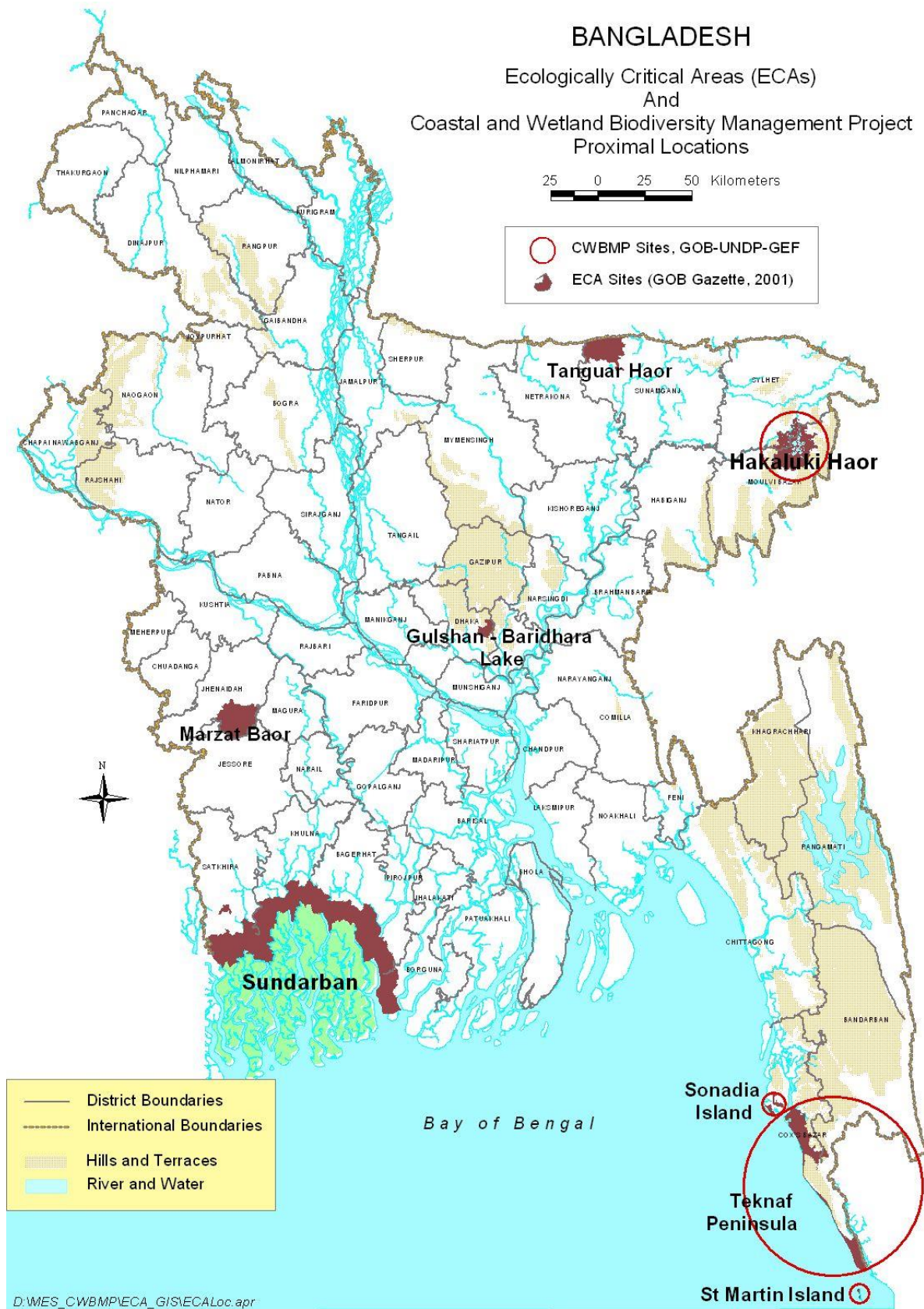


Figure 3.2 'Protected Areas' in Bangladesh in large scale

3.2 Environmental Clearances and Legal Requirements

3.2.1 National Regulatory Agency

The primary institution for environmental management in Bangladesh is the Department of Environment (DOE) under the Ministry of Environment and Forests (MoEF). The DOE is the authority with the mandate to regulate and enforce environmental management, and the setting and enforcement of environmental regulations.

In keeping with its role with respect to environmental clearance permits, and its mandate to prevent and mitigate environmental degradation and pollution, the DOE will be the reviewing agency of this SCREENING and the subsequent ESIA report.

3.2.1.1 Project Categorization and EIA Requirements

According to the Schedule-1 of Environmental Conservation Rules 1997 (ECR'97), proposed VRM Unit-2 falls under the Red Category, Item No-08 of Schedule-1.

The Bangladesh *Environment Conservation Act, 1995* (BECA) stipulates “no industrial unit or project shall be established or undertaken without obtaining environmental clearance from the Director General of DOE.” BECA assigns DOE the decision-making power for reviewing and evaluating Environmental studies, including issuing Site and Environmental Clearances.

As regulated by the *Environment Conservation Rules, 1997* (ECR), DOE requires that the Project Sponsor must obtain Site Clearance and Environmental Clearance certificates prior to commence construction activities and prior to operation of the power station. The ECR assigns development projects into four categories according to their potential for adverse environmental impacts. Schedule 1 of the ECR identifies Cement Manufacturing Plant under the red category; the category requiring the detail environmental and socio-economic assessment.

- **The environmental clearance process for red category projects involves three-steps.**

Step one involves obtaining Site Clearance to permit pre-construction and construction activities. There is a prescribed process for applying for Site Clearance that includes submission of the Initial Environmental Examination Report.

The second step is to obtain approval of the ESIA study. The ESIA is to be prepared on the basis of the scope of work identified in the Initial Environmental Examination, and upon any conditions specified by the DOE in their Site Clearance letter. As indicated, the DOE's comments have been incorporated within this ESIA study. After approval of this ESIA study by the DOE, a Letter of Credit can be opened for all imported equipment and machinery.

The last step in the approvals process is securing Environmental Clearance. This permit is required before the power station can be operated. In certain circumstances (undefined in the guidelines), this three-step process can be combined into one step pending a pre-arranged agreement with DOE (MEF, 1997). Such an arrangement was not followed during establishment of Meghna Cement Mills Ltd in 1996.

3.2.1.2 Regulatory Compliance Status- Meghna Cement Mills Ltd

Meghna Cement Mills Ltd (MCML) has undertaken following activities to comply with the legal

requirement of Department of Environment:

- Meghna Cement Mills Ltd has obtained “**Environmental Clearance Certificate (ECC)**” from Department of Environment (DOE) in 1991 with a set of terms and condition in line of construction and operation of 1st production unit.
- To comply with the condition no-8 of ECC and condition no-2 of **Environmental Clearance Renewal Certificate**, MCML had prepared and submitted a comprehensive full scale EIA study report to the DOE prior to establish the 2nd unit in 1999.
- Upon review of Environmental Impact Assessment (EIA) report, DOE had given approval to set up unit-2 of Meghna Cement Mills Ltd with a set of terms and conditions to comply through out the operational stage of plant.
- Authority of MCML has strictly implemented all mitigation measures and complied with terms and conditions of Environmental Clearance Certificate duly. Regular monitoring of environmental quality components (air, water, noise, etc) has been carried out and monitoring reports are submitted to the Khulna divisional office of DOE. Upon review of monitoring reports, DOE found performance of MCML satisfactory and no objection yet been raised against operational activities of MCML.
- In line of above, DOE has regularly **renewed the Environmental Clearance Certificate till 28th November 2016**.
- In response to the last application regarding yearly renewal of the Environmental Clearance Certificate dated 28th December 2016, Khulna Divisional Office of DOE informed that renewal of Environmental Clearance Certificate of all existing industries that are located within Sundarban ECA areas have been withhold for the time being till further decision made by the ‘National Environment Committee’. But there is ‘No Objection’ raised in continuing operation of all these industries.

It should mention that the High Court has passed an order in August 2017 to the government for not issuing any environmental clearance to new industry further. The court also ordered the government to submit a list of the existing industries and factories those are set up within the 10 km ECA area within 4 weeks. In line, an inventory survey of existing industries that are located within Sundarban ECA areas had been initiated by the respective national committee, which led by Mr. M Mallik Anwar Hossain, former Director- Khulna Divisional Office, Department of environment. Findings of survey have already been submitted to the Prime Minister’s office along with a documentary. In the report DoE made some special recommendations for the factories in Mongla EPZ and Mongla industrial areas to continue their operation following some conditions. Meanwhile the National Environment Committee (NEC) reportedly has resolved to place a recommendation with the Ministry of Forest and Environment to approve all the factories currently operating in the ECA (The Daily Observer, 28th September 2017).

3.2.1.3 Legal Requirement for Proposed VRM Unit

- According to the Bangladesh Environmental Conservation Rules’97, cement manufacturing plants are usually categorized as Red category requiring to obtain “Environmental Clearance

Certificate” from Department of Environment prior to commence commercial run.

- In case of Expansion or increase of production capacity of any existing industry/ project, entrepreneur must have to submit “Environmental Management plan” to the Department of Environment for approval and update of original “Environmental Clearance Certificate” that was issued in favor of the project.
- However according to the *CLAUSE-8 of “Environmental Clearance Certificate” and in CLAUSE-2 of ‘Environmental Clearance Renewal Certificate’*, **prior approval/clearance of DOE is must ‘in case of increase of existing production capacity, expansion of land area, and change of existing production process’**. To comply with this condition and according to the suggestion made by DOE, MCML has prepared this Environmental and Social Impact Assessment (ESIA) report which shall be submitted to the DOE for approval and amendment of original “Environmental Clearance Certificate”.

3.2.2 Infrastructure Development Company Ltd.

Environmental and Social Safeguards Framework (ESSF) defines a cement manufacturing plant project as a Moderate risk project in consideration of its project specific impact. But in case of only installing a vertical roller mill, where there is no issue with significant land acquisition and land development; air, water and noise pollution, this portion of the project can be specifically concluded as a Low Risk intervention.

3.2.3 JICA Guidelines

In 2010, Japan International Cooperation Agency (JICA) has introduced Environmental and Social Considerations Guidelines (ESC Guidelines). It is a master document with the objectives to guide that set forth JICA’s responsibilities and required procedures, together with obligations of partner countries and project proponents, in order to put ESC into practice. By running projects with appropriate ESC put into practice in accordance with the ESC Guidelines, JICA promotes inclusive and dynamic development. The ESC Guidelines, in languages including English, Chinese, French, and Spanish, as well as related documents such as Frequently Asked Questions are available on JICA’s website. http://www.jica.go.jp/english/our_work/social_environmental/guideline/index.html

JICA’s partners, including host countries, borrowers, and project proponents (hereinafter referred to as “project proponents etc.”), bear the primary responsibility for ESC. JICA’s role is to examine the ESC undertaken by the project proponents etc. in their development projects and to provide necessary support to ensure that the appropriate ESC are put into practice and that adverse impacts are avoided or minimized to an acceptable level.

ESC Guidelines have three categories of project in consideration of scale of impacts: A, B, C. Based on this categorization, it seems that although the cement manufacturing plant might be a B type project, but installation of a vertical roller mill in a cement factory seems to be a C category project.

3.3 Concordance Analysis of Rules/ Guidelines

In order to ensure that the project has addressed the requirements of the GOB, the World Bank / IDCOL, and the ADB, an analysis has been undertaken to examine the concordance of policies, procedural issues, and guidelines of the three institutions (Table 3.2).

Table 3.2 Concordance Analysis of ESIA Requirements

Issue	IDCOL/WBG	Bangladesh
Project Need	Not specified	Not specified
Environmental Quality Standards	GEHS	ECR
Project Description	ESAM /OP 4.01	EIAGFI
Physical Resources	ESAM /OP 4.01	EIAGFI
Ecological Resources	ESAM/ OP 4.01	EIAGFI
Socio-Economic Development	ESAM/ OP 4.01	EIAGFI
Quality of Life and Cultural Values	ESAM/ OP 4.01	EIAGFI
Anticipated Environmental Impacts	ESAM/ OP 4.01	EIAGFI
Mitigation	ESAM/ OP 4.01	EIAGFI
Monitoring	ESAM/ OP 4.01	EIAGFI
Project Need	Not specified	Not specified

ECR- Environment Conservation Rules, 1997.; ESAM- Environmental and Social Assessment Manual 2000, IDCOL; EIAGFI - EIA Guidelines for Industries, 1997.

3.4 Concordance Analysis of Environmental Standards

The Bangladesh Environment Quality Standards are promulgated under the Environment Conservation Rules. The standards prescribe emission limits for emission, ambient air, noise, and industrial effluent discharges. The World Bank/IFC guidelines indicate that projects should meet the more stringent of in-country environmental standards.

Sector wise Standards set out in the ECR'97 and subsequent amendment, WBG guidelines (which also acceptable to IDCOL) and design criteria to which the proposed VRM Unit-2 of MCML project shall comply are listed in Tables 3.3, 3.4, and 3.5 respectively.

Table 3.3: Ambient Air Quality Limits (Bangladesh, World Bank, and MCML)

Pollutant	Averaging Time	Bangladesh	World Bank	MCML (VRM)
Nitrogen Oxides (NO _x)	24 hour	-	200 µg/Nm ³	200 µg/Nm ³
Suspended Particulate Matter	8 hour	200 µg/Nm ³	-	200 µg/Nm ³
Particulate Matter (PM ₁₀)	24 hour	150 µg/Nm ³		150 µg/Nm ³
Particulate Matter (PM _{2.5})	24 hour	65 µg/Nm ³		65 µg/Nm ³

Source: Amended Schedule-2, 2005 of ECR'97 GOB; General EHS Guideline, April 2007, IFC/World Bank; VRM Design Criteria

Table 3.4: Air Emission Limits (Bangladesh, World Bank, and MCML)

Pollutant	Averaging Time	Bangladesh	World Bank	MCML (VRM)
Particulate Matter (PM ₁₀)	24 hour	200 µg/Nm ³	50 µg/Nm ³	100 µg/Nm³
Particulate Matter (PM _{2.5})	24 hour	-	25 µg/Nm ³	50 µg/Nm³

Source: ECR'97 GOB; General EHS Guideline, April 2007, IFC/World Bank; VRM Design Criteria

Table 3.5: Noise Emissions

Standards/Design Criteria	Sound Level Limits dB(A)- Industrial Area	
	Day	Night
Bangladesh	75	70
World Bank/ IFC	70	70
MCML (VRM)	75	70

Notes:

1. Sound Pollution Control Rules 2006, GOB
2. General EHS Guideline, April 2007, IFC/World Bank
3. WBG "day" is 07:00-22:00, WBG "Night" is 22:00-07:00
4. GOB "day" is 06:00-21:00, GOB "night" is 21:00-06:00

SECTION 4 BASELINE CONDITION

4.1 Administrative Context

The Proposed cement plant, Unit-1 of Meghna Cement Ltd shall replace the existing ball mill facilities, which means site is already developed and located within the industrial area of Mongla Port under Mongla Upazila of Bagerhat District.

The whole industrial area of Mongla Port is lying within the 'Sundarban Ecological Critical Area' and thus extra attention given in determining 'Project Influential Area'. To the extent possible (considering scope of work), attempts are made to generate baseline data/information focusing the settings and features of 'Project Influential Area'.

The existing infrastructure facilities, land use pattern, settlements, natural resources, water ways, communication facilities, sensitive areas and ecosystems, socioeconomic activities all available on the site and surrounding areas within the study area which may be impacted has been studied. On this basis the information gathered from various sources and field studies the existing condition of the prevailing environmental status have been identified and presented in following subsections.

4.2 Land use Settings

The figure 4.1 given above shows location of the site and also the land use characteristics of the project site and surrounding areas of the new cement unit of Meghna Cement Mills Ltd. at Mongla. A part of the selected plant premise is at present used by the existing cement mill of the company. The remaining blank space of the premise would be used for the cement unit 2 of the same company as an expansion of the existing Unit-1. The site is in the recognized industrial estate of the Mongla port authority at Mongla. In fact this industrial estate is a newly developed industrial zone of the southern-western part of Bangladesh in Bagerhat district. The estate is still lying vacant though many entrepreneurs showed keen interest for industrial development in this coastal region. Only 3-4 industries have so far been established in this area. In addition to these industries there are some housing complexes of the port authority, a naval base and rural settlements are also there within 10 km distances from the plant area. The area is still mainly rural and recently being developed and agricultural activity is an important source of livelihood of the people in this region. A metal paved high way passes through the surrounding area of the site. An export processing zone has been selected which is now underway near the Mongla Port Industrial Estate. The availability of Mongla sea port and good communication and other infra-structural facilities in this area has fascinated both local and foreign entrepreneurs who are now showing interest to build industrial project in this earmarked industrial estates. International sea port at Mongla, proposed air port near Mongla, river ways network, high ways connected with all parts of the country etc. have extended opportunities for increase of the commercial activity of the people of this region.



Figure 4.1: 0.5 km radius airshed around the project site

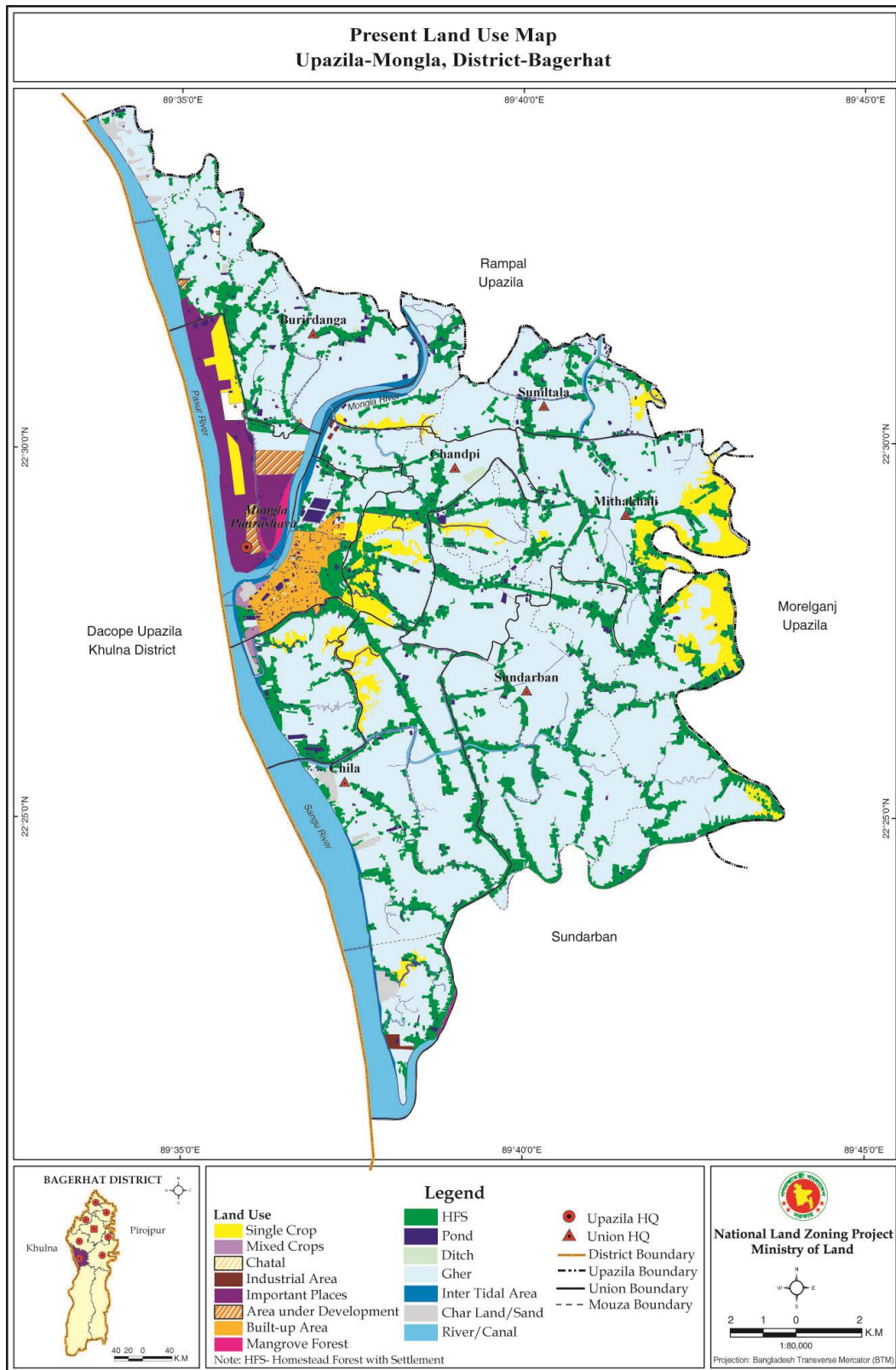


Figure 4.2: Landuse map of Mongla Upazila



Figure 4.3: Settings of Mongla Port and adjacent industrial areas

4.3 Physical Environment

4.3.1 Climate

Climate of Mongla is mainly tropical. The annual maximum and minimum average temperature in this region recorded 36°C and 12 °C respectively. April to May is the hottest months of the year and it cools down during December and January.

Annual average rainfall in the Mongla region is about 150 cm. The heaviest rainfall occurs in the month of July and it ranges up to 36 cm. There is practically no rain during winter months.

The relative humidity in this region is found to be within (85-88) % during the months of June to September which drops down during February to April.

Analysis of past meteorological records of the Mongla region reveals that this region remains very windy during April to August wind blowing from south and south-east

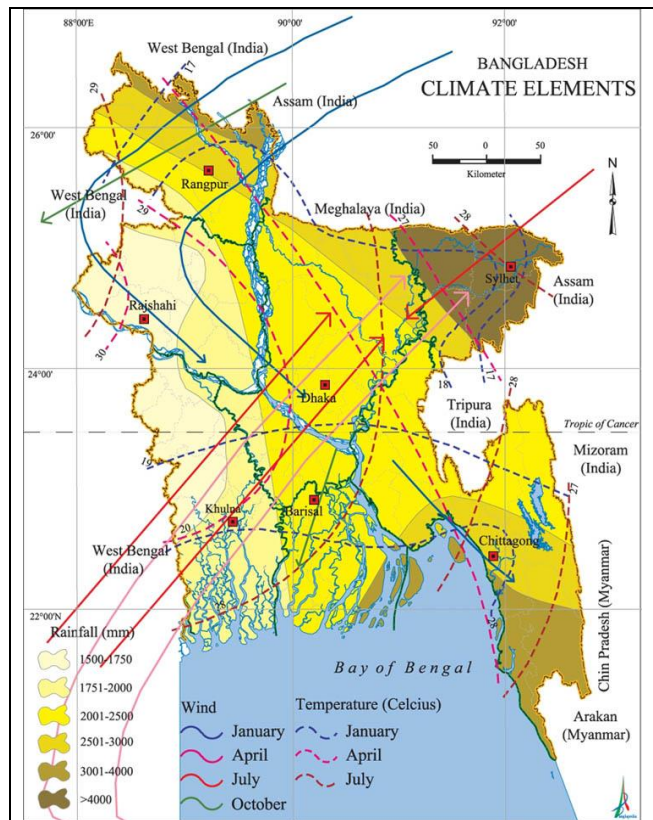


Figure 4.4: Climate map of Bangladesh

and then it remains less windy during October to March wind blowing from north and north-west.

The climatic condition of the Mongla region is found quite good and favorable for quick dispersion and removal of any pollutant emitted/discharged into the air. It is found that the wind velocity in this region varies from 2.3 Kt. to 16.2 Kt.

4.3.2 Ambient Air quality

At present the air pollution sources near the project site in Mongla and surrounding areas are very limited and air pollution level in this area remains within tolerable limit. Sometimes temporary localized pollution problem occurs from the Meghna Cement Mills, Mongla Cement Mills, sea-port activity, vehicles and water vessels etc. movement through this area.

Table 4.1 Results of Ambient Air Quality

Sample Description	Concentration of Pollutants measured in Ambient Air					
	SPM	PM ₁₀	PM _{2.5}	SO ₂	NO _x	CO
Jetty Area (Pasur River Side) N 22°30'55.2 E 089°35'07.4	193.06	132.70	31	5.41	7.11	1

Front Gate of MCML N-22°30'57.7 E-089°35'12	187.01	106.67	43	6.25	3.05	1
Units	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	ppm
Sampling Duration (Hours)	24 hours					
<i>Bangladesh Standard (according to the amendment of Schedule-2, July'05 of ECR'97)</i>	<i>200 (8 hrs)</i>	<i>150 (24 hrs)</i>	<i>65 (24 hrs)</i>	<i>365 (24 hrs)</i>	<i>*100 (year)</i>	<i>35 (1hrs)</i>

Note

Not Detected (ND), Suspended Particulate Matter (SPM), Oxides of Nitrogen (NO_x). Sulphur Di-Oxide (SO₂), Carbone Mono-Oxide (CO)

Analysis of laboratory results of surrounding ambient air quality of the proposed project site reveals that at Mongla was collected from available reports and that from the Department of Environment (DOE). It is found that the air quality is still not polluted and remains favorable throughout the year. From the air quality monitoring data it is found that the concentration level of SPM and PM₁₀ in the ambient air is remarkable and almost at the border line in comparison to the National Standard allowable limits. SO₂, NO_x and CO found well with in the allowable limits.

4.3.3 Surface Water Quality

The Pasur river is the nearest surface water body, which originates from the Madhumati-Baleshwar river system in the east as a tributary of the gauges and passes through Jessore, Jhenaidah, Khulna and finally meets Bay of Bengal. The part of the river passing through different districts and areas takes different names such as in the upper part near jessore and a certain part of Khulna it is known as Bhoirab, while passing Khulna city it is Rupsha and near Mongla it is called Pasur river. The Pasur meets Bay of Bengal in the south where a thick natural mangrove forest has created a beautiful scenery and nursing ground of wide variety of biological diversity.

The bed of the river is muddy and sandy-muddy where tidal water has free flow. The river has no erosion problem and remains stable throughout the entire course.

The river plays an important role to the industries situated in both sides of river in different industrial areas. Many of the industrial units get the process water from this river and they discharge the industrial effluents into this river. The domestic and commercial waste water of different towns and Khulna city as well add considerable pollution load to the river, hi addition to industrial use the river is used for irrigation and other purposes which include washing, bathing, dumping and also obviously for fishing.

As the river is tidal and very turbulent the tides in the Bay of Bengal cause daily changes in water level in the Pasur river of as much as 2.5 m, flooding the lower parts of Khulna city area during monsoon season.

The river carries away enormous silts from the upstream and the coastal areas into the sea during rainy periods and brings salinity, spilled oil, oily substances and other pollutants from the

sea with tidal water into it during lean periods. The water quality of this river is monitored regularly by the Department of Environment and some other hydrological data are monitored by the Water Development Board.

The Mongla Port is situated on the bank of Pasur river near to the project site of the Meghna cement Mills Ltd. at Mongla. It has been learnt that a large number of foreign ships nearly 500-800 in number are handled annually in this port. Wastes from these ships, inland carrying vessels, run off, domestic sources are discharged into this river regularly which are also one of the causes for pollution problem of the river water.

The industries situated nearby and other industrial zones of towns and the city discharge huge quantity of untreated wastes directly or indirectly into this river through out the year. During dry periods the quantity of river water diminishes considerably. So discharge of huge quantity of these wastes into the river water causes to increase the localized pollution problem near the discharging point in the river basin which remains for longer period in it due to the to and fro motion of the tidal water during dry periods. As the natural oxidation process is favoured by the turbulence and tidal motion so the pollution problem diminishes very quickly.

Moreover accidental spillage of oil and oily substances in the river occurs from ships, oil tankers and other carrying vessels. Sometimes oil pollution on top of this river water becomes noticeable. Spillage of bilge and ballast water also happens frequently from foreign ships arriving at the Port for delivery of goods which causes pollution of this river water. How ever due to strong current, wind and wave action the oil and other localized pollution gets dissipated soon. Sometimes the residual floating oil reaches on the bank of the river due to wave action and stains on vegetation.

The laboratory test results of Pasur River water quality are mentioned in following table 4.2

Table 4.2 Results of Surface Water Quality- Jetty Area, Pasur River

Test Parameters	UNIT	Result
pH	---	7.90
Dissolved Oxygen (DO)	mg/L	6.9
Total Suspended Solid, (TSS)	mg/L	518
Total Dissolved Solid, (TDS)	mg/L	12,522
Biochemical Oxygen Demand (BOD)	mg/L	118
Chemical Oxygen Demand (COD)	mg/L	588

The collected data analysis shows that pH of the river water near the project site varies from 6.5 to 8.5. Temperature varies from 31°C to 33°C during Summer and from 25°C to 30°C during Autumn and 18°C to 25°C during Winter. The magnitude of BOD (Bio-chemical Oxygen Demand) of the river water over the period under review was found to vary from 0.8- 3.8 ppm and that of DO from 5.0 to 6.8 ppm throughout the year. The acceptable value for BOD of ambient water in river is 2 ppm and that for pH is 6.5 - 8.5 and that for DO is 7.5 ppm. Comparing these data with national standard values (EQS) it is found that pH value of the river water is within acceptable

limit. The BOD value exceeds the higher acceptable value during some of the periods of the year but reduces again to lower values. Some times the values of BOD exceeds the standard values that means the river gets polluted to the higher extent for some times and by the self cleansing power of the environment the river water gets purified again. It is found that the carrying capacity of the river has not been irreversibly destroyed permanently. Though alarming the present pollution level of the river is still within acceptable condition.

The SS (suspended solids) content of the river water is found to be very high beyond tolerable limit throughout the year which means that the river water is not suitable for survival of some species of fish in there during rainy period. Acceptable value of SS is 25 ppm or less. The higher values of Suspended Solids cause difficulties in breathing for fishes. Abundance of fishes usually decline in any water body which polluted with insoluble solids.

Existing pollution load of Pasur River may influence due to possible pollutants to be contributed by the proposed VRM Unit of MCML.

4.3.4 Ground Water Quality

Ground water source in the plant site is the underground aquifer which is readily available from a shallow depth of 3-5 meters. The shallow ground water is very saline. The deep tube well water is fresh and free from salinity effect. The analytical result of the ground water quality is shown in following table 4.3

Table4.3 Results of Ground Water Quality

Test Parameters	UNIT	Results	Standard (ECR'97)
pH Value	---	7.59	6.5-8.5
Total Suspended Solid, (TSS)	mg/L	70	10
Total Dissolved Solid, (TDS)	mg/L	8410	1000
Total Hardness (as CaCO ₃)	mg/L	1850	200-500
Arsenic (as As)	ppm	ND	0.05
Iron (as Fe)	ppm	0.52	0.3-1.0
Nickel (as Ni)	ppm	ND	0.1
Lead (as Pb)	ppm	ND	0.05
Zinc (as Zn)	ppm	ND	5
Total Coliform	MPN/ 100 ml	23	0
Fecal Coliform	MPN/ 100 ml	7.8	0

Noise Quality

Results of Noise Quality

Noise Level Monitoring Location	Measured Noise Level (LAeq) dB A	
	Day time (6.00 to 21.00 hrs)	Night time (21.00 to 6.00 hrs)
Jetty Area (Pasur River Side)	70.67	68.4
Front Gate (main entrance of MCML)	69.25	66.7
Bangladesh Standard Sound Pollution (Control) Rules-2006 (Site considered under ' Industrial ' Zone)	75	70

4.3.5 Soil Quality

The site is a coastal area of Bangladesh which is mainly plain land with a general elevation of 3.6m above mean sea level. The soil of the site is more or less stable having no soil erosion problem though the Pasur river is turbulent and tidal. Cyclonic storm frequently hits this coastal region during monsoon periods. Even though soil remains in good condition. The soil is very fertile and both short and tall trees have grown plenty everywhere in and around the project site. The surrounding environment is free from any pollution and crops grow in plenty in this region.

4.4 Biological Environment

The surrounding areas of the site are beautified by homestead forestry and many newly planted trees everywhere. The largest and world famous Sundarban mangrove forest is the natural forest area situated within 10 km from the project site. The most important natural eco-system of the Sundarban is precious natural resources near the plant site. The Sundarban constitute the largest mangrove forest in the world covering an area of about 1.0 million ha of which about 60% lies within Bangladesh and the remaining in the state of West Bengal in India. The forest area represent an area where fresh water from the Ganges through its distributaries via Pasur river flow to the Bay of Bengal resulting in the mixing of fresh and salt water which has led to the development of an extremely rich diversity of plant and animal species much of which are as yet unexplored. About one third of the total area consists of water in the form of rivers, channels and tidal creeks varying in width from several meters to several kilometres. The river Baleshwari in the East is the main source of fresh water although several others also bring 'water from the Ganges during the rainy season.

The dominant species of the trees available in sundarbans are Sundri, Gewa and Keora. These plants are now being exploited for timber, pulp wood and for making matches, hard board and pellets. Leaves of Nipa palm locally called golpata are popularly used to make thatching of roofs. The forest also yields large quantities of honey and bees wax from the wild bee hives.

Plenty of fish and shrimp species are now available in the waters of the Sundarbans of which the main ones are Hilsha, BhetId, Indian Salmons, Pomfiets, Jew fish, Bombay duck, Mangofish,

Engraulids, Pangas, Mulletts and Catfish. There are about 20 species of shrimps of which the commercially most important ones are the Tiger shrimp and Golda shrimp.

There are a large number of turtles, crocodiles and frog species of importance. The fresh water dolphins are also found in these rivers. A large number of mammals of which the dears are the most abundant and the Royal Bengal Tigers the most important with only around 400 individuals still in the wild.

The Sundarban are also important for over 120 recorded species of migratory & indigenous birds, particularly gulls and terns. The natural ecosystem of the Sundarban is very important natural resources. Many people live on it collecting natural honey & beeswax from the forest. Nearly 150,000 fishermen live on catching fish from this ecosystem of the forest. Thousands of men, women and children earn a living by catching the post larvae of the shrimps in the shallow waters of the tidal creeks.

Recently a part of the Sundarban has been declared as protected area and sanctuary for 'wild lives by the Government of Bangladesh. The Sundarban also provide raw materials for our Pulp and Paper industries, timber for export and other domestic uses. The forest also protects us from natural hazards, gives us oxygen and other herbal medicines for health, Above all it is playing an important role in our life processes and in the economy of the country as well. So it needs protection from its probable destruction by the industrial pollution.

'Wild lives:

The Sundarban mangrove forest is a natural dense forest in this area where a lot of wild lives are found. The commonly found wild lives are Royal Bengal tiger, deer, rabbit, foxes, jackals, pig, monkey, crocodiles and many other common varieties are found in the small forests and bushy areas. In the mangrove forest quite a large number of different types of birds are seen. The available types are crows, woodpeckers, pigeons, doves, nightingales (bulbul), gulls and many other common varieties those commonly found in Bangladesh.

Aquatic/Marine ecosystems

Pasur river estuary and the mangrove forest area are the nursing grounds for many species of fish and varieties of marine lives. The Pasur river is also favourable for migratory fishes. So a large number of fishermen live on the fishing in these areas. The study reveals that in the past the water quality was very good and the availability of fishes were remarkable but now-a-days the availability has been reduced drastically. Many polluting industries discharge their untreated industrial effluent directly into this river. The untreated city sewage together with many other wastes stream such as run off waste and oily waste water discharged from various ships, water vessels and port activities, offshore drilling etc. go directly into the Pasur river causing frequent localised pollution problem. As the river is very turbulent so the pollution disappears very quickly. Phytoplunkton in the river plays minor role in the food cycle. So due to the present pollution load in the river the availability of fish and other species are diminishing gradually. Sea gulls are observed in the mouth of the estuary but not in plenty. The movement of the migratory fishes in the river has reduced due to interference of the sea going vessels, port

activity.

4.5 Socio-economic Environment

The proposed plant site lies under Mongla Port Thana of Bagerhat district. The agricultural productivity of this region is good and means of livelihood are favourable so the general economic condition of the people is good enough. Income generation activity of the people has increased further with increase of job opportunity due to recent industrial development. The shrimp cultivation and processing industries for shrimp processing and export has increased opportunity for development of socio-economic development of this region.

Nutritionally the people are better off and at present enjoy good environment and good health. Awareness on the need for education for improving the quality of life is increasing. The housing complexes of Mongla Port Authority, Custom house, rich bio-diversity of mangrove forest are sensitive areas near the project site. The mangrove forest with its rich bio-diversity is an attractive tourist spot. The environmental status of the resourceful sensitive areas of the region may be damaged by the industrial effluents if adequate protective measures are not undertaken by the industries at the initial stage of industrial development. The mangrove leaves are the sources of food for the aquatic and marine fauna. So it plays an important role to aquatic life system. The mangrove forests also serve as the shelter for many wild birds. So the forests deserve protection from deterioration/extinction. The Pasur river estuary is an important nursing ground for a wide variety of marine fish species. Increased pollution problem in this area may destroy the spawning ground and the juvenile fishes so needs protection from probable pollution damage. The communication facility and Port have increased the transportation facilities of the various commodities of this locality with the other parts of the country. With the improvement of Port and communication facilities the socio-economic condition of the people of this locality is improving further.

The setting up of the cement plant at Mongla as a part of industrial development in this region is also expected to raise the opportunity for creation of more jobs and hence may boost up some economic upliftment of the society of the locality.

4.5.1 Quality of life values

The population in Mongla and the nearby areas are still not dense. Majority of the people living in this area are illiterate and work in the agricultural fields, industries and offices. The working class is poor and lacks the required amenities for life. The educational rate in this area is within 17%-20%. Private houses which constitute the most of the housing are more or less of poor quality. The most of the houses are made of goal pata and there are only a few semi-pucca houses having pucca wall and tinned roof. Only a few private houses found are pucca in the nearby villages. The colonies of navy and Mongla Port housing colonies and other bonafide houses are multi storied building. As the area is not yet heavily populated so health and sanitation condition in the area has not become a matter of concern. The area does not contain any domestic sewage treatment facility even there is no sewerage facility/line in the area and also it is true for the city and district towns of this region as well.

Thana health complexes are the available nearby health care facilities for the people which are certainly inadequate in comparison to the ever increasing population.

SECTION 5 ENVIRONMENTAL SCREENING AND SCOPING

In addition to addressing GOB laws and regulations, the proposed project is being planned to comply with safeguard policies acceptable to the potential project financier-IDCOL

The following sections describe the results of environmental screening and identification of anticipated impact issues that have been assessed in detail over the course of this ESIA Study. The major issues and concerns that are likely to evolve over the life of the proposed project have been addressed in design management and in developing mitigation measures.

5.1 Compliance Status with WB Operational Policy

World Bank safeguard Operational Policies are widely recognized and accepted by IDCOL. The following Table 5.1 includes a list of WB operational policies with brief statements indicating project consideration to comply.

Table 5.1 Proposed Project Compliance Status with WB Safeguard Policy

World Bank Policies	Status: Rationale
OP 4.01 Environmental Assessment	Considering nature of project intervention, brief environmental assessment is being prepared following a specific scope of study that shall address the requirements for a Category B project.
OP 4.04 Natural Habitats	Site of MCML is situated by the bank of Pasur River. There is an existing Jetty that uses to unload and access raw materials and simultaneously to load finished products for distribution by water way. Potential surface water impact in considered.
OP 4.09 Pest Management	No pest management activities will be undertaken.
OD 4.20 Indigenous Peoples	No indigenous peoples, according to the definition used in OD4.20, are to be affected by the Project
OPN 11.03 Cultural Property	No cultural properties are to be affected as part of development refers to construction and operation of Proposed VRM Unit-2.
OD 4.30, Involuntary Resettlement	The Proposed VRM Unit-2 shall be accommodated within existing MCML site. No additional land is required and thus no Land Acquisition requires.
OP 4.36 Forestry	Proposed VRM Unit-2 shall be constructed within the existing Meghna Cement Plant, which is located at Mongla Port Industrial Area, Buridanga Union under Mongla Upazila and the whole Industrial Area is lying within in SUNDARBAN Ecological Critical Area. MCML site is located at an arial distance of 6.2 km north-east from the edge of Sundarban Reserve Forest. Considering distance, direction and potential pollution source (Particulate) with volume, no impact to the natural habitat of Sundarban Reserve Forest is anticipated.

World Bank Policies	Status: Rationale
OP 4.37 Safety of Dams	Not relevant, as the Project does not involve dam construction.
OP 7.50, National and International Waterways	Various types of vessels shall navigate national and international waterways to and from site to bring raw materials and to distribute finish product. But no navigation impact is anticipated except accidental risk.
OP 7.60, Projects in Disputed Areas	The existing Meghna Cement Plant is established on Leased out land from Mongla Port authority. No dispute identified.
Labour Standards	Since 1996, MCML is operating it's plants with strict compliance of national Labor rules and regulation. MCML authority shall not utilize forced or child labour.
Disclosure of Information Policy	Information about the project has been disclosed to relevant government agencies and Mongla port authorities. Draft final ESIA report would be disclosed if it is required by project financiers.

5.2 Screening and Scooping

5.2.1 Using ADB Screening checklist

The following Table 5.2 lists a set of criteria prescribed in the Environmental Assessment Guidelines of ADB, May 2003 along with the proposed project statement of applicability. The checklist also addressed the requirement of ADB Safeguard Policy Statement (SPS) 2009.

Table 5.2 ADB Rapid Environmental Assessment (REA) Checklist			
Screening Questions	Project Status		
	Yes	No	Remarks
A. Project Setting: Is the project area adjacent to or within any of the following environmentally sensitive area?			
Cultural heritage site		no	No significant cultural heritage features are located on or adjacent to the MCML site.
Protected area	yes		Site is located within 10 Km radius of Sundarban ECA.
Wetland		no	Site is situated by the eastern bank of the Pasur River. Seasonal flood plain is lying by western bank of the river.
Mangrove		no	Site is located within ECA of Sundarban mangrove forest.

Table 5.2 ADB Rapid Environmental Assessment (REA) Checklist			
Screening Questions	Project Status		
	Yes	No	Remarks
Estuary		no	Mongla Port Industrial Area is situated in between Mongla and Pasur River.
Special area for protecting biodiversity or Buffer zone of any protected area	yes		Mongla Port Industrial Area is situated within 10km radius of Sundarban ECA and the existing MCML site is lying at a distance of approx 6.2 km from northern edge of the Sundarban Reserve Forest. Possibility to cause any adverse impact to the biodiversity of Sundarban is anticipated unlikely.
B. Potential Environmental Impacts: Will the project cause any of the following potential impacts?			
Impairment of historical/cultural monuments and other areas, and loss/damage to these sites?		no	There are no historical/cultural monuments on or near the Mongla Industrial Area.
Dislocation or involuntary resettlement of people?		no	Existing MCML site with 9.83 acres of land area has been leased out from Mongla port authority in 1993. No additional land shall require for the proposed VRM unit because existing Ball Mills of unit-1 of MCML shall be replaced by the VRM unit.
Aesthetic degradation and property value loss due to establishment of plant and ancillary facilities?		no	MCML site is located within Industrial Area of Mongla Port Authority, which had been developed in early 90's.
Social conflicts between construction workers from other areas and community workers?		no	All workers shall be hired from the local vicinity, only a few personnel with special skill will be hired from outside.
Short-term soil erosion and silt runoff due to construction?		no	Construction activities shall not anticipate any erosion or site runoff because existing MCML site is already built-up and almost

Table 5.2 ADB Rapid Environmental Assessment (REA) Checklist			
Screening Questions	Project Status		
	Yes	No	Remarks
			cemented.
Noise and dust from construction activities?	Yes		Insignificant noise and dust generation is anticipated but shall not create nuisance to the nearest settlement due to existing infrastructure settings in between source and Mongla Port residential colony, which is located 500 meter south-east from the site.
Fugitive dust from different sources during VRM operation i.e. transportation, unloading, storage, processing of coal, Grinding, Packaging, etc?	yea		Generation of Fugitive dust from all these activities and working location has been identified as major concern and environmental impact issue
Risk of oil spills, which could pollute surface and ground water and soil?	yes		Oil and oily waste water spillage from vessels at Jetty Area identified as potential impact issue. But Effective hazardous waste management system are already in practice, which strictly monitored by Mongla Port Authority.
Air pollution from gaseous emission into the atmosphere?	yes		Proposed VRM unit shall be operated with electricity. Insignificant pollutants i.e NOx, SOx, CO, CO2 shall be emitted due to coal burn for generating hot gas requires in grinding section, which shall not require any special attention or mitigation measure. But exhaust dust emission to the atmosphere is considered as the major pollutant and concern.
Public health and safety hazards due to solid waste disposal?		no	At present, all generated solid waste are disposed off at designated area selected by Mongla Port Authority. Proposed project shall adopt existing waste

Table 5.2 ADB Rapid Environmental Assessment (REA) Checklist			
Screening Questions	Project Status		
	Yes	No	Remarks
			management procedure.

Source: Environmental Assessment Guidelines, ADB, May 2003

5.2.2 Using Checklist (*Munn, 1979*) of EIA Guidelines, DOE

Identification and bounding of potential impacts due to the decommissioning of existing Ball Mills of Unit-1, construction of proposed VRM and operation have been done using the **Checklist** (*Munn, 1979*) that suggested in the EIA guideline 1997 of Department of Environment, GOB. Table-5.3 represents the checklist that is developed with project specific environmental impact issues/indicator to narrow down potential impacts and thus to stimulate the analyst to think broadly about possible consequences of contemplated actions for the plant. In this checklist, actions, which may affect at the various stages of the project activities, are listed and the degrees of Significant Environmental Impacts (SEIs) are shown. The identified probable impacts are weighted/ categorized to classify the magnitude in terms of degree of impacts (e.g. none, minor, medium and major).

Table-5.3 Checklist to Identify Significant Environmental Impacts (SEIs) due to the proposed Project Intervention

Project stages	Issues/Actions may cause Environmental & Social Impacts/Affect	Anticipated SEIs without mitigation measures				Type		Comments
		<i>None</i>	<i>Minor</i>	<i>Mode- -rate</i>	<i>Major</i>	<i>Adverse</i>	<i>Beneficial</i>	
Pre-Construction Stage (Project Location)	Loss of agricultural land	*						Proposed VRM Project shall be established with in existing site of MCML. No impact anticipated
	Land Value depreciation	*						
Construction Stage	Site run-off		*			*		Major civil works include construction of VRM house. Other require major associate infrastructure/ facilities already exist in the site. Therefore, scope of site run-off is occasional and may occur only during monsoon. Minor Impact is anticipated.
	Fugitive dust generation		*			*		Construction activities shall be undertaken at existing MCML site, which is already developed and almost cemented. Insignificant amount of fugitive dust shall be generated. Minor impact is anticipated.
	Noise hazard		*			*		Various construction activities shall generate noise but shall not create nuisance to the nearest resident members or natural environment due to existing settings of MCML site. Minor impact is anticipated.
	Sanitation hazard	*						Adequate sanitation facilities already exist in the site to facilitate similar construction activities. No Impact anticipated.
	Accidental risk			*		*		Accident event in undertaking construction activities Inherently occurs. Moderate Impact is anticipated.

Project stages	Issues/Actions may cause Environmental & Social Impacts/Affect	Anticipated SEIs without mitigation measures				Type		Comments
		<i>None</i>	<i>Minor</i>	<i>Mode-rate</i>	<i>Major</i>	<i>Adverse</i>	<i>Beneficial</i>	
	Wastes Disposal			*		*		Dismantling of existing ball mills facilities, demolishing of ball mills house infrastructure, construction of new mill house and installation of proposed VRM equipment shall generate significant solid and oily waste. Moderate impact is anticipated.
	Traffic congestion	*						Transportation of construction material and equipment of proposed VRM shall increase traffic volume. Simultaneously shut down of production line of Unit-1 shall decrease traffic volume significantly. No impact is anticipated.
	Employment Generation				*		*	Employment opportunity shall be generated for approx 500 persons during the construction works. Major but temporary beneficial impact is anticipated.
Operation Stage	Fugitive dust generation							Significant fugitive dust shall be generated from various point sources (occasionally and continuous) that may create occupational health hazard
	Gaseous Emissions							Dusts that may influence the ambient air quality shall be emitted from Coal Mill and Cement Mill. Insignificant NOx and CO2 shall be emitted from Coal burning and drying section. Major Impact

Project stages	Issues/Actions may cause Environmental & Social Impacts/Affect	Anticipated SEIs without mitigation measures				Type		Comments
		None	Minor	Mode-rate	Major	Adverse	Beneficial	
	Wastewater discharge		*			*		Existing and proposed clinker grinding shall be dry process. Proposed VRM Cooling system is designed with closed-water cooling mechanism. No discharge requires. Sanitary waste treatment facility already exists in MCML site. No Impact
	Pollution from hazardous waste dispose		*			*		Safe disposal process and procedures are already in place. Minor Impact
	Noise/Vibration Hazard			*		*		Clinker Grinding section along with several facilities of production line shall generate significant noises that are hazardous for workers. Major impact.
	Occupational health safety hazard			*		*		Inherently occurs. Day to day activity comply with MPL's own HSE policy. Minor Impact
	Employment				*		*	Operation of proposed VRM shall create employment opportunity for approx 325 persons.

Both potential positive and negative impacts are expected from this project during construction and operation phases.

5.3 Anticipated Environmental Impact/ Key Issues

The key issues to be assessed as part of the ESIA have been identified using a combination of following analysis and results:

1. Review of project related technical data/ information and identification of pollutant and pollution sources by project life cycle;
2. Analysis of baseline condition and identification of potential impact receptor;
3. Analysis of Screening findings corresponding to the receptor; and
4. Professional judgments on the basis of experience gained from similar assignment.

The following anticipated environmental impact/ key issues related to the proposed VRM project have been considered for further assessment:

- i) Fugitive dust generation and impact on human health and surrounding ecology.
- ii) Gaseous emission (exhaust and vehicular) and atmospheric pollution.
- iii) Noise emission and occupational health
- iv) Hazardous (solid and Liquid) waste management and impact on surrounding natural environment
- v) Accidental Risk and occupational Safety and
- vi) Employment generation and benefit enhancement.

In addition to the key issues, there are numerous other minor issues that are of a more routine nature for which potential effects are well known and widely recognized i.e. occupational health and safety, natural hazard, social and occupational conflicts, etc.

SECTION 6 ANTICIPATED IMPACT ANALYSIS and MITIGATION MEASURES

6.1 Summary of Anticipated Impacts

During Screening attempts were made to identify the probable pollution problems and issues which may have adverse impact on the elements of the surrounding environment. It was found that the escaped fine cement dust from the cement plant would be an important environmental issue, which had been studied and found that adequate mitigating measures would be incorporated with the industry. It is found that the cement production unit will have dust collectors for arresting the escaping dust from the dusting sections of the plant. It is true that accidental release of the dust in excess quantity may cause a serious air pollution problem from this type of cement plant if protection system is not incorporated. The air pollution may cause serious damage to the surrounding atmosphere and may create nuisance to the people. As the area is cyclone prone area so during cyclonic storm and tidal surges pollution due to washing away of the dripped machine oil/lubricants may cause pollution of the river water and health risks as well. During construction work water pollution problem may occur if the piling wastes/mud's are not properly contained or managed. Spill over of fuel and engine oil/lubricant from the vessels/ships carrying raw material while playing through the river and unloading in the plant site jetty may also cause accidental pollution in the face of natural calamities. The plant will also have some positive impact on the local community by employment generation and socio- economic development of the locality. The potential impact of the industry on environmental have been identified as follows:

6.2 Impact and Mitigation Measure- Construction Stage

Though limited but to some extent the following temporary impacts are expected to happens during construction stage of the cement plant

- Interference with road transport facilities and traffic
- Hazard and nuisance to workers if adequate preventive measures are not taken
- Possible accidents if precautions/safety measures are not into account
- Piling waste run-off may pollute the poashur river if adequate management plan is not taken beforehand

6.2.1 Impact on Surface Water

During SCREENING study it was found that at normal operation if good house keeping practice be maintained then the generation of solid or liquid wastes will be minimized. In fact there will be no regular discharge of waste into the nearby Pusher river and hence no water pollution problem is expected form this cement clinker grinding plant. However it is found from the experience that in the reality the industrial plants do never work on the ideal condition of plant design. Normally there will be no discharge but even though occasional floor washing water may contain lubricating oil/gear oil and oily waste dripped into the floor/.If the oily waste not removed and treated in appropriate way then it may pollute the water to some extent. The period of the piling work is an important of time then it may go to the river water and can cause pollution of the river water during construction period .If the waste is managed as per the well planned management schedule then it will not cause

any pollution.

As the site cyclone and tidal surge prone area so it may happen that during transportation of imported raw materials by ships to the plant site there may be accidental spillage of oil and oily substances of the ships into the river water causing water pollution problem. Accidental hazard may not happen at all but the possibly is there with other ships arriving and leaving sea port .though it may not be the regular phenomena but in extreme cases there should be preparedness for handling and managing the situation if it is required to save environment and life of people .So there is need for formulating a detail EMP and good house keeping practice and disaster management plan for the industry.

During construction period the extremities must be taken into consideration for avoiding the unwanted consequences. machinery cooling and domestic need for water will be met by ground water taken from deep tube to be sunk in the premise.

6.2.2 Impact on Ground Water

The ground water availability is enough and was tested and found that the ground water of the site contains traces of pollutants which are however within acceptable range. The plant under review will require to dig for piling work which will be done during dry period and in controlled way and the piles required are also very limited in number and very much temporary so it may not cause alteration of ground water flow and elevation, decrease or increase in ground water sources, change in major uses and users of ground water. The plant will not make any type of interference which can bring about changes in natural interaction of ground water with surface drainage through the process of infiltration, recharge, discharge, changes in soil percolation rates etc. there is no possibly off deterioration, recharge, discharge, changes in soil percolation rates etc. There is no possibility of deterioration of ground water or abandonment of any ground water sources for selecting this site for the proposed cerement unit 1 for any kind of activity of the new plant during its construction or operational stage

6.3 Impact and Mitigation Measure- Operation Stage

6.3.1 Ambient Air

Air borne escaped fine cement dusts from the cement plant would be the only main cause of pollution of this plant. Main dust emission points of the cement unit no.1 of Meghna Cement Mills Ltd. are envisaged to be:

- a) Clinker/gypsum receiving hoppers in the jetty
- b) Clinker and gypsum grindings section
- c) Cement & clinker dumping places of the storage silos
- d) Cement packing and delivery sections

It is found that some amount of fine cement dust will pass through the dust collectors with the exhaust air stream from the Proposed VRM unit of the Meghna Cement Mills Ltd, during the normal operation of grinding and packing activates. The concentration of this air borne cement dust in the exhaust air stream will be les than 100 mg/nm³ which is within acceptable limit as per national

acceptable

It is true that without dust collectors in the dusting sections of the industry the air pollution of the surrounding area would be beyond tolerable limit. so for abatement of the air pollution problem dust collectors in the probable dusting sections will be unavoidable. The exhaust air will pass leaving the arrested cement dust in the bags of the filter units of the dust in acceptable limit as per design specification of the dust collectors placed at unloading jetty, clinker silo, cement silo, packing house, etc.

The national acceptable limit of dust emission from all sections of a clinker grinding factory is 250mg/m³ and that from the grinding section is 200mg/m³ for a clinker grinding factory of the concerned expansion unit of Meghna Cement mills ltd. will be more than 1000 MT of cement per day .So the dust emission limit of the new unit will be acceptable as per national effluent quality standard of Bangladesh

The MCML dust control plan shows that to arrest the dust emitted from the dusting sections, 30 (thirty) dust collectors with suction pumps will be installed in the main dusting sections of the unit. The locations of the dust collectors to be installed will be as shown in the figure 6. In most cases the dust emission from the dusting sections depend on the wind characteristics of the site and the quality of the imported clinkers. The emission rates of the dusting sections of the plant other than grinding section will not be continuous and also depend on the quality of handling practice. For which good O&M practice and regular cleanliness schedule would be necessary.

The dust emission from the grinding mills' separation process of the grinding section will occur at a continuous basis. The exhaust air from the cyclone separator used for oversize separation of the ground cement in the grinding section will carry some escaping dust, which will pass through a chimney into the ambient air on top of the factory building. This escaping dust if be allowed to flow into the ambient air without any dust arresting device then it may cause a constant air pollution problem. To avoid this air pollution problem the characteristic effluent treatment plant for clinker grinding mills in the form of dust collectors have been designed and incorporated with the production process. The escaping dust will be mostly retained into the bag filters to be placed in the exhaust air stream before being discharged into the ambient air from the dusting sections of the cement industry.

The dust collectors in fact are bag filters of different sizes and capacities. The filtering media is the filter cloths made of cotton or polystyrene fabrics. Regular replacement of the filter cloths is required as the strength of the cloth and its usefulness decreases due to prolonged use. The capacity of the dust collectors decreases with the duration of use and with the increase of relative humidity in the air, operation characteristics and load given on it. The retained cement dusts in the cloths of the bags of the filter units will have to be collected and returned to the production cycle from time to time. The adhering dusts from the cloths are generally removed by timely given Mechanized pulsating vibration on it. During high humid condition the cement dust remains adhering with the cloths and increases pressure drop and facilitates tearing off. Thus the filtering unit loses its efficiency of retaining the escaping dust with the exhaust air. In these circumstances the pollution by the escaping dust may increase. So there is a need for regular check up of the condition of the cloths

in use and replacement of the torn off cloths from the filtering units when situation demands.

From experience it is found that the cloths remain in good usable condition up to 7 to 8 months from the starting of their continuous use. The replacement of the cloths after 7 months use on schedule is necessary for retaining the 100% working efficiency of the filter units. As long as the cloths remain in perfect working condition and good house keeping practice maintained the level of pollution will remain in negligible condition as per design characteristics.

The dust to be emitted from the main dusting section i.e. the grinding mills house shall be discharged through a chimney into the ambient air. The dispersion of the emitted dust occurs depending on the characteristics of the prevailing wind-flow characteristics and other meteorological conditions.

To keep concentration within acceptable limit protective devices shall be maintained at 100 % efficiency level and in perfect condition of the dust collectors.

6.3.2 Waste Water

By analyzing the process system of the cement industry it is found that so liquid material or oil will be required as raw material in the production process for this cement factory, so generation of liquid waste and pollution by liquid effluent is unlikely. The cooling water for the grinding mill of the factor will be reused again and again and the water will remain in a closed circuit system. So the cooling system will not create any effluent /waste to pollute the environment.

6.3.3 Noise Level

Noise within the factory building maybe and environmental problem within the factory premise .so ear protection measures will be needed for the working people. The noise will not propagate beyond the premise's trees boundary wall and the structures all will prevent the noise propagation and thus will indirectly help in preventing noise pollution.

6.4 Biological Impact

6.4.1 Flora and Fauna

It has been said before that a very resourceful mangrove forest (Sunder bans) with rich Bio-diversity exists within 10 km distance from the plant site. This mangrove forest is now under threat of destruction due to unknown reasons. Many valuable plant species are dying out at an alarming rate. If this resourceful mangrove forest disappears from the earth then it will be a great environmental loss. This resourceful mangrove forest has been recorded as a world heritage by UNESCO. So loss of the forest will be a loss for the world environment.

Though the exact cause of the degradation of the forest is not known yet Experts believe that the cause of dying of the valuable plant species may be due to many reasons. Some of the reasons are suspected to be pollution of the Pasur River by oil, Bio-degradable materials, silts, bacteria, global air pollution, virus attack, rapid increase of salinity, change in the flow pattern of the river due to shortage of water flow, change in ideal characteristics and change in river beds etc.

It is estimated that normally the emitted dust will be controlled and will not reach up to the Mangrove forest. Of the level of pollution increases during pick operational period and if the proper maintenance of the dust collectors fall then the residual amount of air borne dust from this cement

mills may be carried by wind to the vast mangrove forest which eventually may affect the mangrove ecosystem. Probable accidental release of fine cement dust in excess amount into the air from this industry, water pollution by spillage of oil during raw material and finished goods transportation activity through Pasur river, may have some significant impacts on the environment and on the resourceful mangrove forest (Sunder bans) as well

There are some agricultural fields all around the industrial site and homestead fruit trees in different locations from the industrial site. At present the bench mark/base line level of air pollution is still not alarming but it may rise up if the dust collectors are not properly maintained. The probable air pollution caused by emission of dust during operation of the factory may rise beyond tolerable limit and may have damaging impact on growth of the nearby agricultural crops and fruit trees affecting their productivity and hence the economy of the locality. So for avoiding the agricultural loss by air pollutants proper maintenance and good O&M practice will have to be formulated and implemented

The wild lives of the Sundarbans area are valuable natural resources of Bangladesh . A lot of foreign currency is earned from the rich bio-diversity of this Sundarbans Mangrove forest. as the forest is now under that of destruction so as the fate of the wild lives in there. The industrial pollution together with the oil spillage and water pollution from non point sources are believed to be the causes of the degradation of the Sundarbans and its resourceful bio diversity .so there is a possibility of creating an impact on the wild life by the presence or activity of the cement clinker grinding plant. As the plant have some potential air pollution problem so this plant may be responsible for creating an impact on the wild lives and nearby Sundrbans and other social forestry as habitat of the wild lives.

6.4.2 Impact on Aquatic Habitat

From the study of the activity of the proposed cement clinker grinding plant it is found that as the pant will not regularly discharge any liquid or solid wastes into the environment or in the nearby rive water so there is no possibility of creating any damage to the aquatic life in the river. But occasional release of dust and piling waste if goes to water then the suspends solids content of the river which can also modify or destroy the existing condition of the aquatic habitat causing extermination of other aquatic species. So good O& M practice and environment friendly management practice for abatement of the effluent generation should be developed and utilized.

6.5 Socio-economic Impact

6.5.1 Developments

The plant will be based on modern and improved technology. Very limited number of personnel and workers will be needed for its operation, maintenance and management. The need for workers will be met by local people and only a few skilled people will be brought from abroad for imparting training and technology transfer for good operation and maintenance practice. Local personnel will be engaged for running the plant. So migration of people to the project siter will not require to meet the need of the plant to run it. Only a few persons' probable migration will not be required to meet the need of the plant to run it. Only a few persons' probable migration will not cause any significant change to the population size of the locality to create any environmental crisis. It is not

likely to create any adverse impact on the local labor market.

This communication facilities of the locally was very good from before the site selection for the proposed plant. Moreover some improvement will further facilities for quick transportation of the locally produced goods and other items to various parts of the country boosting the improvement of business. With the increase of income level of the poor some awareness about the need for education, need for safe and pure drinking water and that for improvement of the local environment will increase. So need and improvement of environment friendly housing, schools for education, business, market, recreational facilities etc. are expected to rise up in the locality

SECTION 7 ENVIRONMENTAL MANAGEMENT PLAN

7.1 General

The inherent environmental problem together with accidental pollution problems of the plant should be managed as per management procedure to make the plant environment friendly and safe. It has been found that the cement plant would generate in normal operating condition fine cement dust as suspended particulate material, which may cause an adverse impact on the existing nearby ecosystem and environment. The impact may be even worse in abnormal and accidental situations. Then the consequences may be beyond tolerable limit and the ability for tackling the adverse situations may be at stake if those situations and mitigation measures are not properly taken into consideration in the early planning stage. For this reason the environmental management plan (EMP) would always be necessary for the plant. In addition to that the probable potential hazards will have to be managed properly for which the required mitigation and enhancement plans for this industry need to be formulated as follows

- Dust emission control plan
- plan for fire prevention and fire fighting,
- disaster management plan,
- Good O & M practice, equipment safety and good house keeping practice plan
- health protection and sanitation plan
- monitoring plan
- Development of greenery around the project site & in open spaces for beautification.

7.2 Dust Emission Control

Environment friendly closed circuit system of grinding and oversized separation system has been selected for this plant. In this technology fine quality of cement is maintained which is possible by using closed circuit grinding system where recycling of the oversized particles for sending back again into the grinder for grinding the oversized particles to the required fineness is provided. and also the closed circuit system prevents the escape and emission of cement dusts from the clinker grinding process where dynamic cyclone separator will be used for oversized separation. The air used for producing the vortex for size separation in the cyclone separator is exhausted from the separator, which normally reduces pollution. Moreover nearly 30 modern dust collectors will be installed in the exhaust air stream of the cyclone separators and other dust emitting sections of the plant to control the emission of dust from the cement plant.

To assist the production process i.e. to enhance the mill output as well as for securing dust free working environment there are several nos. of dust collectors with modern dedusting system in the VRM area. Moreover there are several nos. of dust collector having larger capacity of modern dedusting system to secure almost dust free working environment.

Dust Collector VRM-Grinding Area

	Name of the Dept	Total D/C No	Total D/C volume
212	Additive Transport	01	8,000m ³ /h
245	Fly ash feeding	01	10,000m ³ /h
461	Coal mill	01	22,930m ³ /h
465	Coal dosing	04	7,000m ³ /h
481	Clinker Transport 1&2	03	40,100m ³ /h
482	Clinker Transport 3.4	01	15,300m ³ /h
511	Cement mill feed	08	91,100m ³ /h
531	Cement mill	06	10,54,100m ³ /h
541	Cement transport	07	48,500m ³ /4

Dust dispersion

The dust emitted from the main dusting section i.e. the grinding mills house is discharged through a chimney into the ambient air. The dispersion of the emitted dust occurs depending on the characteristics of the prevailing wind-flow characteristics and other meteorological conditions.

Dust to be emitted from the main chimney of unit-1 should dispersed widely so that ground level concentration remain within acceptable limit. Mitigation measures refer to dust collectors efficiency must remain at 100 % and in perfect condition.

The particulars of dust collectors have been detailed in the **Annex 6** Specific locations of the dust collectors are shown in equipment flow diagram. See **Annex 7**.

If the filter cloths of the bag filters are properly maintained and replacement of the wasted filter cloths of the bag filter units is carried out on schedule then the dust emission in ambient are shall be negligible.

Table 7.1 below summarizes the potential impacts which are to be controlled, the mitigation measures which are to be adopted and indicated time frame for implementation with responsibility concern for ensuring the management plans are efficiently carried out.

Table-7.1: Implementation Schedule of Specific Mitigation Measures

Environmental Impact/Issue	Mitigation Measures	Time Frame	Responsibility	
			Implementation	Supervision
A. Construction Phase				
1. Dust/air pollution	- Water should be sprayed in the line and earth mixing sites, temporary road site. - Materials delivering vehicles should be covered to reduce spills. - Mixing equipment should be equipped with dust-removal device. Operators should pay attention to their health & safety. - Brick, concrete making plants should be located away from settlement as possible.	During Construction	Contractor	Engineer in Charge
2. Soil Erosion/ Water Logging	- Measures as per design or as directed by the Engineer to control soil erosion. - Ensure installation of - Retention structures to limit erosion and increase slope stability - Measures will be taken to prevent earth works and RCC works from impeding the khals and streams. - Suitable measures will be taken to prevent the waste water produced in construction from entering into creek and streams.	During construction	Contractor	Engineer in Charge
3. Labor Shed	- Provision of garbage bins and sanitary facilities will be made. - Special attention shall be paid to the sanitary condition of sheds.	During Establishment, operation and dismantling of sheds	Contractor	Engineer in Charge
4. Noise	- Construction work will be restricted in between 0600 to 2100 hours of each date. - Maintenance of machinery and vehicles should be enhanced to keep their noise at a minimum	During Construction phase	Contractor	Engineer in Charge

Environmental Impact/Issue	Mitigation Measures	Time Frame	Responsibility	
			Implementation	Supervision
	level.			
5. Accidental Risks	- Safety tapes and signals will be installed and traffic rules and regulations will be actively enforced in the temporary diversions.	During Construction	Contractor	Engineer in charge
- B. Operation Phase				
1. Air Emission	- Suitable dust collectors (Fabric Filters) shall be provided at all major emission source - Belt and idlers will be maintained in proper condition to avoid spillage of material - Good house keeping practice will be maintained	Throughout Operation Period	Environmental Engineer, MCML	Process Manager, MCML
2. Noise	- Proper design and sound management practice will be adopted.	Throughout Operation Period	Environmental Engineer, MCML	Process Manager, MCML
3. Solid Waste	- All materials will be disposed by MCML central solid waste disposal system	Throughout Operation Period	Environmental Engineer, MCML	Process Manager, MCML
4. Maintenance and Safety	- regular Check-up of all support equipment, generator, trolley etc. to maintain the proper operating conditions - Water and fire fighting facilities will be provided in terminal stations. - Local control stations will be provided adjacent each end of the LBC, including emergency stop controls	Throughout Operation Period	Environmental Engineer, MCML	Process Manager, MCML
5. Occupational Health & Safety	- Occupational, Health and Safety Program will be adopted as per MCML guideline. - Review and evaluate to improve the effectiveness of Environmental Health and Safety Program as & when required.	Throughout Operation Stage	Environmental Engineer, MCML	Process Manager, MCML

7.3 Specific Management Plans

To resolve several adverse impacts/ issues, phase-wise suitable mitigation measures with implementation procedures as well as some specific environmental management action plans like Dust Emission & Air Pollution Management Plan, Liquid Effluent Management Plan, Solid Waste Management Plan, Noise Pollution Management Plan, Occupational Health and Safety Management Plan, Disaster/ Risk and Emergency Response Plan, Operation and Maintenance Plan, Public Consultation Plan are put together under the umbrella called the **Environmental Management Plan** that have been developed category/ issue wise and presented in this chapter for subsequent use during implementation of the proposed project activities and at times of emergency events and disastrous situation.

The proposed EMP together with suggestive impact mitigation measures program are now-a-days recognised as a multidisciplinary tool or instrument that provides the MCML Project Management's environmental awareness and thereby help enhance the project development & Proposed activities for long-term survival, growth/ Proposed, social responsibility and ultimate sustainability. This means by exercising/ practising suitable environmental management plans/ norms, the overall environmental degradation from adverse impacts can be safe guarded.

In this context, the prescribed serial EMP provide participatory planning process in fulfilling development and Proposed activities of MCML project management at desired level with simultaneous intimation to DoE, GoB for co-operation. Implementation of these EMP will occur with development and Proposed activities. Specific responsibilities to carry out the various plans of these EMP will be assigned to the key personnel of the Plant Manager, Process Manager, Environmental Engineer will be responsible to ensuring all aspects of environmental compliance.

7.3.1 Dust Emission & Air Quality Management Plan

Air quality management at the cement industry utilizes a number of control technologies to achieve the desired degree of emission reduction. Various factors play a role in the selection of these technologies, including emission standards, energy requirements, plant economics, availability of spare parts, as well as the technical know-how to operate and maintain the control systems. The choice of appropriate control processes and development of the flow scheme requires an understanding of the unit operations, operational capabilities, and environmental effects of various control components.

At the proposed MCML Proposed plant, as much as possible of the potential dust emissions into the environment will be captured and recycled to the process through efficient de-dusting facilities including Fabric Filters installation at all major emission sources to ensure compliance with the Bangladesh and World Bank/IFC Standards. The dust control in the cement industry is very important for both economic reasons as well as its social and environmental benefits.

Fabric Filters (FFs) use filtering media to separate the dust particles from the exhaust gas, which typically constitutes woven fabrics and felts made of organic and inorganic fibers. With efficient maintenance, high dust removal efficiencies may be achieved with FFs, which mainly depends, however, on the filter charge as well as on the structure and the density of the filter medium.

FFs are favored by the cement industry because of their simplicity, reliability, high removal rates, and economic competitiveness. The main advantage of bag filters is that the de-dusting efficiency is always very high. Furthermore, they can help in reducing SO₂ emissions by promoting absorption to the alkaline dust cakes that collect on the surface of the bags. In contrast, the main disadvantage of FFs is the high pressure drop causing comparatively high power consumption at the filter fan. In addition, their performance deteriorates for mechanical and process reasons, and fabrics usually have a limited life. It is important, therefore, to prevent hot particles from entering and to avoid severe temperature surge. It is imperative that the new FFs be properly selected, installed, and maintained.

The FF should be operated and maintained according to the following general guidelines:

- A proper and clear maintenance scheme should be developed in conjunction with the manufacturing and installing company
- Regular replacement of bag filters according to the specification provided by the manufacturer
- Regular in house dust emission measurement to gain more information about the effectiveness of the FFs
- Readily available spare parts (particularly FF bags and fans) to better respond to emergencies
- Regular monitoring of the temperature of incoming gases to maintain suitable gas temperatures and avoid damage to FF (by high temperatures that can lead to dew point)

The installation of the FF should allow for the automatic shutdown of the production line (s) whenever the FFs are placed off-line. This option will increase transparency and enhance the relationship between the plant and its surroundings. Furthermore, MCML should implement a regular inspection and maintenance program for the FF compartments, cages, and filter bags whereby faulty equipment are replaced immediately. (fabric filter have an average age ranging between 3 and 5 years).

7.3.2 Liquid Effluent Management Plan

During Construction

Site Drainage

A site drainage plan will be developed to ensure that if erosion of soils occurs during storm periods, particularly during the rainy season, minimal amounts of sediments reach surface waters by reducing both the flow velocity and sediment load before being discharged into the Pasur river.

Erosion

The impact from construction activities can be addressed by minimising the amount of land left bare and re-vegetating any slopes as quickly as possible, any temporary stockpiles will be protected from erosion by using a reduced slope angle where practical, and by incorporating sediment traps in drainage ditches.

MCML is committed to implement the above measures, and will ensure that these good practices are specified in any construction contracts.

During Operation

The process is 'dry' and thus all water used during the process is only used for cooling purposes. The cooling water is either evaporated during the process or conducted to a settling reservoir before being recycled. The water used in the gas conditioning tower will be evaporated and discharged along with the flue gases through the stack. The result is zero liquid effluent being discharged from the plant.

The only water effluent source will be domestic waste from the workers. The waste water will be treated to comply with national and World Bank/IFC standards at an on-site waste treatment plant before being discharged into the Pasur River.

7.3.3 Noise Pollution Management Plan

Construction Noise

Specific noise mitigation measures for the construction phase reflect standard good practice and include:

- enforcement of vehicle speed limits, strict control of vehicle routing and prohibition of vehicle movement during the night time;
- diesel engine construction plant to be equipped with effective silencers;
- orientation of noisy items of equipment (temporary generators) away from nearby houses, where practical;
- construction of temporary noise barriers around particularly noisy parts of the site;

MCML is committed to implementing the above measures, and will ensure that these good practices are specified in any construction contracts.

Operation Noise

The main noise generating units are the crushers, grinder mills, fans, blowers and Compressors. To control the impact of the noise from these units, the following mitigation measures are planned:

- Use of a vertical roller mill for raw material grinding with substantially reduced noise levels compared to conventional ball mills;
- Provision of noise suppressors for blowers and compressors as necessary;
- Regulation of distance between noise source and operators (control cabin for operation);
- Reduction of structure borne transmission by damping/isolation of the sources using suitable mountings;

- Provision of ear protectors to operate when operating in areas where noise levels are in excess of 85 dB A.

7.3.4 Solid Waste Management Plan

Nearly all waste will be put in the kiln for incineration. One key waste which can not be incinerated is the scrap iron which is not suitable for burning. This will be resold. Any other waste materials identified as not suitable for incineration will be transported by barge to a suitable approved place. The dust, which is a by-product of the cement production process will be recycled.

7.3.5 Disaster & Risk Management Plan

An evaluation of Risk involves combining the consequences of most critical disaster like fire, explosion, cyclone and earthquakes and other natural calamities are:

- ❑ Individual Risks
- ❑ Social Risks

Fighting procedure and equipment/ facilities combating this effects should be provided in appropriate areas of Proposed Project as well as Field Camp and Storage areas of MCML to deal with fire hazards/ explosion, cyclone and earthquakes effectively to protect loss of lives, damages of property and assets, etc.

A trained and experienced team would be assigned at project site to handle all foreseen risks at any of the locations under the project area with necessary fighting tools and facilities together with guidelines for immediate action.

A siren or fire-alarm with high sound level (warning system) would be installed in the project area as necessary to warn the project workers/ employees and the surrounding communities to notice the gravity of the situation that raised there.

Now that, the respective authority of MCML will be ready with their '**Disaster & Risk Management Plan**' while implementing the mitigation measures to protect all personnel, workers, employees, villagers, property, assets and the environment in particular against the consequences of major hazards events. All the employees and workers of the project area would be familiarized with the code of practices of the Disaster & Risk Management Plan pertaining to handle fire-out break, explosion, accidents, environmental events and the major natural disaster/calamities, etc. as these events are related to major risks of hazards that might cause death or risk to serious injury to project workers/employees and people residing near project site. These hazards would also damage the property/ asset of the project as well as serious harm to the adjacent environment.

The prime aim of the Disaster & Risk Management Plan is to minimize or to eliminate these hazards/ calamities which lead to adverse impacts on the project workforce and the environment at large. To this end in view, a judicious approach of the management of these hazards/ calamities and risk involvement therein will be applied to combat these events and risk. The important approaches are,

- A. Avoidance or elimination
- B. Prevention
- C. Control/Minimize
- D. Mitigation and/or Protection from natural disasters/ calamities

Such approaches or measures are mainly directed towards saving life and protecting property, and to dealing with immediate disruption, damage and other effect caused by the Disaster.

7.3.6 Emergency Response Management Plan

The Response Measures activity segment of the Disaster Management Cycle is very often called '**Emergency Response Plan**' to indicate that it applies to a short period to deal with the immediate effects after a disaster impact.

The Emergency Response Management Procedures/Plan is designed at the most significant emergency situation. The following precautionary measures will be taken to minimize/ control the possibility of occurrence of such event:

- Electrical cables, wires and fire extinguishers should be checked periodically
- Arrangement should be made for fire hydrants/ fire extinguishers
- Train-up workers/ employees of the project in the proper maintenance and operational procedures of fire extinguishers/hydrant
- Using of fire-proof jackets and oxygen inhaler

Besides these measures, the specific Emergency Response Plan (ERP) is to be developed by MCML:

- i) Two (2) types of alarm will be activated for emergency
 - Horn : General Muster for fire, explosion, etc.
 - Siren : Personnel evacuation of work-site due to occurrence of natural disaster, explosion, fire, etc.

In case of **Disaster Emergency** that forces the immediate and indefinite shutdown of all operational activities to avoid extensive damage to project property including equipment and serious harm to adjacent environment. In this situation, respective authority is responsible for collecting the information about the incident & the incident report forms should be forwarded to the 'Higher Authority' of MCML Head Office and to Khulna Divisional office of Department of Environment as well as relevant agencies according to ERP procedures. The action program is to commence immediately after such a Disaster Situation.

Finally, application of DMP requires the support and involvement of various agencies such as the local police force, fire and civil defense, hospitals etc.

The DMP should also specify the duties of above agencies, sequence of priorities, communication establishment, and released emergency plants and public notification.

Lafarge Management would formulate their DMP in consultation with aforesaid involved agencies and to be coordinated by local statutory authorities.

7.3.7 Occupational Health & Safety Management Plan

Meghna Cement Mills Ltd. is committed to protect the existing conditions of the surrounding environment, health, safety and hygiene of employees, workers, contractors, and sub-contractors with in the project area during construction and operational phase on the basis of IFC/ World Bank Guidelines as well as code of practices will also be in compliance with GOB guidelines/requirements.

This guideline applies to intermittent, temporary and permanent places of work and activities undertaken by contractors' workforce, suppliers' people and employees of the LBC project.

An Occupational Health, Safety and Hygiene Management Plan/ System shall be established, operated and maintained for overall project of MCML. It is the responsibility and duty of the

employer to ensure healthy and safe working conditions. A fully transparent OHSMP is a powerful tool towards fulfilling the objectives. Meaningful participation by workers and employees is required for optimum results and these could be obtainable through efficient awareness building and training program among the workers and employees.

The initial system of assessment should include the needs for risk reduction and management related to HIV/AIDS at the place of work. The contents of the OHSMP manual is prepared from ILO-OHS 2001 and outlined in brief at bellow.

Occupational Health, Safety and Hygiene Management System Feature

1.	Occupational Health, Safety and Hygiene Policy
-	Management's supports and direction
2.	Organizational Framework of the OHSMP (Safety Organization)
-	Staffing of OHSMP
-	Operating procedures
-	Training program on all topics of OHSMP
-	System documentation
-	Communication
3.	OHSMP Objectives
-	Realistic and achievable participation of all by supervision
4.	Risk and Hazard Prevention
-	Prevention and control measures
-	Emergency preparedness/ awareness and response
-	Procurement (tools, equipment, services contractors, etc.)
5.	Performance Monitoring, Investigation and Reporting
-	Hazards and natural calamities prevention measures
-	Ambient working environment
-	Work related injuries, ill health, diseases and on-going incidents
-	On-going Medical and safety monitoring program for all workers and employees
6.	Evaluation
-	Feedback
-	Corrective measures
-	Action plan

In-line with aforesaid salient features of management plan referred in IFC guidelines, MCML management has prepared their Action Plan Manual on above subject.

In fulfillment of MCML Commitment on execution of this particular project and in response to EIA Study, MCML management conducted and also will conduct its project activities in a manner so as to minimize environmental and human health and safety impacts and to provide project area free from recognized safety hazards and risk as far as practicable.

In addition to cited action plan, provisions have been incorporated in the operation policy manual for protecting OHS, electric shock and hearing impairment to the workers/ employees, health and life insurance system to be introduced in contractual agreement as per procedure laid down in DOE's Rules of GOB and WB.

In fact MCML will comply with all applicable safety, health and environmental laws and regulation prescribed by Department of Environment (GOB) and IFC/World bank. MCML will also monitor and assess performance in Health, safety and environmental protection from major impacts.

Management will also impart training needed for human, environmental and physical resources and project protection.

MCML Limited always encourages timely communication of health, safety and environmental risks between employees/workers and their supervisors /foremen.

Subject matter statement within **box-umbrella** referred under frame work of the OHSMP reflects the expectation and requirement of all employees, workers and contractors of the proposed project and they adhere to the adopted principles/ guidelines of OHSMS compliance in their performance of their respective job responsibilities.

7.4 Fire Safety

FIRE FIGHTING:

A fire fighting cell will be formed in the plant which will be responsible for controlling fire incidence if any from the construction period up to the entire life of the project .an amount of nearly 0.02% of the total project cost will be earmarked for procuring the fire fighting equipment. The cell will be well trained and mock drilling will be exercised to develop ability to tackle the situation effectively when the situation demands .The cell would be available to reach anywhere inside the plant within shortest possible time on receipt of a fire cell.

Safety cell:

The safety cell would be formed to look after the safety issues and for the following functions:

- to formulate the safety codes and orders to ensure that every employees become aware of the working procedures,
- to ensure the implementation of the safety codes and orders
- organize training about safety
- Installation of safety notices and boards in appropriate places.

The details of he fire fighting and fire safety plan has been given in the annexure 8

7.5 Disaster Management Plan

The area of the project site is a disaster prone area. Cyclonic storm and tidal surge, flood etc, frequently hit this region during the monsoon period and take away of many. so in extreme condition for any unwanted consequences the plant authority should have a well planed disaster management plan for tackling the situation so that no pollution or damage to environment does not occur due to this plant. For this purpose the company has formulated a **disaster management plan** which has been shown in **annexure 9**

7.6 Good House Keeping

The good house keeping practice is a vital issue for maintaining safe working environment and profitable business. The company is committed to maintaining equipment safety and good house keeping practice in the cement clinker grinding and packing plant at Mongla. For which the company has formulated the procedure for maintaining equipment safety, good O&M and good house keeping practice in the plant. An outline of the O&M practice, equipment safety and good house keeping practice procedures have been shown in annexure 10

7.8 Greenery

The residual air pollution of the plant would be minimized further by developing a green belt around the premise and in the open spaces inside the premise. This will also help to minimize the propagation of noise from the cement clinker grinding mills.

7.9 Environmental Monitoring Plan

7.9.1 Introduction

This Project Specific monitoring program is designed to ensure that up-to-date records of the environmental parameters are maintained during operational phases to allow timely intervention in the advent of unacceptable environmental impacts.

7.9.2 Monitoring Schedule

Monitoring schedule describe in Table 7.2 that include list of environmental key components to be monitored, sampling location, frequency environmental quality standard parameters, and reporting

Table-7.2: Quality Key Indicator's Parameters Monitoring Program Format

DURING CONSTRUCTION			
Key component/issue to be Monitored: (I) Occupational health and safety			
<i>Monitoring Location</i>	<i>Frequency</i>	<i>Parameters</i>	<i>Reporting</i>
At Working area	weekly, throughout the construction period	Standard HSE Indicators under best practice.	Prepare weekly report and submit to plant manager.
Key parameters to be Monitored: (II) Noise Quality			
<i>Monitoring Location</i>	<i>Frequency</i>	<i>Parameters</i>	<i>Reporting</i>
At site boundary focusing nearest settlement.	weekly throughout the construction period	Limits in dBA	Prepare weekly report and incorporate in the bi-monthly report to submit to the DOE and in the annual monitoring report for the project financiers.
DURING OPERATION			
Key parameters to be Monitored: (I) Ambient Air Quality			
<i>Monitoring Location</i>	<i>Frequency</i>	<i>Parameters</i>	<i>Reporting</i>
As per present ECC	Quarterly	SPM and NO ₂	Prepare Quarterly monitoring report and submit to the DOE and project financiers.
Key parameters to be Monitored: (II) Ambient Noise Level			
<i>Monitoring Location</i>	<i>Frequency</i>	<i>Parameters</i>	<i>Reporting</i>
As per present ECC	Quarterly	Limits in dBA	Prepare Quarterly monitoring report and submit to the DOE and project financiers.
Key parameters to be Monitored: (III) Waste Water Quality			
<i>Monitoring Location</i>	<i>Frequency</i>	<i>Parameters</i>	<i>Reporting</i>
As per present ECC	Quarterly	pH, DO, BOD, COD, TDS, Oil & grease and Total heavy metal	Prepare Quarterly monitoring report and submit to the DOE and project financiers.

Key parameters to be Monitored: (VI) Public Complaints			
<i>Monitoring Location</i>	<i>Frequency</i>	<i>Parameters</i>	<i>Reporting</i>
Public complaints register book shall be maintained and kept at front desk	Throughout the construction and operational phase	Any affected person and All kind of complaints are eligible for registration.	Inform plant manager immediately in case of any complaint receive and status regarding action taken must incorporate in the bi-monthly report and submit to project financiers.

7.10 Institutional Arrangement

Institutional Arrangement:

1. We have a designated employee Mr. Alamgir Kabir. AGM (QA) to take care environmental and social issues
2. Based on academic qualification along with training on relevant area Mr. Kabir is performing his assigned job satisfactorily.
3. Primarily such issues are communicated with factory management then if required it is forwarded to the top management for their kind decision/instruction

- Occupational Health and safety

The company has established good working procedure and maintains safety at work by proper training and management. There is clinical facility for the working people and the concerned persons are provided with mask for preventing inhalation of cement dust, ear protectors for protecting them from noise of the machinery inside the factory building. The safety training has been given to the people and safety notices have been displayed in places where-ever it is necessary. Aprons and helmets have also been provided with the persons, working in the Meghna Cement Mills.

There is an arrangement of **FIRST AID** facilities for the employees of MCML in case of occupational injury like burn fracture, lacerated, abrasion and penetration

MCML have one doctor and three trained Medical Assistant in our Medical Center as Under:

SL No	Name	Qualification	Year of Experience	Cell No
1	Dr MD Ruhul Amin	MBBS (Dhk)	20yrs	+8801712562434
2	Md Ayub Ali	Paramedic	9yrs	+8801735947687
3	Nd.Abul Kyair Bhuyan	Paramedic	8yrs	+8801920690795
4	M r.Bisnu Podo Roy	Paramedic	5yrs	+8801925678553

3. We have provided the following PPE to he workers as safety purposes:

- a) Safety Helmet
- b) Safety Goggles
- c) Visual jacket
- C) Ear protection
- d) Safety Mask
- e) Hand Gloves

f) Safety belt

g) Apron

h) Safety Shoe

○ **SOCIAL CONTRIBUTION:**

Bangladesh is being one of the densely populated countries in the world, our standards of life communication industrial and agricultural growth etc. has not been remarkably developed. As such employment opportunity has not been satisfactorily improved. Bashundhara Group is playing significant role by creating employment opportunity for hundreds of young generation through industrialization

On the basis of priority MCML also produces various types of quality cement as per customer's desire want and needs .We are able to produce any type of quality cement and maintain proper standardization using equipment for laboratory testing which ensure the quality.

Since inception MCML has actively contributed to the national as well as global economy by way of effective utilization of human resource using raw materials ,producing and marking high quality product at most competitively prices and creating employment opportunities.

Meghna Cement Mills Ltd do lot of charity activities for the betterment of people as well as society. In case of natural disaster like SIDOR/AILA, MCML bestowed significant volume of warm clothes, medicine, dry food, removing saline water from pond and financial assistances. On the different national memorial days, MCML donated sewing machine, financial assistance to freedom fighter and others through Thana & District administration .Cement sacks and cash payment and also bestowed for construction of different Mosque, School, Mondir, and Madrasha etc.

he company has a well equipped quality control laboratory for testing the quality of the cement produced which will be able to carryout the environmental monitoring as well .A monitoring cell out of the laboratory personnel will be formed which will be responsible for bi-monthly monitoring of both surface and ground water quality and the ambient air quality as well .the parameters to be tested for river will be mainly :P^H, turbidity, Oil content, SS, EC,Coliform.The findings will be compared with the baseline data for having information whether these parameter show increase in values near the project site .The parameters for ambient air quality would be SPM in the nearby air .If the values increase then the environmental auditing for the plant would be necessary for finding out the probable leakage loss or any other fault which may be responsible for the increase of pollution level in the vicinity of the plant. The necessary corrective, mitigation and enhancement measures should be undertaken accordingly.

The persons forming the monitoring cell and their responsibility for assessing the ambient air quality has been given in the monitoring plan, shown in the annexure.....

SECTION 8 STAKEHOLDER CONSULTATION

With a view to assure the participation of the local people in the industrial sitting and planning process for the clinker grinding plant of Meghna Cement Mills Ltd. at Mongla notification and a survey was conducted in the locality to assess the opinion of the local people. They were asked whether they want this plant to be set up in that area or not. However, they would be benefited after implementation of this plant was assessed through a questionnaire. According to the opinion of the people it is found that this project will not normally do any harm to their living environment rather this will create employment opportunity in this locality. This plant will contribute to the development of the region which will directly or indirectly be responsible for socio-economic development and ultimately beneficial to them.

The required information for the ESIA assessment and unrelated environmental data were collected by the ESIA team during its field visits and meeting with a number of people from different organizations

The nature of the pollution in cement clinker grinding factory was learnt from the experienced people working in the existing grinding mills while visiting and talking with them during the field visits. The information on the existing environmental routes of the country, ESIA guideline and requirements to fulfill for the environmental safeguards were collected by the ESIA team from the personnel of the local DOE office at Khulna. Meteorological data was collected during field visit and meeting with concerned officials of the local office of the Department Meteorology. There Mongla Port Authority and other nearby persons were met as target group for assessment of public opinion about the setting up of the proposed new cement industry at Mongla Industrial Estate.

Most of the public interviewed wants the industry to be set up in that area as because this will create employment in that locality may also be boosted by this industrial development.

9. CONCLUSIONS and RECOMMENDATIONS

It can be concluded that adequate attempts have been made to identify the possible pollution problems of the new cement industry of Meghna Cement Mills Ltd. The ESIA team has identified all probable environmental impacts of the industry. The corresponding management /mitigation plans for the adverse impacts have been formulated and incorporated with this ESIA report for consideration and materialization at right time by the project proponent. If these plans are implemented properly during construction, erection, operation and maintaining periods of the project then there will be no possibly of intolerable damaging impact on the environment, property and on life of the surrounding area. This project will contribute certain role to the industrial development of the country and socio-economic development of the locality.

This project will also provide opportunity for getting the best quality cement short fall of the country and save hard earned foreign currency by reducing importation of the cement from abroad, which may induce the increase of the development potential of the construction, erection, operation and maintaining periods of the project then there will be no possibly of intolerable damaging impact on the environment, property and on life of the surrounding area. This project will contribute certain role to the industrial development of the country and socio- economic development of the locality.

The new cement plant will be built in an industrial estate of the coastal zone where the ambient environment has a high potential for receiving the pollution load, so there is now obligation for accepting the development of the cement industry in that estate.

Technology is improved, pollution prevention measures are adequate more over good O&M practice and management plans have been formulated for probable impacts due to residual pollution and accidental situation .So he environments clearance for the establishment and cement operation of this industry can be given.

It is expected that the proponent of the plant will give proper attention to the training need or good O&M practice and on al formulated management pans to the persons working in the factory. and it will arrange adequate budgetary allocation for the materialization of their formulated damaging impact mitigation plan, environmental management plans for the environmental improvement and environment friendly operation of the industry.

Under the backdrop, environmental clearance certificate might be issued in favor of **Proposed VRM Cement Grinding Plant** of Meghna Cement Mills Ltd with conditions regarding compliance and keep functional of Proposed Environmental Management Plan during construction and operational stage.

ALL ANNEXES

ANNEXURE 1

Environmental Clearance/ Renewal Certificate

Terms of Reference of ESIA Study

The brief Environmental and social Impact Assessment (ESIA) report shall contain but not limited to the following contents:

A. Executive Summary

This section will describe the project activities, critical environmental and social issues, significant findings, and recommended actions.

B. Introduction

This section will cover the following aspects:

1. Background of the proposed VRM Unit ;
2. The ESIA Team Composition. Please describe the team composition with following tabular format.

Name	Designation	Official e-mail

C. Policy, Legal, and Administrative Framework

Under this section please confirm following aspects:

1. Whether there is separate Environmental Clearance required for the VRM Unit ;
2. Whether there is requirement of any other govt. clearance for the VRM unit;

D. Description of Project

This section will cover the following aspects:

3. Description of cement manufacturing process in the VRM Unit with process flow diagram;
4. Details of proposed layout plan of the project by clearly demarcating various facilities of the project with required area
5. Amount of required raw materials and capacity to produce different types of cement
6. Requirement of water and electricity with their sources
7. Description of civil works and electro-mechanical components with major technical specification.
8. Detail activity schedule with mentioning tentative time-period to accomplish each major task¹
9. Approximate work-force/personnel required during construction and operation phases

¹ Preferably in work-break downstructure (WBS) format

10. Please describe the accessibility to site in detail with approximate length and width of different types of roads and waterways

11. Description of site location and area with reflection on proximity to nearby communities, designated environmentally sensitive areas and heritage sites²³

E. Baseline Environmental Condition

This section will cover the following aspects of the project area:

1. Briefly describe the current landuse of the proposed site of VRM Unit
2. Description of landuse of the adjacent area to the VRM Unit (a 500m radius air shed) comprising eastern, western, southern and northern sides
3. No of trees required to cut for VRM Unit
4. Approximate amount of required land-filling and source of land-fill materials (if land filling is required)
5. Air quality

Please provide a latest ambient air quality data including SO_x, NO_x, CO, PM 10, PM 2.5 collected from 2 different points. No. 1 point is at front side of Meghna Cement Mills Ltd. (MCML) and No.2 point is at Pashur River Side, to be presented in following ways:

Location of air quality monitoring point	SO _x	NO _x	CO	PM 10	PM 2.5	DOE Standard
MCML front side						
Pashur Rive side						

6. Surface and Ground Water Quality

Please provide a latest surface and ground water quality data⁴ including basic parameters like PH, BOD, COD, DO, TDS etc. The surface and ground water quality samples are to be collected in close proximity of MCML.

7. Noise Quality

Please provide hourly noise data which is to be collected 8 hourly from two different points at day and night time. No. 1 point is at front side of MCML and No.2 point is at Pashur River Side, to be presented in following ways:

Location	Day time	Night Time	DOE Standard for day time	DOE standard for night time
MCML front side				

² In addition of satellite image, please insert relevant photographs.

³ Please use relevant maps and illustrations.

⁴ The air, water and noise level data are to be monitored during January 2017 and onward (as applicable).

Pashur Rive side				
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F. Anticipated Environmental, Occupational Impacts and Mitigation Measures for Construction and Operation Phases

1. Environmental impacts and mitigation measures during construction phase⁵

Environmental impact	Potential source	Mitigation measures
Dust emission	Site clearing, construction materials carrying etc.	
Noise	Construction activities, traffic involve in carrying raw materials and site clearing	
Traffic hazard	traffic involve in carrying raw materials and site clearing	
Water pollution and Soil contamination	Improper management of human and construction wastes	
Air pollution	Diesel fueled construction devices may result in air pollution	

2. Environmental impacts and mitigation measures during operation phase⁶

Environmental impact	Potential source	Mitigation measures
Dust emission	▪ Quarrying operations of raw materials ▪ Grinding and blending operations ▪ Stacks from the kiln operation ▪ Raw material storage ▪ Packing ▪ Transport between the processes ▪ Transport to and from the site	
Air emission	Emissions to air may come from manufacturing activities, such as grinding, or kiln operation from the fuel and additives used. The key releases are oxides of nitrogen, dust, SO _x mercury, cadmium and carbon monoxide.	
Wastewater	Wastewaters are created in the wet grinding and washing activities. Slurry from dampening activities may generate a waste slurry and could require a slurry treatment plant. Also	

⁵ This is basically an indicative list of environmental impacts. There could be other major impacts, which need to be discussed.

⁶ This is basically an indicative list of environmental impacts. There could be other major impacts, which need to be discussed.

Environmental impact	Potential source	Mitigation measures
	vehicle washings and site run off occur that contain suspended solids and associated metals. This water can have a high pH.	
Noise	In a cement manufacturing plant, there are three types of noise. Machine generated noise includes mainly process machines (crushers, grinding mills), fan motors. Air-flow generated noise deals with stack, fan inlet/outlet or air intake and ventilation units, where other sources include noise escaping from buildings or caused by the transport of materials within the plant's boundaries.	
Dust	Dust emissions arise as a result of transport of raw materials to the site, from stockpiles of raw materials, from hoppers and raw material transfer, various crushing plant, pipe-work and from vents and furnaces.	
Solid waste	Solid waste is created in the manufacturing process. This typically comes in the form of non hazardous wastes, such as, cement or cement kiln dust. The majority of this can be reused in the process. In addition, depending on raw materials there can also be spoil rocks which are removed from the raw materials. There may also be waste ash from the incineration of waste	
Burns and heat stress	Kilns working at high temperatures can increase the temperature of the working environment which can lead to heat stress for those working in the vicinity. Contact burns can result from contact with hot equipment especially during maintenance activities. In addition, there can be contact burns from alkali materials that are used in the process and mix with moisture.	
Community health safety issue	Due to increase in production capacity, there will be more frequent movement of trucks and marine vessels carrying raw materials and	

Environmental impact	Potential source	Mitigation measures
	cement. This more frequent movement of trucks and marine vessels can result in health risk of workers of adjacent industries and communities.	

G. Environmental Management Plan

This section will deal with the set of **mitigation and management measures** to be taken to avoid, reduce, mitigate, or compensate for adverse environmental, occupational and social impacts with institutional arrangement, monitoring schedule, parameters to be monitored and so on including tentative monitoring budget. This section is also expected to describe in detail about proposed **institutional arrangement with specific responsibility at different tier of staff and workers**, which is required to ensure proper environmental, occupational and social safeguards. In addition, this section will also include **an annual indicative budget** to ensure satisfactory safeguards during operation phase⁷.

H. Grievance Redress Mechanism

There will be around 400 workers and officials at proposed VRM Unit. In addition, there will be frequent movement of external and internal truck drivers and other stakeholders. So, this section is expected an indicative guidelines about how internal and external stakeholders will raise their grievances and how it will be resolved⁸. In addition, this section is also expected to reflect on child labour and female workers issue.

I. Disaster Management and Emergency Response Plan

1. Describe the potential sources and causes of fire and explosion with focus to operation phase;
2. Describe how fire hazard has been addressed in planning, design, construction and operation of different features of the project;
3. Describe the proposed firefighting arrangement;
4. Describe how seismic hazard has been addressed in planning, design, construction and operation of different features of the project;
5. Discuss the proposed Emergency Response Plan.

⁷ Due to limited span and less complexity with construction phase, operation phase has been emphasized.

⁸ This section is expected to be within 2-3 pages

ANNEXURE 3

Technical specification of OK 54-6 grinding mill along with LIST OF MACHINERY AND EQUIPMENT

Master Plan Layouts

Tentative Construction Schedule

ANNEXURE 6

SPECIFICATIONS OF THE DUST COLLECTORS TO BE SET UP FOR THE PROPOSED VRM UNIT 2 OF MEGHNA CEMENT MILLS LTD AT MONGLA

We have 30 Bag filter but every bag filter design capacity different. Only below parameters are constant for everyone.

Dust Collector		VRM-Grinding Area
Name of the Dept	Total D/C No	Total D/C volume
212 Additive Transport	01 212 BF050	8000m ³ /h
245 Fly ash feeding	245 BF 350---01	10000m ³ /h
461 Coal mill	461 BF 300---01	22930m ³ /h
465 Coal dosing	465 BF 580---02 465 BF 640---02	6000} 7000m ³ /h 1000}
481 Clinker Transport 1&2	481 BF 155-01} 481 BF 210-01}03 481 BF 255-01}	17000 17000}40,100m ³ /h 6100
482 Clinker Transport 3.4	482 BF 170-01	15300m ³ /h
511 Cement mill feed	511 BF 020- ----- 01 035- ----- 01 060- ----- 01 070- ----- 01 080- ----- 01 620- ----- 01 640- ----- 01 660- ----- 01 Total=8mos	9000 6000 7100 12000 15000 16500 16500 9000 91,100m ³ /4
531 Cement mill	531 BF 050---01 ----- 215---01----- 290---01----- 500---01----- 620---01----- 630---01----- Total=06mos	13000 17500 21000 993600 2500 6500 10,54,100m ³ /4
541 Cement transport	541 BF 095-----01 130} 135}-----04 140} 145} 155-----01	4500 20000 12000

	160-----01	12000
	Total= 07 mos	48500m ³ /4

MCML P/H =85340- 86020m³/4

PH#1: 52500m³/4

Pack House #01

Model:

- No of D/C : 641FN-2
- Location : 2nd Flore
- Total Bags : 64 no's
- Size of Bags: 160x3660
- D/C capacity : 7500m³/h
- Origin :INDIA
- Blower capacity : 7500rpm
- Motor capacity : 11kw
- Motor rpm :1440 rpm

Model:

- No of D/C : 61 FN-1
- Location :5th Flore
- Total Bags : 338 no's
- Size of Bags : 1660x3660
- D/C capacity : 45000m³/h
- Origin: INDIA
- Blower capacity : 3265 m³/h
- Motor Capacity : 75 KW
- Motor rpm : 1450 rpm

Pack House # 02

Model: UFSTD-3

- No of D/C : D/C -511
- Location : 1st Flore

- Total Bags : 144 no's
- Size of Bags : 125x2150
- D?C capacity : 2040~2720m³/h
- Origin : China
- Blower capacity : 2900rpm
- Motor Capacity : 3kw
- Motor rpm : rpm

P/H # 02: 32,840-33,520m³/h

- Model :156M-12-20 (TRL type)
- No of D/C : 612
- Location : 3rd Flore
- Total Bags : 156 Pcs
- Size of Bags : 116x3755
- D/C capacity : 20000m³/h
- Origin :INDIA
- Blower capacity : 22435 m³/h
- Motor capacity : 30 KW
- Motor rpm : 2950 rpm

Model: LFBC 180/78

- No of D/C : D/C-615
- Location : 4th Flore
- Total Bags : 78 Pcs
- Size of Bags : 340/148
- D/C capacity : 10800m³/h
- Origin : CHINA
- Blower Capacity : 14755m³/h
- Motor Capacity : 15kW
- Motor rpm :1475 rpm

Unloading Area

Section: Clinker Unloading

Sl No	No of D/C	SL No	NO of D/C
01	D/ No - 201 Model ;LCPM-GS32-3 Capacity : 6900 m ³ /h Total filter area : 62m ² No of filter bags : 96 pes Filter Bag size : 130x2450 mm Location : MCML jetty North Blower Motor -11K.W Blower Capacity :Not found Origin :China	04	D/C No -206 Model : UF (STD-5) Capacity :4080-5450 m ³ /h Total filter area : 74.3 m ² No of filter bags : 96 pes Filter Bag size : 125x2150mm Location : MCML Clinker silo top# 01 &02 Blower Motor -5.5 KW Blower Capacity : Not found Origin :China (Mechanical)
02	D/C No -204 Model :DMC-160A Capacity : 11000-13000m ³ /h Total filter area : 120 m ² No of filter bags : 160 pes Filter Bag size : 125x2035 mm Location : MCML CT-06 Blower Motor -15K.W Blower Capacity :Not found Origin :China	05	D/C No : 207 Model : LDM63-58 Capacity : 5000m ³ /h Total filter area : 58 m ² No of filter bags : 63 pes Filter Bag size : 125x2035 mm Location : MCML Clinker Silo top #03 Blower Motor -5.5kw Blower capacity : Not found Origin :China
03	D/C No -205 Model :UF (STD-5) Capacity : 4080-5450m ³ /h Total filter area : 74.3 m ² No of filter bas : 96 pes	`06	D/C No -208 Model :LLDM 63-58 Capacity :5000m ³ /h Total filter area : 58 m ² No pf filter bags :63 pes

	Filter Bag size :125x2150mm Location : MCML Clinker silo Top # 01&02 Blower Motor -5.5 K.W Blower Capacity : Not found Origin :China (Mechanical)		Filter Bag size : 125x2035 mm Location : MCML Clinker Silo top #04 Blower Motor -5.5 KW Blower Capacity :Not found Origin :China
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Specific locations of the dust collectors are shown in equipment flow diagram.

ANNEXURE 8

FIRE EMERGENCY PREPAREDNESS PLAN

Objectives

This action plan is for use in the event of a fire at the factory. The primary objectives are to save lives, prevent injuries and eliminate or minimize damage to property

Definitions

Factory Safety Plan. a diagram of the factory indicating the location of and type of safety and fire protection equipment is to be displayed in the entrance gate, control room and other important point of the factory.

Responsibilities

Executive Director overall responsibility.

General manager Responsible for implementation and monitoring

Employees, Compliance with General Manager's directions

General Principles of Fire-fighting

The preservation of life and the safety of personnel shall take precedence over all other considerations when determining the actions to be taken in case of fire.

The key to successful fire-fighting is to take action quickly to suppress, extinguish, or control the fire before it can become established or spread further.

A fire requires three elements in order to start and to be sustained

1.Heat

2 Oxygen (AIR)

3 Fuel

These elements form the triangle of fire. If any one of these elements is removed the fire will be extinguished.

All fire-fighting efforts should be used on the range of fire and should aim at eliminating one or more of the three essential elements.

- Fire preparedness and planning
- The plant and its personnel must be prepared to respond to a fire at all times, regardless of operating status. The General manager shall ensure that all fire-fighting equipment is maintained in a constant state of readiness and is available to personnel
- It is the responsibility of the General manager and every shift in charge to ensure that the employees under their supervision know how to exit the plant in a fire emergency.

evocation depends on both adequate warning and employee awareness of the proper procedures. The General manager shall ensure that all operating personnel are in a state of readiness by conducting weekly fire drills.

- The General manager shall establish an emergency organization consisting of a selected number of employees, organized and trained, to deal effectively with fires, explosions, and similar occurrences.
- The general manager shall ensure that procedures and check lists are maintained and kept current for after hours notification of key personnel when the facility is operating at less than normal competent or shut down
- Proposed changes in facility layout, material, operation and construction shall be reviewed by unit safety and fire prevention personnel as early in the planning stage as possible to establish necessary fire prevention and control measure
- the factory fire and safety officer shall inspect the plant daily to ensure that all fire fighting equipment is in place and available for use, as well as to identify any potential fire hazards
- Emergency exits and routes leading to them shall be clearly identified by signs
- current standards on construction, dimensions, lighting and number of exits required by safety codes shall apply in designating exits
- A program of fire-fighting training shall be established by the fire officer under the direction of the Executive Director.

Thus program shall ensure that all personnel are familiar with:

1. With the location of the fire-fighting equipment at the factory

2. Fire-fighting techniques

3. The fire emergency preparedness plan

- the operators and maintenance techniques shall be qualified in fire-fighting before being permitted to stand watch the factory.
- The plant safety committee shall routinely meet to review this procedure and to recommend improvements. The subject of fire-fighting shall be on the agenda of each safety meeting
- Factory fire-fighting plan. The factory safety committee will develop and post a fire fighting plan
- The factory fire-fighting plan will;
- Nominate persons in charge of fire-fighting efforts
- Nominate persons responsible for taking specific sections upon finding a fire
- Identify specific actions to be taken in case of fire
- List the telephone numbers of the appropriate emergency services in the fire emergency notification and response list

- List the telephone numbers of the fire emergency notification and response in the fire emergency notification and response list
- list the telephone numbers, in the fire emergency notification and response list list of other persons to be contacted in case of fire
- the factory fire- fighting plan shall be posted at carious strategic location throughout the plant, including in the control; room This plan shall include a floor plan drawn to indicate the emergency exits, The procedure for sounding an alarm, and evocation instructions
- If possible, the safety committee shall arrange for key emergency instruction and telephone numbers from the plan too be highlighted in the plan's internal phone directory.
- A set of master keys providing access to all doors will be maintained in special fire locker within the control room

Interface with Local Fire Department

Factory management, through the fire and safety committee, shall establish an interface with the local fire department and shall establish an action pan for use in case the local fire department is called to respond to an emergency

The action plan shall

- Establish a protocol for responding to an emergency call from the factory
- Define the types of fire-fighting equipment to be used at the factory
- Ensure that fire department has access to the facility
- Determine who will be in overall command of fire-fighting efforts
- clearly establish actions to be taken by the fire department in response to different types of fire and different sections for example, base oil storage tank fires, lubricant store fire, electric fires etc.
- the safety and fire officer shall ask the fire department to become familiar with the plant and to participate in fire-fighting training conducted a the factory
- The Executive Director shall also ensure that the fire department can connect directly to the factory fire-fighting training conducted at the factory
- The Executive Director shall also ensure that the fire department can connect directly to the factory fire-fighting system without on the spot modification
- Special fire fighting procedure to be posted at fixed fire-fighting operating stations such as the control room CO₂ flooding station, the station, the separator room, and so on

Training

- Fire awareness training shall be given to all factory personnel as a part of new employee orientation

- Fire-fighting training and qualification examinations will be given to all factory operating staff and to maintenance staff. Selected personnel will be required to attend advanced fire-fighting courses
- Specialized training shall be provided to persons with responsibilities for demonstrate a complete understanding of the factory procedures and fire-fighting system
- The safety and fire officer must attend advance fire- fighting course and demonstrate a complete understanding of the factory procedures a and fire-fighting system
- The safety and fire officer shall coordinate with the local fire department and shall arrange for joint fire-fighting training at the project site

Fire Drills

- Each location shall establish an evocation procedure to be followed in fire drills and emergencies
- Each location shall have an alarm system or other suitable means to alert the occupants to the need for evacuation
- The general manager shall conduct weekly fire drills to;
- Demonstrated the operational readiness or fire fighting equipment
- During each drill, the fire pump and at least one fire house should be opered for minimum of ten minutes
- The fire house used in the weekly drill should be rotated
- Personnel Response to a fire alarm (Drill or emergency)
- Taka whatever immediate steps are necessary and feasible to minimize any hazard in leaving the work area unattended
- do not use elevators for evacuation purpose
- Do not reenter facilities until “All Clear” signal sounds or clever verbal instructions to reenter are given by responsible authority
- Supervisor Response to a fire alarm (Drill or Emergency)
- Direct the evacuation of your area and account for personnel
- Advice the responding authority of the situation and warn of potentially hazardous conditions

If a fire Occurs

- In all cases, immediately raise the alarm by operating local fire alarm buttons
- Asses the situation to determine if the fire cane be extinguished easily .If so attempt to fight the fire using available equipment
- if the fire is large or has the potential to become large:

- If possible, isolate the air supply and/or stop the operation. This may include shutting down vent fans, closing ventilators, and shutdown the electrical switch board
- Stop any operating equipment, shut down engines adjacent to the fire .Bear in mind that shutting down the plant completely will cause a black out and may make fire-fighting difficult.
- Attack the fire using the appropriate equipment .Be aware of potential electrical sock hazards when using water to fight a fire
- In all cases, the shift in charge shall initiate a call to the local fire department and notify others according to the fire emergency notification and response list in attachment
- If the fire is too large or can not be readily extinguished by actions of one person, a fire fighting team should be ambled under the direction of the person designated to be in charge .Based on the individual circumstances the approach will be some appropriate combination and sequence of the following
- Contain the fire. Use hoses or other means to restrict the fire to as small an area as is practically possible .If necessary use boundary cooling
- Isolate he fuel supply by closing all supply valves to the equipment or area
- Isolate or minimize the air supply to the fire by closing vents and dampers and shutting down vent fns
- Attack the fire using appropriate means.

After a fire

- Post fire watch for at least 30 minutes after any fire. In the case of larger fires, a longer fire watch may be necessary
- The operations supervisor or maintenance engineer shall prepare in incident report. The Executive Director shall distribute copies of the incident report for any at the factory to the Owner with a copy retained on file
- The General manager shall hold a debriefing to review the actions taken during the fire and to emphasize: Lessons learned” any recommendations for changes in this procedure or in the factory fire-fighting plan, as deemed appropriate should be made to the safety committee.

Records

- All records are to be maintained for three years
- Superseded copies of this procedure are to be retained on file for three years

ANNEXURE 9

NATURAL DISASTERS, EMERGENCY PREPAREDNESS PLAN

Objectives

Mongla port is the second sea port of Bangladesh and is very near to the Bay of Bengal. Every year these areas are facing ever problem with natural disaster, hurricane, cyclone and tropical storm. So it is essential to have an emergency preparedness plan for use if the cement factory is threatened with a hurricane, tropical storm, flood or earthquake. The primary objectives are to save lives, avoid injury to personnel and eliminate or minimize damage to property.

Scope

This procedure is divided into the following sub procedures:

Procedure	description
1	General principles for natural disaster emergencies
2	Hurricane and tropical storm preparedness plan
3.	Flooding Preparedness plan
4	earthquake preparedness plan

Definitions

Flood Any situation that may result in the proposed plant being covered to depth water that may potentially endanger personnel or equipment. Flooding may occur from severe rainfall, storm surge from windstorms, tidal actions, or from earthquakes

Hurricane. A tropical storm, as defined by the United States national Weather Service, with sustained winds of 75 knots or more. The following four levels of preparation for a hurricane or tropical storm are used in this procedure.

level 1 Storm Watch. A hurricane or tropical storm is reported to be within the region and may be within 48 hours of reaching landfall within the vicinity of the plant

Level 2 Storm Watch. a hurricane or tropical storm is reported to be within the region and may be within 24 hours of reaching landfall within the vicinity of the plant.

Level 3 Storm Watch

A hurricane or tropical storm is reported to be within the region and may be within 12 hours of reaching landfall within the vicinity of the plant

Level 4 Storm Watch. A hurricane or tropical storm is reported to be within the region and may be within **8 hours** of reaching landfall within the vicinity of the plant

Hurricane season The time of the year when general climate conditions allow tropical storms and hurricanes to develop

Plant Safety Plan A diagram of the plant indicating the location and type of safety and fire protection equipment. This plan is to be displayed in the control room and in various prominent locations close to the entrance to the plant

responsibilities

- Executive Director, Overall responsibility
- Safety officer. Responsible for monitoring weather conditions and reporting adverse conditions or potentially dangerous conditions to the plant manager
- Employees. Compliance with plant manager's directions

General principles

- The preservation of lives and safety of personnel shall take precedence over all other considerations when determining the actions to be taken in the case of threatened storm, flood or earthquake damage
 - If it is deemed necessary to shut down plant operations and evacuate the plant every precaution possible must be taken to ensure that equipment is shut down in the proper manner and secured in such a way wind storm, flood wave action, or earthquake will have minimal impact
 - plant management is responsible for restoring services to normal as quickly as is practically and safety possible following evacuation and shut down
 - 2. Hurricane and tropical Storm Preparedness plan
 - Monitoring
 - The safety officer shall be responsible for monitoring weather conditions for potential problems
- a. the safety shall monitor local radio channels and when possible CNN (Cable News Network) or similar wide-area broadcast /cable information services
- b. If local broadcast channels or cable services are not available the safety officer shall establish contract with the national Weather Services and shall arrange to receive periodic weather reports
- The safety officer shall keep the plant manager advised of any potential weather related threats to the plant. At the least all conditions that may result in a level 1 (or higher level) storm watch must be reported to the plant manager
 - If a tropical storm or hurricane reaches level 2 it should be tracked on an hourly basis on a suitable map
 - As the storm approaches the plant will be put in to a storm alert condition and appropriate actions taken as described in Paragraphs C through F in this subsection

Hurricane Action Plan

1. The plant manager shall establish and maintain a hurricane Action plan .This plan shall ensure that the plant to ready to cope with a huri cane in case of level 1 warning
 2. The action plan shall identify a hurricane crew
 - a. The hurricane crew should consist of the minimum number of persons required to safely operate the plant in case of an emergency
 - b. The hurricane crew will be responsible for operating the plant during Level 1 through Level 4 conditions unless the plant manager determines that the plant is to be evacuated completely
 3. The action plan shall identify a securing crew
 - a. the securing crew should consist of the minimum number of persons required to cure the plant in the event of an impending hurricane or severe storm
 - b. The securing crew will be responsible for preparing the plant for potential hurricane but will evacuate the plant in case of level 3 conditions
- .the plant manager will ;
- a. Develop a hurricane check list similar to Attachment A. which will be used as a guide for actions needed to prepare for hurricane
 - b. Develop a securing crew list similar to attachment Bewitch will be used to secure Level 1 atom Watch In the event of a level 1 storm watch the plant manager shall take the following actions
 1. Nominate the hurricane crew
 2. Nominate the securing crew
 3. Check fuel and tube oil inventory level (if necessary, diesel fuel tanks will be topped-off)
 4. Notify plant staff that a Level 1 which is in effect and call a meeting with all plant supervisors to review the hurricane procedures
 5. Inventory hurricane supplies (see Attachment C) and replenishes them as necessary.
- D. Level 2 Storm Watch In the event of a Level 2 storm wach, the plant manager shall take following actions
1. Determine whether to evacuate all personnel from the plant except the hurricane crew and other deemed necessary top prevent theft or looting.
 2. Carry out the evacuations have been taken
 4. Notify Owners and GMO (General Manager Operations) of plant status
 5. Notify the power utility of plant status
- F. Level 4 Storm Watch
1. In the event of a level 4 storm watch the plant manager shall track the storm and based on its reported intensity and course determine whether to continue to operate the plant

2. If a shutdown and evacuation of the hurricane crew is deemed necessary the plant manager shall;
 - a. Notify the power utility of impending shutdown
 - b. Notify Owners and GMO of impending shutdown
 - c. shutdown and evacuate the plant
3. Shutdown of the plant will be conducted according to predetermined plan designed to minimize the potential for damage to the plant and to enable rapid startup after the storm passes.

ANNEXURE 10

GOOD HOUSE KEEPING PLAN

Purpose

This plan provide guidelines for the good house keeping practice of the plant, which promotes the corporate image ,also provides a safe and pleasant working environment, and reduce the risk accident. good house keeping is a primary objective of the company and is essential to good business. Besides promoting order less and cleanliness, good housing helps to eliminate accidents and fire hazards, save space-time and effort in material handling and improve employee normal by developing pride in a neat and orderly work environment

Responsibilities

- Executive director, overll responsibility
- safety Officer Implementation
- visitors Compliance
- Employees, Compliance

Good Housekeeping Practices

Many industrial injuries are caused by falls, falling objects, and the mishandling of equipment, materiala, buildings, vehicles,and properties in clean condition and in good order

All employees, regardless of position are required to contribute to cleaning the plant .all personnel will clean up as work progress and will ensure that work, equipment and tolars are cleaned when a job is complete

Operation staff, regardless of position, shall clean wile on shift, operators shall carry a clean rag wit them at all times and will use it to clean as they carry out their duties

No job is completed until tools are cleaned and put away, scrap and waste are disposed off and the equipment and location are in good orderly condition .Supervisors will not sign of on work and plant attention reports until they are satisfied that all work areas are in clean and safe condition and that tools have been put away in a clean condition

Do not scatter tools and materials around the work area

- Clean up oil and lubricant spill sites immediately to prevent spilling or fire hazards
- Dispose of waste, trash, used rags, used insulation, etc as often as necessary to maintain a safe working environment .Dispose of them only in approved steel, fire -proof containers designed for trash
- Do not throw waste materials outside or river, or dump them at the site or outside near the plant other than in approved and designed landfills, plant management is responsible for designating landfills

- Immediately remove all protruding metal straps, etc, from boxes, packing cases and crates. Remove nails, staples, etc from boards or flatten them stack the boards with the flattened nail or staple ends facing down
- Store tools, materials and equipment in an orderly manner in tool houses, store houses, welding shops or other acceptable locations when not in use. Use shadow boards and tool boards to identify tool locations and to simplify inventory counts
- Cross -tie, or otherwise secure stacked material to prevent it from falling
- Keep aisles and walking area in warehouse or other material storage areas clear of material and equipment
- A good paint job is to be maintained throughout the plant. This encourages employees to be neat and orderly. A well -pointed facility not only protects the surface but adds greatly to the general appearance and makes cleaning easier.
- 1 Exercise care when painting to ensure that instrumentation, electrical equipment and other sensitive equipment are not painted over
- 2. Neutralize or remove rust before painting
- Immediately correct or note on a plant attention report any product leaks or seepage cannot be corrected immediately place a drip tray under it and identify the tray for regular cleaning until repairs can be condition
- Maintain all equipment and structures in good overall condition
- Do not store materials toolset in a way that obstructs access to fire extinguishers firehouses or other safety equipment
- Check parking areas routinely for oil contamination. Vehicles that leak oil will not be allowed to park on site
- Do not allow lube oil filters or fuel oil filters to drip or leak onto walkways open ground or paved areas. Store them in leak-proof and fire- proof containers until disposed of either by incineration or in approved landfill
- Maintain bathrooms and showers in clean and neat condition at all times
- Notices and signs are to be properly located and affixed to surfaces. No taped messages or hand -written notes and instructions, using pencil and colored markers allowed on equipment or control panels

Training

- This executive director or any assigned safety officer shall ensure that all employees are aware of the plant procedures for good housekeeping and understand the requirement for a clean and safe workplace