ENVIRONMENTAL ASSESSMENT REPORT

VERTICAL EXTENSION OF KITCHEN CUM MUNICIPAL MARKET AT WARD NO. 03 OF BHOLA MUNICIPALITY

Municipal Governance and Services Project (MGSP)

Bangladesh Municipal Development Fund (BMDF)

APRIL 2018

BHOLA MUNICIPALITY, BHOLA

EXECUTIVE SUMMARY

Introduction: The Bhola Municipality is a "Category A" municipality as well as the main town of Bhola district having a total area of 31.48 sq. km. The Municipality has been enhancing its infrastructural development for ensuring the necessary services to its inhabitants and meeting the growing demand of the people. Recently, the Municipality has prepared its Capital Investment Plan (CIP) for its infrastructural development following a participatory approach with the technical assistance from Bangladesh Municipal Development Fund (BMDF) and identified the vertical extension of kitchen cum municipal market as a one of the priority work (CIP No.04) for creating more scope of income generation for the in habitants as well as more revenue generation for the municipality using the single piece of land through multipurpose use. The estimated cost of the subproject is BDT 100 million and the duration of construction is one year starting in June 2018 and to be ended in May 2019.

Location of the subproject: The proposed subproject is located at Chakbazar area, the heart of the main town, under ward no. 03 of Bhola Municipality and only 300 meters far from the Pourabhavan. The coordinate of the subproject is $22^0 41' 6.3'' N$ and $90^0 38' 43.1'' E$.

Justification of selecting the subproject: The people of the municipality areas have been increasing day by day, thus increasing more demand for both essential and luxury goods of households. On the other hand, adequate market facilities are required to meet the increasing demand of the citizens so that the supply of goods might be ensured. However, the area of the municipality is limited and horizontal extension of market facilities is not possible because of the needs of more land. In order to overcome the barrier of limited land and to meet the increasing demand for varieties of goods, vertical extension of the existing market becomes rational. In addition, the proposed subproject site is owned by the municipality and no need to acquire additional land for its vertical extension and there is no possibility of displacement of people as well as shop keepers. Moreover, it will create business opportunity for many businessmen and traders, and create jobs for workers and salesmen, thus helps to increase income and earnings for their livelihood. It will also open the revenue generation avenue for the municipality and will help the municipality in attaining the sustainability of the institution.

Objective of the study: As per the environmental management framework of BMDF, it is required to conduct an environmental assessment of the proposed kitchen cum municipal market in accordance with the legal regulatory framework of the Government of Bangladesh and World Bank policies. The general objective of the study is to determine the major environmental impacts that might be happened due to the implementation of the subproject and to recommend possible mitigation measures to avoid or reduce identified adverse environmental impacts and to enhance positive impacts. The specific objectives include:

- Identifying existing environment condition at the sub-project areas for environmental components viz. air, noise, water, land, soil, biological and socio-economic aspects;

- Prediction and evaluation of positive and negative impacts that may result from the proposed sub-project;
- Undertaking public consultation and disclosure of project-related information;
- Formulation of an environmental management plan (EMP) to eliminate or minimize the adverse impacts of the project on the surrounding environment and affected communities;
- Preparing occupational health and safety to minimize any accident or emergency situation;
- Proposing plans for the post project monitoring, ongoing consultation and disclosure, EMP implementation, and institutional arrangement/organizational arrangement; and
- Suggestion and recommendation for abatement/mitigation/management measures to ensure environmental, biological, health and social compatibilities and also to comply with the National Environmental legal requirements and national Environmental Quality standards.

Methodology of the study: This is a qualitative study. However, both quantitative and qualitative data are collected and analyzed to achieve the objective of the study and show the baseline information of the study areas. Quantitative data are collected from secondary sources and qualitative data are collected from primary sources using different qualitative approach and methods. The approach and methods those are applied during the assessment include: (i) Consultation with stakeholders and community people; (ii) Focus Group Discussion; and (iii) Field visit and observation.

Findings of environmental impact assessment: The **environmental screening, field observation** and **community consultation** have identified that the proposed kitchen cum municipal market has insignificant ecological, physiochemical and biological impacts on the environment but has positive impact of social environment. There is no need to fell down trees and clearing vegetation as the structure will be developed as the extension of an existing market. There is no water body nearby the market and there is a well-constructed drainage system all around the market, hence insignificant impact on aquatic species. The market may have temporary and localized negative impact on physicochemical environment during construction and operational phases due to movement of vehicles and using of different machines. It is anticipated that the air pollution and water logging will be insignificant due to taking necessary measures and existing drainage system. The noise pollution may have moderate level of impact due to use of mixture machine, drilling machine, vibrator, carrying of construction materials etc which can be minimized by using proper silencer and mufflers in all categories of machineries. In contrast, water pollution, solid waste pollution and construction waste might have insignificant impacts on the environment due to spillage of oil and lubricant, waste water generation due to washed out water from existing slaughter house and fish sellers shops, solid waste generation from residuals of vegetable, residuals of food packaging materials, residuals of construction materials etc during construction and operational phases as there is a well-constructed drainage system all around the market and provision of collecting waste water

through vacuum cleaner and disposing it at specific landfill after proper filtration. In addition, the physical, cultural and archeological impact will be insignificant. There is only a temple adjacent to the market which is well-protected by a boundary wall. The subproject might have negative socio-economic impact due to traffic congestion and health and safety issues of workers and laborers during construction phase. However, it has a positive impact on the local and regional economy due to generation of employment opportunity and will facilitate the trade and business of the people living in the different parts of the.

Conclusion and recommendations: On the basis of the findings of the environmental assessment, it could be concluded that the subproject is environmentally sound and sustainable. The potential environmental impacts seem very minimum and manageable, and it would be minimized by taking proposed mitigation measures. The Government of Bangladesh and World Bank have some legal and social safeguard compliances issues those are applicable during constructing and operating the proposed subproject. Considering the issues and findings of the study, following key recommendations are made for smooth construction and successful operation of the market:

- Separate parking lot for private cars and goods carrying trucks should be established by the municipality maintaining a considerable distance from the market to avoid traffic congestion at the market area.
- A well-defined solid waste collection and disposal system should be in place at the market.
- All waste water should be discharged to the Municipal sewer system. In the absence of such system in the vicinity of the market, the septic tanks should be constructed.
- Fire prevention and fighting equipment should be provided and maintained as well as market management committee should be trained in fire prevention and fighting.
- The market should have facilities for washing, prayer, toilet, waiting, shopping, meals and snacks.
- Contractor will ensure availability of the PPEs and first-aid box, water supply and sanitation facilities to the workers.
- The surrounding people should be informed about the construction and operation of the bus terminal.
- Above all, the EMP should be followed and mitigation measures should be monitored as per EMP.

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ABBREVIATION

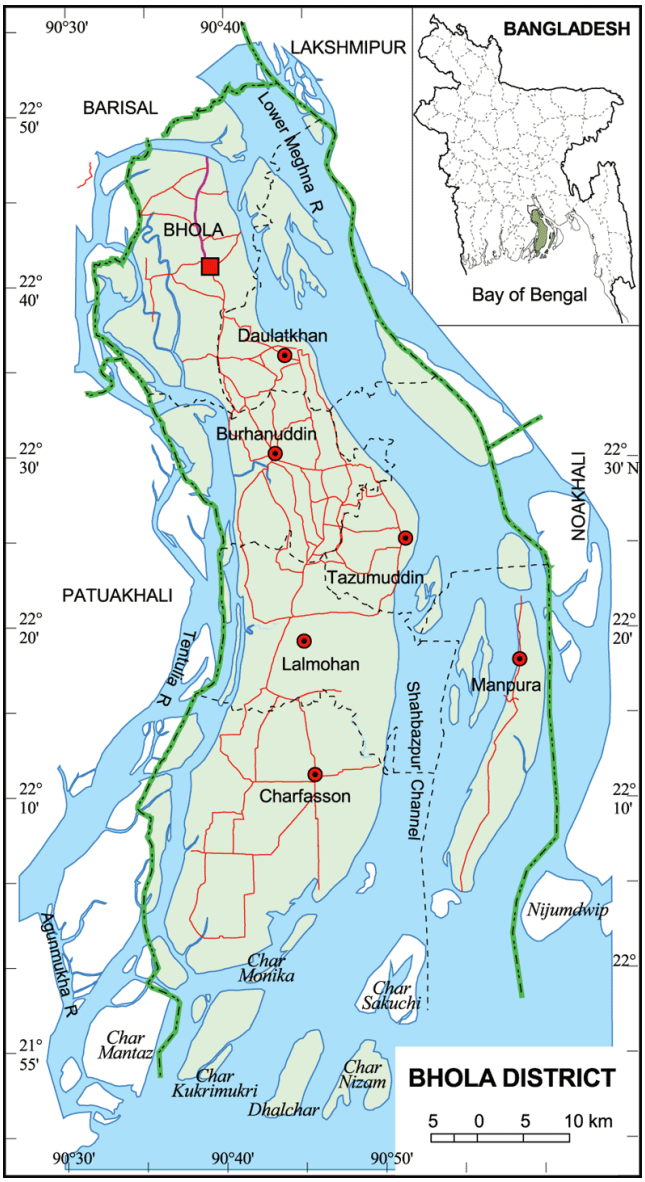
AP	Affected People
BBS	Bangladesh Bureau of Statistics
BDT	Bangladesh Taka
BMDF	Bangladesh Municipal Development Fund
BOQ	Bill of Quantity
CIP	Capital Investment Plan
DOE	Department of Environment
ECA	Environmental Conservation Act
ECoP	Environmental Code of Practice
ECR	Environmental Conservation Rules
EMF	Environmental Management Framework
EMP	Environmental Management Plan
ES	Environmental Screening
FGD	Focus Group Discussion
GOB	Government of Bangladesh
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
GW	Ground Water
IUCN	International Union for Conservation of Nature
MD	Managing Director
MGSP	Municipal Governance and Services Project
NGO	Non-Governmental Organization
OP	Operational Policy
PIU	Project Implementation Unit
PMU	Project Management Unit
PPE	Personal Protective Equipment
RCC	Reinforced Concrete Cement
SPW	Supply Water
ULB	Urban Local Body
WB	World Bank

1. INTRODUCTION

1.1 Background of the Municipality and the Sub-project

Bhola is a district in south-western Bangladesh and within the Barisal Division. It is an Island as well as an active delta and a part of the Ganges tidal floodplain (towards north) and the young Meghna estuarine floodplain (towards south). It was a part of Barishal district and upgraded as Bhola Mohakuma in 1854. After the independence of Bangladesh, it is established as a district of Bangladesh in 1984. Now, it is branded as a name "Queen Island of Bangladesh".

The Bhola Municipality, within the Sadar Upazilla of Bhola district, was established on the 10th October in 1920. The Bhola Municipality was recognized as "Category A" municipality on the 3rd May in 1989. It is located between 22°32′and 22°52′north latitudes and between 90°32′ and 90°44′ east longitudes bounding the areas by the Tentulia and Meghna rivers (Website of Bhola Municipality, 27 March 2018).



Map 1: The map of Bhola district

The total area of the Bhola Municipality is 31.48 sq km dividing into nine administrative wards and 18 mahallas. A total of 88940 people including 45580 male and 43360 female with population density of 2825 per sq km reside in the Bhola Municipality (Municipality statistics, 2018). The literacy rate of the Municipality is 72.14 percent (Census 2011).

As a "Category A" municipality as well as the main town of the Bhola district, the Bhola Municipality has been improving its infrastructural development for ensuring the necessary services to its inhabitants and taking new initiatives to meet the growing demand of the people. Recently, the Municipality has prepared its Capital Investment Plan (CIP) for its infrastructural development following a participatory approach with the technical assistance from Bangladesh Municipal Development Fund (BMDF) and identified the vertical extension of kitchen cum municipal market as a one of the priority

work (CIP No.04) for creating more scope of income generation for the in habitants as well as more revenue generation for the municipality using the single piece of land through multipurpose use.

The Municipality has already submitted an application for sub-credit to BMDF seeking financial support for vertical extension of existing kitchen cum municipal market. The significant features of the subproject are given in **Table 1-1** as below:

Table 1-1: The significant features of the proposed subproject

Name of the Sub-Project	Vertical Extension of Kitchen cum Municipal Market
Name of District	Bhola
Name of ULB	Bhola Municipality
Location of the Subproject	Ward No.03
Service Areas	All the areas under the municipality
Types of shops	Jewelry shops and other commercial facilities for the traders and shopkeepers
Structural Design Option	RCC structure
Total Land Area	28 decimal
Land Acquisition	Municipality owned land
Estimated Cost	BDT 100 millions
Subproject duration	12 months
Tentative Starting date	June 2018
Tentative Completion date	May 2019

1.2 Justification of Selecting the Subproject

Bhola Municipality is the main town as well as the key business center of the district. The citizens who are living in the municipality areas have some regular household needs. In one hand, the people of the municipality areas have been increasing day by day, thus increasing more demand for both essential and luxury goods of households. On the other hand, adequate market facilities are required to meet the increasing demand of the citizens so that the supply of goods might be ensured. However, the area of the municipality is limited and horizontal extension of market facilities needs more land. In order to overcome the barrier of limited land and to meet the increasing demand for varieties of goods, vertical extension of the existing market becomes rational. After the completion of the market through the vertical extension, it will ensure the opportunity of supplying all necessary and luxury goods at one point, acting as the “one stop shopping mall”.

In addition, the proposed subproject site is owned by the municipality and no need to acquire additional land for its vertical extension and there is no possibility of displacement of people as well as shop keepers. Moreover, it will create business opportunity for many businessmen and create jobs for workers and salesmen, thus helps to increase income and earnings for livelihood. It will also create the revenue generation avenue for the municipality and will help the municipality in attaining the sustainability of the institution.

1.3 Policy Legal and Administrative Framework

There are some environmental laws and regulations under the environmental legal framework of Bangladesh for environmental protection and natural resources conservation. In addition, there are also some safeguard policies of World Bank to prevent and mitigate undue harm to people and their environment in the development process. All the subprojects to be prepared and implemented under the BMDF should be in compliance with these environmental laws and policies of Bangladesh and World Bank. The proposed subproject will also be prepared and implemented in compliance with these laws and policies. The environmental laws and regulations of Bangladesh and the safeguard policies those are applicable to this subproject are given as below:

National Environmental Laws and Regulations:

- National Environmental Policy 1992
- Bangladesh Environmental Conservation Act (ECA) 1995 amended 2002
- Environmental Conservation Rules (ECR) 1997 amended 2003
- National Land-use Policy 2001
- Bangladesh Labor Action 2006
- Bangladesh National Building Code

World Bank Safeguard Policies:

- OP/BP 4.01 Environmental Assessment
- OP/BP 4.04 Natural Habitats
- OP/BP 4.11 Physical Cultural Resources

Now, as per the environmental management framework of BMDF, it is required to conduct an environmental assessment of the proposed kitchen cum municipal market in accordance with the legal regulatory framework of the Government of Bangladesh and World Bank policies. Therefore, the Bhola Municipality has deployed an individual consultant to carry out the environmental impact assessment of the proposed bus terminal as a subproject.

2. OBJECTIVE AND METHODOLOGY

2.1. Objective of the study

The general objective of the study is to determine the major environmental impacts that might be happened due to the implementation of the subproject and to recommend possible mitigation measures to avoid or reduce identified adverse environmental impacts and to enhance positive impacts. The specific objectives include:

- Existing environmental condition at the sub-project areas for environmental components viz. air, noise, water, land, soil, biological and socio-economic aspects;
- Prediction and evaluation of positive and negative impacts that may result from the proposed sub-project;
- Consideration of alternatives;
- Undertaking public consultation and disclosure of project-related information;
- Grievance redress mechanism;
- Formulation of an environmental management plan (EMP) to eliminate or minimize the adverse impacts of the project on the surrounding environment and affected communities;
- Preparing occupational health and safety to minimize any accident or emergency situation;
- Proposing plans for the post project monitoring, ongoing consultation and disclosure, EMP implementation, and institutional arrangement/organizational arrangement; and
- Suggestion and recommendation for abatement/mitigation/management measures to ensure environmental, biological, health and social compatibilities and also to comply with the National Environmental legal requirements and national Environmental Quality standards.

2.2. Scope and methodology of the study

2.2.1. Scope of the study

This study includes different dimensions of environmental issues those need to be considered at different stages of selecting, implementing, and operating the subproject following the environmental policies of Government of Bangladesh and World Bank. Addressing the environmental issues in this subproject includes a series of tasks to be carried out by the study. The scope and methods of this Environmental Assessment includes:

- Baseline Survey data acquisition of the baseline both environmental and social to carry out the Environmental Assessment;
- Understanding the technical aspects of the proposed sub-project through gathering and analyzing primary and secondary data;
- Explore the present environment condition of subproject influence areas through reconnaissance survey and in consultation with community people;

- Identification of potential environmental impacts and evaluating the consequences through using given environmental screening format;
- Categorize the pollutions that may come out during pre-construction, construction and operation phases at subproject site and surrounding areas through key informant interview and field observation;
- Discuss with the people living in the sub-project area about the mitigation measures suggested to avert the negative environmental impacts and to enhance the positive environmental impacts through stakeholders' consultations and general public consultation; and
- Assess the institutional aspects, and develop Environmental Management and Monitoring Plan for the subproject in consultation with Mayor and other PIU members , and based on the findings of the study.

2.2.2. Methods of the study

The study is qualitative in nature and different qualitative methods are used to gather information. Both primary and secondary information are collected, analyzed and used to fulfill the requirements of the study. The primary information is collected following qualitative technique as given below:

- Consultation with stakeholders and community people;
- Focus Group Discussion; and
- Field visit and observation.

Consultation with stakeholders and community people: Consultative meeting with different stakeholders such as Ward Councilors, market management committee, shop keepers, civil society members, representatives of business men, community leaders and representative of community people is done to exercise the environmental screening using prescribed form of BMDF and filled in the screening form as per their information and opinion. Before starting the screening exercise, the participants are informed about the details of the project information and the way of implementing the subproject.

Focus group discussion: Two focus group discussion (FGD) sessions are organized separately with male community participants and female community participants, mainly the people who are residing adjacent to the proposed subproject and coming to the market to know their attitudes towards the proposed subproject, its potential impact and their feedback, and suggestions on mitigating the potential negative impacts and enhancing the positive impacts of the subproject.

Field visit and observation: Field visit and observation of different environmental features are done by the consultant to understand the overall environmental situation of the subproject areas and the potential impacts of the subproject on it during pre-construction, construction and operational stages.

In addition, some quantitative information is collected from secondary sources to complement the qualitative information. The secondary information is collected by reviewing national, district and municipality level document and different websites.

3. SUBPROJECT DESCRIPTION

3.1. Name of the subproject

The name of the subproject is "Vertical Extension of Kitchen cum Municipal Market".

3.2. Brief description of the subproject

The proposed subproject is located at Chakbazar area, the heart of the main town, under ward no. 03 of Bhola Municipality. At the north, there is ward no. 2 of the municipality and ward no. 9 is at the south side while ward no. 6 and ward no. 7 at the west side and shibpur union of Bhola Sadar Upazilla is at the east side of the market. The site of the market is 300 meters far from the Pourabhavan of Bhola Municipality. There is an approach road in front of the market which is connected with Bhola Sadar road. There is another approach road along the bank of bhola khal which is connected with the approach road of the market and facilitating the movement of customers in and around the market.

The proposed kitchen cum municipal market has already two-storied building with a basement and it will further be extended vertically to another three floors for creating more space for business and marketing facilities of the citizens of the municipality. At present, the kitchen cum municipal market with two-storied building has been completed with available facilities for vegetable, fish, meat and slaughter houses at the basement, and grocery items at both ground floor and first floor. The floor size of each floor is 13330 sqft. Each floor will have the following facilities:

- Space for shops and other commercial activities;
- Two toilets, urinals and washing basins for male;
- Separate two toilets with washing basins for female;
- Tea corner; and
- Canteen.

The detail of proposed floors is given as below:

Second floor:

- Space for show rooms and departmental stores; and
- Space for tea stalls, dry food corners and restaurant.

Third floor:

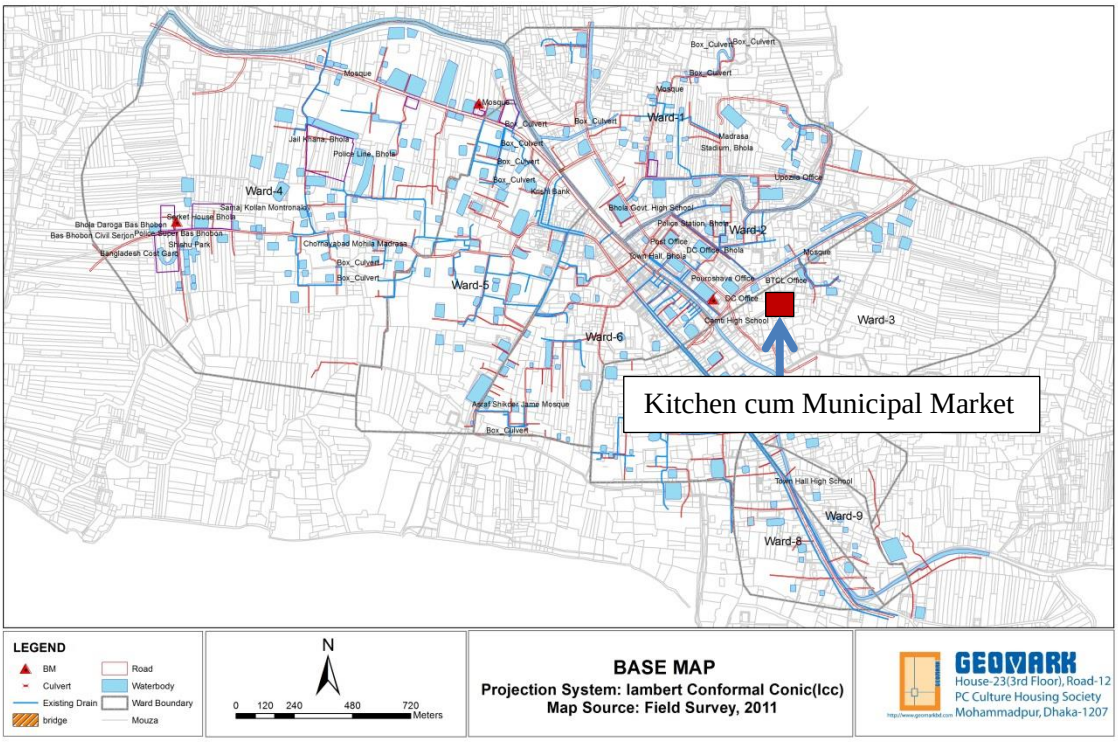
- Space for different financial institutions like bank, insurance company etc.

Fourth floor:

- Space for 26 jewelry shops.

3.3. Location of the subproject

The proposed subproject is located at Chakbazar area, the heart of the main town, under ward no. 03 of Bhola Municipality. At the north, there is ward no. 2 of the municipality and ward no. 9 is at the south side while ward no. 6 and ward no. 7 at the west side and shibpur union of Bhola Sadar Upazilla is at the east side of the market.

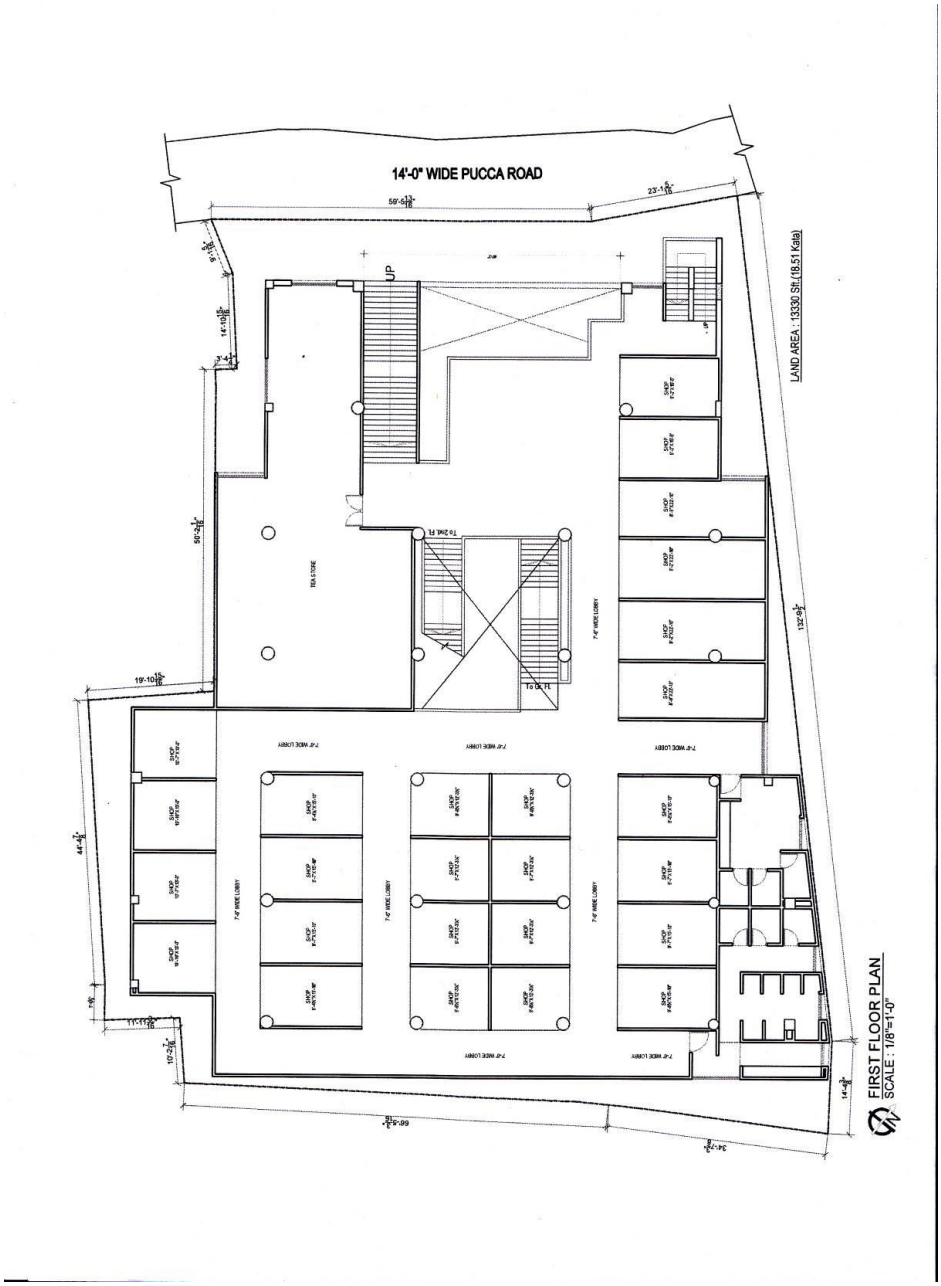


Map 2: Location map of the proposed Kitchen cum Municipal Market

The project site of the market is 300 meters far from the Pourabhavan of Bhola Municipality. There is a market and bhola khal in between the Pourabhavan and the proposed kitchen cum municipality market. The coordinate of the subproject is $22^0 41^/ 6.3^{//}$ N and $90^0 38^/ 43.1^{//}$ E.

3.4. Layout of the subproject

The layout plan of each floor of the proposed kitchen cum municipal market to be constructed at the top of the existing structure is given as below:



Picture 1: Layout plan of proposed each floor of Kitchen cum Municipal market

3.5. Ownership of the subproject land

Bhola Municipality is the legal owner of the proposed land where the Kitchen cum Municipal Market will be extended vertically. No land acquisition is required.

3.6. Present condition of the proposed subproject's site

The proposed subproject will be constructed at the top of the existing well designed market building and extended for another two floors. The existing market is a newly constructed two-storied building with a basement and well protected boundary wall and storm water drainage system at all sides of the building. The total area of the land of market is 28 decimals and the land is owned by the municipality. No commercial activity is started yet at the market. The site is surrounded by commercial establishments at west side, 14-feet pucca road and commercial establishments at the north side, temple and commercial establishments at the east side and small residential area at the south side. The detail of the existing market structure is given as below:

Basement floor:

- Space for 39 shops;
- Kitchen processing area;
- Washing area;
- Meat processing area;
- Cow waiting area;
- Fish retail area; and
- Electrical and mechanical room.

Ground floor:

- Space for 47 grocery shops; and
- One official room

First floor:

- Space for 26 grocery shops; and
- Space for tea, dry food corner and restaurant.

Although there is no space for stocking materials at the site, the construction materials will be stocked at a stockyard located at Didar Mosjid Goli within 100 meters of the construction site. The site of stockyard is surrounded by storm water drainage system. Two labor-sheds separately for male and female will also be constructed at that place. The mixing of materials for construction work will be done at that site and carried by small trucks to the construction site.

3.7.Key activities of the subproject

The activities to be carried out during preconstruction include:

- Construction of the semi-pucca site office;

- Construction of semi-pucca separate labor sheds with latrine facilities for male & female workers;
- Construction of pucca platform for stocking construction materials; and
- Construction of temporary boundary wall around the labor shed and stockyard

As the proposed construction will be done at the top of the existing two-storied structure, so there will be no need to demolishing and cleaning work, layout and pilling work, and earthwork and excavation for pile cap and semi-basement work.

However, the major activities to be carried out during the construction phase include:

- Construction of the superstructure and associated civil works;
- Electricity connection and other ancillary works;
- Provision of other supporting/ancillary facilities; and
- Workers' health and safety issues.

The activities to be carried out and continued during operational phase include:

- Solid waste collection and disposal;
- Waste water collection, treatment and disposal;
- Traffic control; and
- Fire safety, natural disaster and risk management.

3.8. Category of the subproject

Environmental Screening (ES) for the Kitchen Market has been conducted with the purpose of fulfilling the requirements of Government of Bangladesh (GOB) and the World Bank (WB). Environmental Screening ensures that environmental issues are properly identified in terms of extent of negative and positive impacts. Environmental Screening Checklist, as adopted in Appendix C of the Environmental Management Framework (EMF) of the MGSP, was administered for identifying the impacts and their extents.

- According to ECR 1997: Green □ Orange A □ **Orange B** □ √ Red □ Not Listed □
- According to WB classification: **Category B** □ √ Category C □

Considering the potential environmental impacts, the vertical extension of the kitchen market can be considered as Orange B as per ECR-97*(Multistoried Commercial Building)*. According to the WB classification, it is of Category B.

3.9. Analysis of alternatives

This is an extension type of subproject, where the existing two-storied kitchen market will be vertically expanded to another two storied for ensuring the optimum use of the land as well as establish the market as one stop shopping mall. Hence, no alternative of the subproject is

considered here. As there is no ongoing shops in the existing compound, so the issue of marketing daily commodities of the people is absent here. The construction work will have no impact on the business as well as on the people of the municipality.

3.10. Estimated cost of the subproject

The estimated cost of the proposed vertical extension of the kitchen cum municipal market is BDT 100 million.

3.11. Schedule of implementation

The proposed subproject will be started on June 2018 and will be completed by the end of May 2019. Therefore, the subproject will be implemented within a period of 12 months.

4. BASELINE ANALYSIS OF ENVIRONMENTAL CONDITION

4.1. Physicochemical environment

4.1.1.Important environmental features

Important environmental features in influence areas (1 km around the subproject site) were observed through field observation. Detail observation and assessment were made on identified key environmental features like drainage congestion, waste water discharge, solid waste disposal and management, water contamination, air pollution, soil degradation, odor spreading and traffic movement etc. in and around the catchment or influenced areas of the subproject. Moreover, land use pattern of the influence areas was also observed and found human settlement, offices, commercial establishments, health care facilities, educational institutions, and water bodies as depicted in Table 4-1 as below. As an essential ingredient, an engineering and topographical survey was done that may need to be adjusted minor during the construction phase.

Table 4-1: Land use and important environmental features around the proposed market

Sides/Direction	Important Environmental Features
North	Government Boys School, Homio College, Adhyawan Pre-cadet School, Bhola Cadet School and College, Islamic Complex& Madrachha, Alia madrachha, Shaheed Zia School and College, Sabuj Chhata Clinic, Bandhan Health Center, Kalinath Rayer Bazar, Mahajon Potti, Khalpar Whole Sale Market, Zia Super Market, Mudumiyar Dargha and Majarsharif, Power House (1), Temple (2), Mosque (12), Primary School (2), Sonali Bank, UCB Bank, Agrani Bank, Social Bank, SIBL Bank, Krishi Bank. Children's Park (1), Zilla Stadium (1) etc.
South	Residential area, Town Committee Secondary High School, Ubaidul Haque College, Government Girls High School, Town School, Machhuma Khanam Girls High School, Town Committee Disable School, Town Committee Night School, Mosque (4), Temple (2), Bhola Diagnostic Center, Habib Medical Center, Asia Medical Center, Islamia Medical and Diagnostic Center, National Health Center, Diabetic

	Hospital, Islamic Bank, Mercantile Bank etc.
East	Government Mohila College, Primary School (3), Matrishadan, Grameen Diagnostic Center, Muktijoddha Market, New Market, Town Hal, Pourabhavan, Zilla Parishad Bhavan, Press Club, Bhola Khal, Zilla Parishad Pond, Tmple (2), Mosque (8), Musium, Zilla Parishad Pushkani Park etc.
West	Nalini Das Girls School, Adrasha Kindergarten, Government Primary School (2), Alif Medical Center, Medi Fast, Saif Diagnostic, Super Market (4), Abosar Cinema Hall, Temple (3), Mosque (10), Reserved Pond (1) etc.

4.1.2. Climate

4.1.2.1. Precipitation

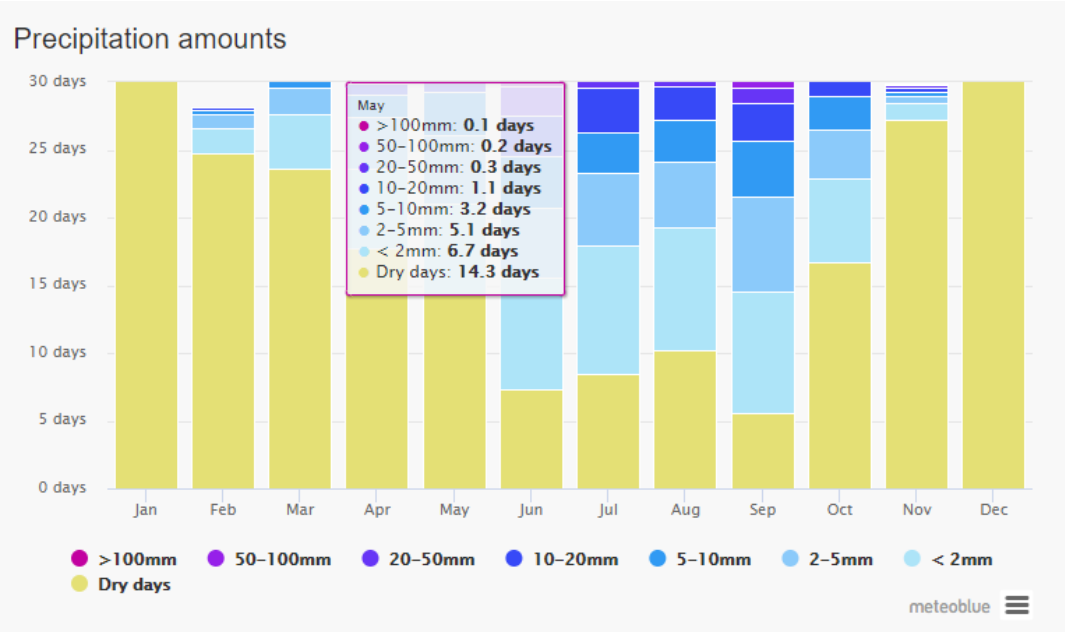


Figure 4-1: Precipitation amounts

The **Figure 4-1** for Bhola District shows on how many days per month, certain precipitation amounts are reached. In tropical and monsoon climates, the amounts may be underestimated.

(Data Source: https://www.meteoblue.com/en/weather/forecast/modelclimate/bhola-district_bangladesh_1336136, date 24.3. 2018)

4.1.2.2. Ambient air temperature

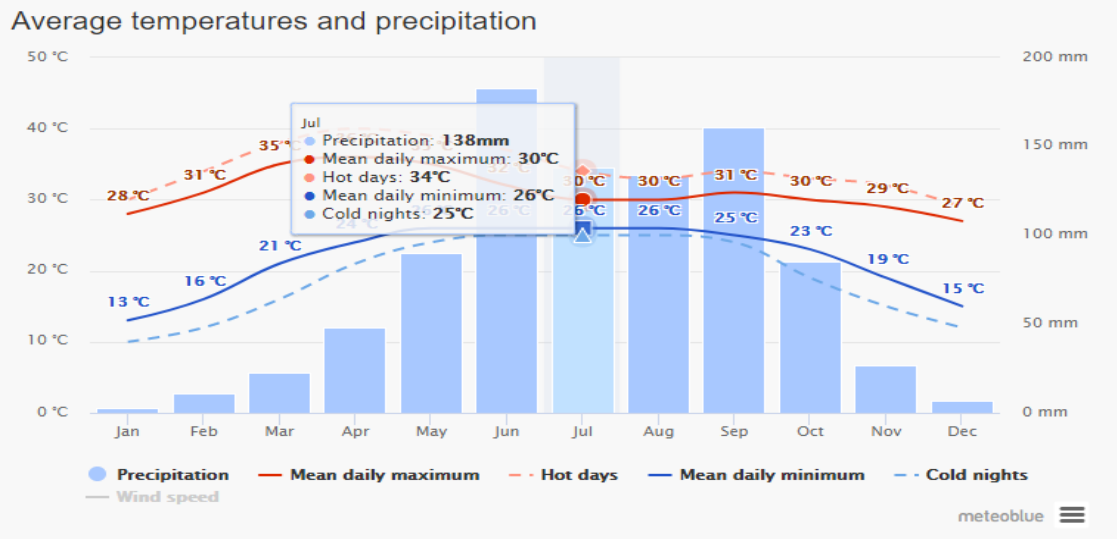


Figure 4-2: Average temperature and precipitation

The **Figure 4-4** shows the average temperature and precipitation of Bhola district. The "mean daily maximum" (solid red line) shows the maximum temperature of an average day for every month for Bhola District. Likewise, "mean daily minimum" (solid blue line) shows the average minimum temperature. Hot days and cold nights (dashed red and blue lines) show the average of the hottest day and coldest night of each month of the last 30 years. For vacation planning, you can expect the mean temperatures, and be prepared for hotter and colder days. Wind speeds are not displayed per default, but can be enabled at the bottom of the graph.

4.1.3. Topography and drainage

The island of Bhola is very flat, the highest peak is around 3 meters over the sea level and categorized as estuarine floodplains. There is some mound on the island, but many of these are man-made, for example embankments, roads, ponds etc. The northern part has more mound than the southern part of the island. This could be a result of the erosion and accretion. Estuarine floodplains differ from meander floodplains in being almost level, lacking meander scars and abandoned channels, and having almost uniformly silty deposits (both laterally and vertically). They differ from tidal floodplains in lacking a close network of tidal creeks and in having predominantly silty deposits. There are a few minor rivers, but most of the drainage of older landscapes is affected through manmade canals (khals).

4.1.4. Geology and soil

Bhola Island is part of the Ganges tidal floodplain (towards north) and the young Meghna estuarine floodplain (towards south) and is an active delta. In the Ganges tidal flood plain area, the sediments are mainly non-calcareous clays, but they are silty and slightly calcareous on riverbanks and in a transitional zone in the east adjoining the lower Meghna. In the young

Meghna estuarine floodplain area, new deposition and erosion are constantly taking place on the margins, continuously altering the shape of the land areas. The sediments are deep silts, which are finally stratified and are slightly calcareous. In many, but not all parts, the soil surface becomes saline to varying degrees in the dry season.

4.1.5. Hydrology and water resources

Bhola Island falls under the Ganges tidal flood plain and young Meghna estuarine floodplain and has a network of large number of tidal rivers and their distributaries. The lower Meghna River is highly influenced by the tidal interactions and consequential backwater effects. North and West of Bhola falls under the micro tidal region (0-2m) under the global tidal classification (Hydro-morphological dynamics of the Meghna Estuary by DHV et al, June 2001). Riverine processes dominate the lower Meghna River, Tentulia River and Shabazpur channel surrounding the Bhola Island. All the rivers are connected with streams and tidal channels and flow down to the Bay of Bengal. Meghna (Lower Meghna), one of the largest rivers of Bangladesh along with its distributary, Shahbazpur channel separates the Bhola district from the Lakshmipur district in the east. The Shahbazpur channel, 5-8 km wide, flows between Bhola and Ramgati-Hatiya islands. The Tentulia river, a channel of Meghna further separates the Bhola island from the rest of the Barisal Division in the west

4.1.6. Air quality and dust

The profile of the Municipality is mainly urban area, which has mix of semi-densely settlements and commercial areas. The major sources of air pollution noted within the study area include normal vehicular pollution in roads as well as commercial activities, and domestic emissions. No major industrial activity is reported in the study area. Energy supplies are not good in the area, and therefore, diesel-fired small power generating sets are common in the urban areas of the study area.

4.1.7. Noise level

The purpose of ambient noise level measurement is to determine sound intensity at the subproject locations. As a part of the baseline study, noise level measurement was done at different locations inside and around the proposed subproject site. Noise level measurement was performed during daytime with a calibrated noise level meter (Extech HD-600). 2-minutes continuous noise level measurements were carried out at the selected locations in 'A' weighting and slow response mode with 1 sec interval, and the equivalent noise levels (Leq) as well as the maximum noise levels (L_{max}) were determined. Table 4-2 shows the summary of noise level measurements carried out in different locations in and around the study area. It also shows the Bangladesh noise level standards for commercial areas.

Table 4-2: Noise level measurements during day time at the selected locations in and around of the market

Noise level measurement locations	GPS Co-ordinate	Day-time		Bangladesh standard for commercial place (dBA),L_{max}
		Equivalent Noise level (dBA),L_{eq}	Maximum Noise level (dBA),L_{max}	
Outside of market(North)	$22^0 41^/ 7.8^{//}$ N $90^0 38^/ 42.9^{//}$ E	93.886	103.1	70
Outside of market (South)	$22^0 41^/ 6.3^{//}$ N $90^0 38^/ 42.9^{//}$ E	56.880	70.3	70
Outside of market(East)	$22^0 41^/ 7.8^{//}$ N $90^0 38^/ 42.9^{//}$ E	58.243	69.5	70
Outside of market(West)	$22^0 41^/ 8.2^{//}$ N $90^0 38^/ 43.1^{//}$ E	75.114	87.8	70
Inside the market	$22^0 41^/ 6.3^{//}$ N $90^0 38^/ 43.1^{//}$E	57.715	65.7	70

Source: Field Survey, April 2018

4.1.8. Water Quality

The result of water quality test is given in **Table 4-2** as below:

Table 4-2: The result of water quality

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Lab ID	Caretaker Name	Village/ Ward	pH LOQ:, BDS:6.5-8.5		Arsenic(mg/l) LOQ:0.001, BDS:0.05		Iron(mg/l) LOQ:0.1, BDS:.3-1		Chloride(mg/l) LOQ:, BDS:150-600		Manganese (mg/l) LOQ:0.05, BDS:0.1	
			Conc	pH Meter	Conc	Method	Conc	Method	Conc	Method	Conc	Method
BAR2017110521	Md. Tanim	Word No-09	7.95	pH Meter	<LOQ	AAS	<LOQ	AAS	167	TM	<LOQ	AAS
BAR2017110522	Md. Sumon	Word No-09	7.91	pH Meter	<LOQ	AAS	0.421	AAS	111	TM	<LOQ	AAS
BAR2017110523	Zakir Hossain	Word No-09	7.91	pH Meter	<LOQ	AAS	0.254	AAS	127	TM	<LOQ	AAS
BAR2017110524	Soyed Mahabub Miah	Word No-09	7.95	pH Meter	<LOQ	AAS	0.241	AAS	106	TM	<LOQ	AAS
BAR2017110525	Sumon Salim Miah	Word No-09	7.91	pH Meter	<LOQ	AAS	0.214	AAS	127	TM	<LOQ	AAS
BAR2017110526	Md. Dulal	Word No-09	7.90	pH Meter	<LOQ	AAS	0.362	AAS	96	TM	<LOQ	AAS

Note :LOQ-Level on Quantization, BDS: Bangladesh Drinking Standard, AAS: Atomic Absorption Spectrophotometer
N.B. Test has been done as per receive sample.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: Kazi Zehad Designation: Sample Analyzer 2.) Name: Designation:	05/12/17 (Kazi Zehad) Sample Analyzer, DPHE	1.) Name: Shamsuddin Ahmad Designation: Senior Chemist.	05-12-17 (Shamsuddin Ahmad) Senior Chemist, DPHE

The Bhola Municipality urban dwellers mainly depend on Ground Water. The ground water is extracted by Municipality installed deep tube well and supplied by pipeline water supply system.

In some cases people install hand tube well for fulfill their domestic requirements. **Table 4-2** shows the results of water quality parameters of ground Water (GW) and supply water (SPW).

4.2. Biological Environment

4.2.1. Floral habitat and diversity (terrestrial and aquatic)

Reconnaissance field surveys were made to assess the various vegetation types/ecosystems present within the sub-project impact zone. Once established, the target areas were extensively surveyed and a species assessment was made. Standardized transects were laid in order to assess species composition and vegetation structure. To facilitate the identification of the maximum number of species, several visits were made. The study area (both directly and indirectly impacted area) occupies both terrestrial as well as aquatic ecosystems.

4.2.2. Faunal habitat and diversity (terrestrial and aquatic)

In terms of faunal components, the study area does not large wild mammals due to its vegetation condition and lack of forested areas. Among mammals, 19 species were recorded under 9 families. Common mammals that were found within the study area are Mole Rat, Bandicot Rat, House Shrew, Field Mouse, House Mouse), House Rat, Indian Grey Mongoose, Indian Jackal etc. None of the mammalian species of conservation significance i.e., listed in IUCN as threatened or endangered were recorded in the study area. A total of 4 species of amphibians, 3 species of reptiles, 6 species of avi-fauna and 2 species of mammals were observed at the Project site and its immediate vicinity. None of these species recorded during the ecological survey is of conservational significance, i.e., listed in IUCN red list.

4.3. Socioeconomic Environment

4.3.1. Status of land use pattern, housing and built-up infrastructure

Land use/cover inventories are an essential component in land resource evaluation and environmental studies due to the changing nature of land use patterns, transport networks and administrative boundaries etc. The sub-project area is consisted with mixed land use pattern. There are medium to high densely populated residential area. Most of the houses are pacca and no katcha houses are found. There are super markets, shops, educational and recreational centers, private and government offices, business establishments etc in the surrounding areas of the subproject.

4.3.2. Beneficiary population

All the people living in Bhola Municipality will be benefited by the bus terminal. Therefore, a total of 88940 people of the municipality will be benefited just after the construction of the bus terminal (Municipality Data, 2018). Considering the current average growth rate of population in urban areas of the country as 3.2 percent per year, the estimated number of the people of the

Municipality will be 104113 in 2031 and 160746 in 2041. All these people will be benefitted from the proposed market. In addition, people coming from different parts of the district to the Municipality as well as district main town will also be benefitted.

4.3.3. Educational status

The majority of the people of Bhola Municipality are literate and literacy rate is 76.93. The literacy rate among the male is higher than the female. The literacy rate among the male is 79.19 whereas it is 74.51 among the female. There are six colleges, two school and colleges, nine high schools, 33 primary schools, 17 madrasas, three kaumi madrasas, one vocational school, two libraries and four kindergartens which are providing educational supports and services to the inhabitants in Municipality areas(Source: Municipality data, 2018). The noted educational institutions are Bhola Govt. College (1962), Govt. Fazilatunnesa Mohilla College (1972), Nalini Das Homeopathy Medical College (1981), Altazer Rahaman College (1994), Bhola Govt. Boys High School (1918), Bhola Govt. Girls High School (1928) (source: population and housing census, 2011).

4.3.4. Livelihood and economic situation

Bhola Municipality is a district based Municipality and mainly depends on commerce and agricultural activities specially fishing. Main sources of income Agriculture 55.72%, non-agricultural labourer 5.43%, industry 0.50%, commerce 14.76%, transport and communication 3.33%, service 7.74%, construction 2.17%, religious service 0.39%, rent and remittance 0.41% and others 9.55%. (Source: Bangla Pedia)

4.3.5. Land acquisition and resettlement

The subproject site is situated on the land which is owned by Municipality. Hence, land acquisition is not required. The proposed subproject will be constructed at the top of the newly constructed kitchen market. Therefore, the issue of resettlement is absent here.

4.3.6. Tribal communities

There is no indigenous or tribal people settlement in the subproject area. Therefore, there is no need to take any kind of protective measures for indigenous peoples' safeguard.

4.3.7. Cultural heritage and protected areas

Within the influence area of the subproject, there is no protected area and no important historical sites identified during the field visit. However, there are some important establishments like Zilla Parishad building, Municipality building, Deputy Commissioner's office etc. within the influence area of the subproject.

5. ENVIRONMENTAL SCREENING

5.1. Potential Environmental Impact during Construction Phase

(A) Ecological Impacts:

- Felling of trees : Significant □ Moderate □ **Minor** □√
  Number of trees : N/A
- Clearing of vegetation : significant□ Moderate □**Minor** □√
- Potential impact on aquatic species environment : Significant □ Moderate □**Minor** □√

The proposed subproject will be constructed at the top of the existing newly constructed kitchen market. Therefore, there is no need of felling trees as well as clearing of vegetation. In addition, there is no water body at the surrounding areas and there is a RCC drain around the existing kitchen market ensuring the proper drainage of water from the proposed site to nearby cannel. The cannel is connected with the river.

(B) Physico-Chemical Impacts:

- Noise pollution : Significant □**Moderate** √□Insignificant□
- Air pollution : Significant □Moderate □**Insignificant**□√
- Drainage congestion : Very likely □Likely□ **Unlikely** □√
- Water pollution : Significant □Moderate□ **Insignificant** □√
- Solid waste pollution :Significant □Moderate □**Insignificant** □√
- Construction wastes : Significant □Moderate□ **Insignificant** □√
- Water logging : Significant □Moderate □ **insignificant** □√

The subproject will have temporary and localized negative impact on physico-chemical environment during construction and operational phases due to the construction of super structure, movement of vehicles for carrying construction materials and equipment, and using of welding and drilling machine, winch machine, concrete mixer and vibrator machine etc. Hence, the anticipated impact on noise is considered as moderate. Construction activities such as transportation of sand, stones, brick cheeps etc may generate dust that may cause air pollution and anticipated impact of it is considered as minor. Construction activities need no demolishing work thus minimum chance to generate solid wastes and temporary impact on drainage system may cause if the raw materials of the construction work fall dawn into the existing drainage system. There is no chance of water pollution as there is no water body adjacent to the site as well as labor shed. A minimum amount of household level solid waste may generate at the labor shed. But, as the Municipality has solid waste management system in place and it will have no impact on the surrounding environment. Further, no solid waste will be generated during the construction work and will have no impact due to construction waste. In addition, there is well

constructed and functional drain around the proposed site which will ensure the removal of storm water and reduce the chance of water logging. Primarily, the subproject will have no adverse impact on the other physicochemical components. Moreover, proper silencer and muffler are to be used in all categories of machineries to be used during construction period to avoid uneven sounds.

(C) Socio-Economic Impacts:

- Traffic congestion **:** √**Likely** □Unlikely □
- Health and safety : Significant □√ **Moderate** □Insignificant □
- Impact on archaeological : Significant □ Moderate □**Insignificant** □√
- Impact on historical : Significant □ Moderate □ **Insignificant** □√
- Employment generation : Significant □ √**Moderate** □ Insignificant □

As the subproject is situated at the center of the main town, the subproject will likely have temporary negative impact in traffic congestion due to transportation of the construction materials and equipment during construction phases. So, proper traffic management is required during construction phases. However, it is anticipated that the subproject activities will have moderate impact on the local traffic system. Mixing and carrying construction materials etc work will be performed with the conventional equipment and skilled laborers. Hence, anticipated impact on health and safety is considered as moderate. However, in case of any accident such as falling from the height during brick work, plastering work, painting work, glass fitting work etc. may cause severe impact on health and safety. So, the use of personal protection equipment will minimize the impact. There is no archaeological and historical site within the influence area. However, there is a temple adjacent to the proposed kitchen market that demands extra precaution to avoid any damage of the temple during construction phase. Further, it has moderate positive impact by generating employment opportunity for the local people as labors for construction of works will be hired locally.

5.2. Potential Environmental Impact during Operational Phase

(A) Ecological Impacts:

- Potential impact on species of aquatic : Significant □ Moderate □**Minor** □√

During operational phase, the subproject activities will not have any likely impacts on the surrounding ecological environment. The existing kitchen market has a system to reserve black water in underground reserve tank and vacuum cleaner to remove this water. Moreover, there is a well-constructed drainage system surrounding the subproject site and connected with a khal through which the grey water to be generated at the market will be discharged into running river. It will reduce the impact on aquatic species.

(B) Physico-Chemical Impacts:

- Potential air quality & noise level : Improvement □**No-improvement**□ √Deterioration □
- Drainage congestion : Improvement □ Minor Improvement □**No Impact** □√
- Risk of water pollution : Significant □Moderate□ **Minor** □√
- Pollution from solid waste : Improvement □**No-improvement**□√ Deterioration □

During operational phase, there is no possibility to deteriorate the air quality as no dust and emission of carbon-dioxide will be generated from the proposed subproject but noise pollution due to public gathering at the market may create moderate noise nuisance. As there is a provision of managing solid waste to be generated at the market is in design and there is a well-constructed RCC drain around the market, so there may have no chance for drainage congestion. However, proper management of solid waste using waste bins, collecting waste from bins and disposal of waste at landfill, and maintenance of drainage system to be ensured during operational phase. If the waste bins are not used properly at different places of the market and wastes are thrown here and there may pollute the surrounding environment.

(C) Socio-Economic Impacts:

- Traffic **:** Improvement □**No-improvement** √ □ Adverse□
- Safety : **Improvement** □ √ No-improvement□ Adverse □
- Employment generation : **Significant** □√ Moderate □ Minor □

There is a specific site in the plan, 75 meters far from the kitchen cum municipal market, for car parking and only walking by foot will be allowed to enter into the market area that will keep the market area free from traffic congestion. However, if any motorized or non-motorized vehicle moves through the small road in front of the kitchen cum municipal market may create congestion. So proper traffic management plan is required during operational phase. In addition, the market has a provision of proper security system with CCTV camera in and around the market premises and residential facilities for the shop keepers and traders at the top floor of the market which will improve the security and safety of shop keepers and traders. However, during operational phase, possible accidents and social risks due to causalities at the market, fire hazard, short-circuit and other vulnerability may also have negative socio-economic impacts. The kitchen cum municipal market will have significant positive impact by providing job and business facilities and resource mobility. There is a provision of establishing different types of shops at the market.

5.3. Summary of Possible Environmental Impacts of the Subproject

The ecological impact is not significant due to the construction activities but there will be some impacts on the physico-chemical parameter of environment during construction period. Construction works may temporarily increase noise pollution at the surrounding environment

and may create localized hazards. The anticipated impact on physicochemical components is mainly site specific and will be within the market boundary.

Solid wastes generation from residues of vegetable, packaging materials etc, and black water or waste water due to blood of slaughtered animals and fishes at the market are significant issues that should be handled and disposed-off properly by placing waste bins inside the market, and removing the waste water by using vacuum clear. This subproject has positive impacts in terms of the generation of the employment opportunities due to construction activities, supplying of the materials at construction phase and by providing business facilities at operation phase.

6. IDENTIFICATION OF MAJOR SUBPROJECT ACTIVITIES

6.1. Major Activities during Pre-Construction Phase

As the proposed subproject will be implemented at the top of existing kitchen market, so some pre-construction activities will be carried out for preparing the site ready for proposed construction activities. The major pre-construction activities to be carried out are as below:

- Construction of temporary separate labor sheds for men and women;
- Construction of separate toilet facilities for men and women labors;
- Providing temporary electric and water supply lines at the labor shed;
- Construction of temporary office for supervision of construction activities.

6.2. Major Activities during Construction Phase

During the construction phase, following major subproject activities to be carried out:

- Construction of multi storied building with associated civil works;
- Electricity connection and other ancillary works;
- Provision for workers' health and safety.

6.3. Major Activities during Operational Phase

The major activities to be considered during operational phase are as below:

- Collection and disposal of solid waste;
- Management of waste water and its treatment;
- Maintenance of drainage system;
- Traffic control;
- Safety and security mechanism.

7. ASSESSMENT OF ENVIORMENTAL IMPACTS AND ITS MITIGATION & ENHANCEMENT MEASURES

7.1. Potential Significant Environmental Impacts and Its Mitigation & Enhancement Measures during Pre-Construction Phase

7.1.1. Impact due to labor camp and its sanitary latrine

Two separate labor camps, one for male and another for female will be constructed at the site before starting the construction activities. If the labor camps are not constructed with minimum raised platform and not cleaned properly, that will create health hazard to the laborers. Two temporary sanitary latrines, one for male and another for female will also be installed. Improper sanitary facilities may cause health hazards to the laborers and that may reduce the work efficiency. There is functional storm water drainage system all around the proposed site for labor shed that will facilitate easy surface runoff. Following measures should be taken to avoid or minimize the health hazard:

- Two labor camps with raised platform should be constructed at the separate sides of the site with separate toilet facilities to ensure the safety and security of female workers.
- The contractor will install separate sanitary latrines for male and female workers. The latrines should have washing facilities (availability of water and soap).
- The labor shed shall be with the facilities like; mosquito nets, cooking arrangement, water supply, waste bins, lighting etc.
- A temporary drain for the kitchen waste water is to be provided and rain water drainage around the camp site is to be provided for easy surface runoff.

7.2. Potential Significant Environmental Impacts during Construction Phase

7.2.1. Pollution from the construction materials and equipment

A wide variety of construction materials and equipment will be used during construction which required to be dumped at the site. Construction spoils such as accidental leakage of the oil, grease, and fuel in equipment yards might have a significant hazard. Surface water and soil quality might be polluted from these contaminants. Dumping of construction material such as sand, brick chips, cement etc might have a significant impact on air quality. The people to be engaged for the construction activities may also impede the physical and human habitats of the area.

The impacts to be caused by construction materials and equipment can be avoided or minimized by adopting the following mitigation and enhancement measures:

- Safe transport, storage, and disposal of the construction materials, and the equipment have to be carried out in order to avoid the accidental spillage and loss;

- Raised platform (brick soling with neat cement finishing to keep the materials) shall be constructed prior to start working (to be included with environmental safeguard items in the bidding document).
- Leakage fuel and lubricants from equipment will be collected by separate container for reuse or safe disposal. So that it cannot be spread and pollute adjacent areas.

7.2.2. Impact due to solid waste disposal

Solid waste will be generated during construction works and in the labor shade and kitchen. The improper solid waste management activities during construction period may damage both the construction site, labor shared areas and local environment.

The impacts to be caused due to solid waste generation can be avoided or minimized by adopting the following mitigation and enhancement measures:

- Within the construction site, a number of waste bins will have to be provided by the contractor; and
- The Contractor will be responsible to deposit the every generated waste in a safe place and that will be carried by conservancy unit of the Municipality to the dumping yard or landfill site.

7.2.3. Impact due to labor camp and its sanitary latrine

Two separate labor camps, one for male and another for female will be constructed at the site before starting the construction activities. If the labor camps are not constructed with minimum raised platform and not cleaned properly, that will create health hazard to the laborers. Improper sanitary facilities may cause health hazards to the laborers and that may reduce the work efficiency.

The impacts to be caused due to labor camps and its sanitary latrine can be avoided or minimized by adopting the following mitigation and enhancement measures:

- Two labor camps with raised platform should be constructed at the separate sides of the site with separate toilet facilities to ensure the safety and security of female workers.
- The contractor will install separate sanitary latrines for male and female workers. The latrines should have washing facilities (availability of water and soap).
- The labor shed shall be with the facilities like; mosquito nets, cooking arrangement, water supply, waste bins, lighting etc.
- A temporary drain for the kitchen waste water is to be provided and rain water drainage around the camp site is to be provided for easy surface runoff.

7.2.4. Impact due to inadequate drinking water supply

Safe drinking water supply is important for the construction workers such as labors, engineers, supervisors during construction work. If sufficient drinking water is not supplied during construction, it may cause health damage to them.

The impacts to be caused due to inadequate drinking water supply can be avoided or minimized by adopting the following mitigation and enhancement measures:

- The contractor will install tube well or ensure pipe line water supply as considered in the BOQ (environmental safeguard component) prior to starting the construction works;
- The water quality will have to be tested for its quality judgment in a regular interval.

7.2.5. Planning for transportation before starting works

During construction phase, some additional traffic will be accumulated for bringing the construction material and equipment. This traffic may cause temporary congestion on the roads nearby subproject areas. It is anticipated that the subproject activities will not create any severe impact on the local traffic system, because movement of the vehicles and equipment will be only for a short time and as per requirement. The on-site subproject activities do not have any impact on the local traffic system during construction phase, because the works will be done in a confined area. However, during operational phase, improper and roadside parking may create localized traffic congestion.

The impacts to be caused due to transportation of vehicles to be used for construction works can be avoided or minimized by adopting following measures:

- Any materials required for construction should be transported at night time (within 10.00 pm – 6.00 am) to avoid local traffic congestion;
- Proper vehicle movement schedule should be maintained in consultation with local people;
- Unloading of materials should be done inside project areas;
- Traffic control manpower will be deputed during construction and operation period;
- Control sign should be provided to regulate traffic movement;
- Safety arrangement should be inserted in the safeguard cost in BOQ.

7.2.6. Impact due to earth work

No earth work will be required as the proposed subproject will be constructed at the top of the existing structure.

7.2.7. Clogging of local drain water

There is a possibility to clog the local drain with construction materials kept at the subproject site as there is an open storm drain at the south side of the kitchen market.

The impacts to be caused due to clogging of local drain water can be avoided or minimized by adopting the following mitigation and enhancement measures:

- Construction materials should be kept within a corner of construction area;
- Contractor will ensure proper disposal of construction wastes and that should not be disposed to the local drains.

7.2.8. Impact on air quality due to dust and emission of carbon dioxide

Different construction activities such as handling of construction materials (stone/brick chips, sand, and cement), rod fabrication, movement of trucks with construction materials etc. may generate dust and damage the air quality. The air quality in the area can be affected by emission of carbon dioxide of the construction trucks and other equipment that uses gasoline, and the unpleasant smell of paint and thinners that will be used during painting. This might affect the health of the people passing by or living around and working within the area.

The impacts on air quality to be caused due to dust and emission of carbon dioxide can be avoided or minimized by adopting the following mitigation and enhancement measures:

- Water should be sprayed to control the dust at day time;
- The trimming activity using odorless paints should be minimized;
- The condition of combustion-engine powered machine should be maintained;
- Low-sulfur fuels should be employed;
- Construction material should be transported through truck covered by tarpaulin; and
- The construction period condition of Air quality should be tested in laboratory.

7.2.9. Impact on noise level

Different activities during construction work such as movement of vehicles, concrete mixer machine and crushing bricks at site may generate a significant level of noise. Concrete casting, cutting of steel for reinforcement etc. may also cause noise hazard.

The impacts on noise level can be avoided or minimized by adopting the following mitigation and enhancement measures:

- Construction materials should be transported with scheduled time;
- All powered mechanical equipment and machinery should be fitted with noise abating gear such as mufflers for effective sound reducing device;
- The use of personal protective equipment like helmet, goggles, ear plug, gloves, safety boot etc. should be ensured;
- The crushing of bricks/ stones should not be allowed at the project site. Broken brick or stone chips should be collected from distanced source to the subproject site for construction purpose; and
- Separate batch plant might be used for concreting work (Ready Mix Concrete if available).

7.2.10. Impact on surface water quality

There are no bodies adjacent to the subproject site and no demolition work is required for the construction of the subproject. However, improper storage of different construction supplies such as fine sand, considerable gravel and alike will affect the quality of the run-off water that will run down on drainage areas.

The impacts on surface water quality can be avoided or minimized by adopting the following mitigation and enhancement measures:

- Waste material in any form should not be thrown in storm drainage system;
- Proper construction management including waste management, training of operators and workers will be provided to avoid pollution of water bodies or nearby habitants; and
- Waste bins are to be provided at different location of working and living places.

7.2.11. Contingency planning for any uneven situation

There are so many unwanted happenings may occur during construction periods. Proper contingency planning is required for overcoming any unwanted situation, otherwise, that will hamper the progress of works. As a precaution, proper contingency planning is essential for smooth progress.

In order to avoid or reduce the impact of any uneven situation, following contingency measures should be taken in advance as precaution:

- All the emergency telephone numbers of all the departments like Police station, fire service and civil defense, truck and bus stands, hospitals, clinics, etc. should be available at site;
- There should be standby transport facilities to deal any accidental case;
- There should be a provision for fast-aid box and emergency on-call physician.
- The storage of the construction materials should be done in such a way that it might not create obstacle for movement of vehicles and pedestrians.

7.2.12. Occupational health and safety

The occupational health and safety is an important issue for any construction activities. It primarily focuses on work equipment and protective gears to avoid or minimize the risks. The Contractor should give especial attention on workers' health and safety during construction work. The most important risks associated with the construction activities are listed below:

- Risks of using of the machineries in motion such as steel cutter, glass cutter etc.;
- Risk of falling from the height during chipping, plastering work, painting work etc.;
- Risk from drop down of the materials from the height during chipping, plastering work, painting work etc.;
- Risk from mechanical failure of the equipment such as pile rig and winch machine;

- Risk from the traffic collision or accidents during operation of the equipment such as hydraulic excavator, steel cutter, pile rig, winch machine, welding machine, and vehicles movement for the transportation activities of the subproject;
- Risks from head loads for carrying soil, construction materials and construction equipment;
- Risk associated to the sudden bad weather working conditions such as storm, thunder storm and earth quake etc.
- Exposure to the sunlight- workers are being exposed to the sun for long hours;
- Exposure to the high temperature, and humidity for a long time resulting in dehydration;
- Contact with the hazardous substances and wastes pose risks of the infections and diseases.

The key salient features of the general requirements for the workers' health and safety stated are presented in **Table 7.1**.

Table 7-1: General requirements for the workers' health and safety

Issues	Requirements
Health and Hygiene	• Protection against dust and furnace by using of the nose masks and covering of the head and body; • Laborers will use proper safety belts during work at high altitude • Ensure availability and using proper PPE (helmet, gloves, safety glass, safety shoes etc.) of all workers during work. • Provide construction workers with basic information on infectious diseases including HIV/AIDS • Proper scaffolding should be made available during construction • Proper disposal of the wastes and effluents; • Introduce waste bins for the solid waste management system.
Safety and Fast Aid Box	• Using of the personal protective equipment (helmet, gloves, goggles, nose mask, safety boots); • Precautions during work on or near machineries in motion; • Head loads are prohibited; • First aid facilities should be provided and maintained; • The first aid kit should include adhesive bandages, regular strength pain medication, gauze, and low grade disinfectant.
Compensation for Accidents at Work	• Contractors will bear medical treatment costs. If any sever accidents such as loss of hands, legs or loss of working ability or any case of death needs compensation-(the amount of the

Issues	Requirements
	compensation should be fixed considering the type of accidents).
Dust and Fumes	• For any dust, fumes, or other impurities likely to be injurious to the workers, effective measures shall be taken to prevent their accumulation and its inhalation by the workers.
Over-crowding	• No labor room should be over-crowded, the labor camp should be provide 15 ft x 30 for male and 12 ft x 15 ft for female workers.

7.2.13. Impact on local community

The construction of subproject can cause air pollution and noise pollution during construction phase due to blow of dust and emission of gases during vehicle movement, generation of high sound during using equipment for mixing etc that may affect community people living surrounding the construction site. In addition, there might be a conflict with community people in any uncertain events.

Following measures should be taken to avoid or minimize the local community impacts:

- Community people should be oriented to use masks during their movement near construction site;
- Construction equipment and machineries should not be used at night;
- Orientation and training will be provided to the contractors, supervisors and workers, on health, safety and environment including sexual diseases control (as of BOQ);
- Liaison with the communities will be maintained throughout the construction phase;
- Grievance redress mechanism has been established at the sub-project site.
- A detail disclosure on sub-project to be hanged at the visible side where community can see and read

7.2.14. Labor influx and anticipated impacts

The subproject has a positive impact on labor engagement since it will attract employment of local laborers. The most of the works will be done by the local laborers and there is very limited chance of engagement of outside laborers. So, the labor influx will be minimum in the construction of sub-project. There is a chance to avoid female workers from poor households to be employed in construction activities.

Following measures should be taken to avoid or minimize the impact on labor influx:

- Laborers from the local community should be employed in construction activities;

- Female laborers from poor households should be given highest priority to employ in construction activities.

7.3. Potential Significant Environmental Impacts and Its Mitigation and Enhancement Measures during Operational Phase

7.3.1. Air quality degradation

The emission of carbon dioxide of the cars to be used by the customers will be insignificant and there will be a parking place for the cars at 100 meters distance from the proposed subproject site which will avert the air pollution. However, unpleasant smell of paints and thinners that will be used during painting and bad odor from the solid wastes materials to be generated from the kitchen market can affect the air quality. This might affect the health of the people customers or people living and working within the area.

The following mitigation and enhancement measures should be taken to minimize the air quality degradation:

- Odorless and lead free paints available in the market should be used;
- Control any likely bad odor generated from the waste materials;
- Ensure effective solid waste management facilities.

7.3.2. Noise pollution

No private car will be allowed at the kitchen market area. Therefore, there is no chance of noise pollution due to hydraulic horns by private car. However, the use of hydraulic horns by private cars at the parking place may create noise pollution. In addition, overcrowded customers during peak-hours of marketing can create minimum level of noise nuisance at the market place as well as at the nearby residents.

The following mitigation and enhancement measures should be taken to minimize the noise pollution:

- The traffic control authority should control the use of hydraulic horn in cars and minimize the traffic congestion at peak-hours at the parking place.

7.3.3. Solid wastes generation and disposal

Solid wastes such as leftover food, foils, bottle and plastic from food and drink can be generated at market premises by the customers. If these generated solid wastes are not disposed properly, it will create unhygienic environment at the market and customers will feel discomfort.

The following mitigation and enhancement measures should be taken to ensure proper solid waste disposal and minimize its impact on environment:

- Sufficient numbers of waste bins should be in place at market premises.
- Solid wastes to be generated at the market should be collected and disposed in selected landfill by the Municipality Authority.

7.3.4. Traffic congestion

There is a possibility of traffic congestion at the front side of the parking lot. The proposed kitchen market will be the hub of all essential goods of a household and most of the citizens can prefer this market for its diversified nature. As a result, people will use car, auto-rickshaw, easy-bike, non-motorized rickshaw etc for transportation from and to the market. It may cause traffic congestion at the parking lot. In addition, trucks those carrying goods to the market can cause traffic congestion.

The following mitigation and enhancement measures should be taken to minimize the impact of traffic congestions:

- Proper traffic control mechanism should be in place.

7.3.5. Accident due to fire hazard and electric short circuit

Fire hazard is a common threat to any establishments. Firing may occur due to negligence and poor understanding of safety systems. Fire hazard may come from short circuit or open burning of waste material at the market.

The following mitigation and enhancement measures should be taken to minimize the accident due to fire hazard and electric short circuit:

- Fire extinguisher should be used and be placed at the stair-case site in every floor.
- Touching electrical appliances with wet hands should be prohibited with properly visible danger sign.
- Faulty or malfunctioning electrical products should not be used.
- Training should be provided to use firefighting equipment when necessary.
- Regularly checking and maintenance the electrical line of the market should be done.

7.3.6. Waste water disposal

There is an existing waste water disposal system of the market and the nature of shops to be installed at the proposed floors of the subproject will not generate waste water (black water). But, as the proposed subproject is a part of total kitchen market and waste water (black water) to be generated due to animal blood, washed out water from fish sellers, etc requires waste water collection, treatment and disposal facilities. This waste water can be linked with local drain and decrease the water quality of outfall.

Following measures should be taken to minimize the impacts:

- Separate sewer lines should be in place for waste water to be generated at the market; or waste water tank should be constructed at the market and waste water should be collected by vacuum cleaner for proper disposal;
- Provision of soak pit is to be provided for disposal of waste water to be generated. On the bottom of soak pit 1.5 m depth filter bed (Sylhet Sand and brick chips, 1:1 proportion) is preferable;

- The waste water, after filtration through the soak pit, will not be harmful either to ground water or to the nearby drains/ surface water; and
- The soak pit will have to be cleaned in a regular interval (at least in every three months).

7.3.7. Fecal sludge management

Fecal sludge will be generated from toilets to be used by customers and shop keepers of the proposed subproject. It will be managed through on-site sanitation system i.e. by constructing septic tank and soak pit. If the septic tank is not cleaned in regular interval, it can be overflowed and cause environmental pollution.

The following mitigation and enhancement measures should be taken to ensure proper fecal sludge management and minimize its impacts on environment:

- The Municipality's conservancy unit will clean the septic tanks in regular interval; and
- The collected fecal sludge must be transported to fecal sludge treatment plant by using a vacuum truck.

7.3.8. Impact on local community

The proposed subproject has a positive impact on the community people by creating business and employment opportunity during operational phase. The shops of the market will be allocated among the eligible community people of the municipality thus creating business opportunity to generate income. It will also create employment opportunity for young people by engaging them in shops to be operated. Local people including both male and female should be given emphasis in case of allocating shops of the market.

8. ENVIRONMENTAL MANAGEMENT PLAN

The objective of the environmental management plan (EMP) is to record environmental impacts resulting from the sub-project activities and to ensure implementation of the identified "mitigation measures", in order to reduce adverse impacts and enhance positive impacts. Besides, it would also address any unexpected or unforeseen environmental impacts that may arise during construction and operational phases of the sub-projects. The identified environmental impacts and its mitigation and enhancement measures are given in Table 8-1 as below:

8.1. Environmental Management Plan (EMP) Matrix

The anticipated environmental impacts and corresponding mitigation and enhancement measures have been outlined in **Table 8-1.**

Table 8-1: EMP matrix of the proposed Kitchen Market

Issues/ Environmental impact	Mitigation and enhancement measures to be taken	Location	Timing	Responsible organization	
				Implementation	Supervision/ Monitoring
Pre-construction phase					
Environmental clause in the contract	• Incorporate environmental clauses in bid and contract document	At the Bhola Municipality	Before bidding or contract	PIU of Bhola Municipality	PIU of Bhola Municipality and PMU of MGSP under BMDF
Construction vehicles and machinery	• Trial run of vehicles and machinery to be used to confirm that their conditions, level of emissions of pollutants and noise level will not cause serious damages to the surrounding environment.	At the construction site, or vehicle depot	Before the commencement of construction	Contractor	PIU of Bhola Municipality and PMU of MGSP under BMDF
Air, water and noise quality laboratory test	• The base line condition of Air, Water and Noise quality of proposed kitchen market should be tested in laboratory	Proposed site	Pre-construction	Contractor	PIU of Bhola Municipality and PMU of MGSP under BMDF
Construction phase					
Pollution from the construction materials and equipment	• Safe transport, storage, and disposal of the construction materials, and the equipment have to be carried out in order to avoid the accidental spillage and loss; • Raised platform (brick soling with neat cement finishing to keep the materials) shall be constructed prior to start working (to be	At the Construction site	During construction period	Contractor	PIU of Bhola Municipality and PMU of MGSP under BMDF

Issues/ Environmental impact	Mitigation and enhancement measures to be taken	Location	Timing	Responsible organization	
				Implementation	Supervision/ Monitoring
	included with environmental safeguard items in the bidding document). • Leakage fuel and lubricants from equipments will be collected by separate container for reuse or safe disposal. So that it cannot be spread and pollute adjacent areas.				
Solid waste disposal	• Within the construction site, a number of waste bins will have to be provided by the contractor, • The Contractor will be responsible to deposit the every generated waste in a safe place and that will be carried by conservancy unit of the Municipality to the dumping yard or landfill site. • Contactor will carry out the pile slurry to a safe place and that safe place shall be selected earlier (before pile diving).	At the Construction site	During construction period	Contractor	PIU of Bhola Municipality and PMU of MGSP under BMDF
Labor camp and its Sanitary latrine	• Two labor camps with raised platform should be constructed at the separate sides of the site with separate toilet facilities to ensure the safety and security of female workers. • The contractor will install separate sanitary latrines for male and female workers. The latrines should have washing facilities (availability of water and soap). • The labor shed shall be with the facilities like; mosquito nets, cooking arrangement, water	At the Labor camp and construction site	During construction period	Contractor	PIU of Bhola Municipality and PMU of MGSP under BMDF

Issues/ Environmental impact	Mitigation and enhancement measures to be taken	Location	Timing	Responsible organization	
				Implementation	Supervision/ Monitoring
	supply, waste bins, lighting etc. • A temporary drain for the kitchen waste water is to be provided and rain water drainage around the camp site is to be provided for easy surface runoff.				
Inadequate drinking water supply	• The contractor will install tube well or ensure pipe line water supply as considered in the BOQ (environmental safeguard component) prior to starting the construction works; • The water quality will have to be tested for its quality judgment in a regular interval.	At the Labor camp and construction site	During construction period	Contractor	PIU of Bhola Municipality and PMU of MGSP under BMDF
Transportation before starting works	• Any materials required for construction should be transported at night time (within 10.00 pm – 6.00 am) to avoid local traffic congestion; • Proper vehicle movement schedule should be maintained in consultation with local people; • Unloading of materials should be done inside project areas; • Traffic control manpower will be deputed during construction and operation period; • Control sign should be provided to regulate traffic movement; • Safety arrangement should be inserted in the safeguard cost in BOQ.	At the Construction site	During construction period	Contractor	PIU of Bhola Municipality and PMU of MGSP under BMDF
Clogging of local	• Construction materials should be kept within a corner of construction area;	At the Construction	During construction	Contractor	PIU of Bhola Municipality

Issues/ Environmental impact	Mitigation and enhancement measures to be taken	Location	Timing	Responsible organization	
				Implementation	Supervision/ Monitoring
drain water	• Contractor will ensure proper disposal of construction wastes and that should not be disposed to the local drains.	site	period		and PMU of MGSP under BMDF
Air quality due to dust and emission of carbon dioxide	• Water should be sprayed to control the dust at day time; • The trimming activity using odorless paints should be minimized; • The condition of combustion-engine powered machine should be maintained. • Low-sulfur fuels should be employed; • Construction material should be transported through truck covered by tarpaulin. • The construction period condition of Air quality should be tested in laboratory.	At the Construction site and surrounding areas	During construction period	Contractor	PIU of Bhola Municipality and PMU of MGSP under BMDF
Noise level	• Construction materials should be transported with scheduled time; • All powered mechanical equipment and machinery should be fitted with noise abating gear such as mufflers for effective sound reducing device; • The use of personal protective equipment like helmet, goggles, ear plug, gloves, safety boot etc. should be ensured; • The crushing of bricks/ stones should not	At the Construction site and surrounding areas	During construction period	Contractor	PIU of Bhola Municipality and PMU of MGSP under BMDF

Issues/ Environmental impact	Mitigation and enhancement measures to be taken	Location	Timing	Responsible organization	
				Implementation	Supervision/ Monitoring
	be allowed at the project site. Broken brick or stone chips should be collected from distanced source to the subproject site for construction purpose. • Separate batch plant might be used for concreting work (Ready Mix Concrete if available).				
Surface water quality	• Waste material in any form should not be thrown in storm drainage system; • Proper construction management including waste management, training of operators and workers will be provided to avoid pollution of water bodies or nearby habitants. • Waste bins are to be provided at different location of working and living places.	At the Construction site and surrounding areas	During construction period	Contractor	PIU of Bhola Municipality and PMU of MGSP under BMDF
Uneven situation	• All the emergency telephone numbers of all the departments like Police station, fire service and civil defense, truck and bus stands, hospitals, clinics, etc. should be available at site; • There should be standby transport facilities to deal any accidental case; • There should be a provision for fast-aid box and emergency on-call physician.	At the Construction site and surrounding areas	During construction period	Contractor	PIU of Bhola Municipality and PMU of MGSP under BMDF

Issues/ Environmental impact	Mitigation and enhancement measures to be taken	Location	Timing	Responsible organization	
				Implementation	Supervision/ Monitoring
	• The storage of the construction materials should be done in such a way that it might not create obstacle for movement of vehicles and pedestrians.				
Occupational health and safety	• Protection against dust and furnace by using of the nose masks and covering of the head and body; • Labors will use proper safety belts during work at high altitude • Ensure availability and using proper PPE (helmet, gloves, safety glass, safety shoes etc.) of all workers during work. • Provide construction workers with basic information on infectious diseases including HIV/AIDS • Proper scaffolding should be made available during construction • Proper disposal of the wastes and effluents; • Introduce waste bins for the solid waste management system. • Using of the personal protective equipment (helmet, gloves, goggles, nose mask, safety boots); • Precautions during work on or near	At the Construction site and surrounding areas	During construction period	Contractor	PIU of Bhola Municipality and PMU of MGSP under BMDF

Issues/ Environmental impact	Mitigation and enhancement measures to be taken	Location	Timing	Responsible organization	
				Implementation	Supervision/ Monitoring
	machineries in motion; • Head loads are prohibited; • First aid facilities should be provided and maintained; • The first aid kit should include adhesive bandages, regular strength pain medication, gauze, and low grade disinfectant. • Contractors will bear medical treatment costs. If any sever accidents such as loss of hands, legs or loss of working ability or any case of death needs compensation- (the amount of the compensation should be fixed considering the type of accidents). • For any dust, fumes, or other impurities likely to be injurious to the workers, effective measures shall be taken to prevent their accumulation and its inhalation by the workers. • No labor room should be over-crowded, the labor camp should be provide 15 ft x 30 for male and 12 ft x 15 ft for female workers.				

Issues/ Environmental impact	Mitigation and enhancement measures to be taken	Location	Timing	Responsible organization	
				Implementation	Supervision/ Monitoring
Impact on local community	▪ Community people should be oriented to use masks during their movement near construction site; ▪ Construction equipment and machineries should not be used at night. ▪ Orientation and training will be provided to the contractors, supervisors and workers, on health, safety and environment including sexual diseases control (as of BOQ), ▪ Liaison with the communities will be maintained throughout the construction phase. ▪ Grievance redress mechanism has been established at the sub-project site. ▪ A detail disclosure on sub-project to be hanged at the visible side where community can see and read.	At the Construction site and surrounding areas	During construction period	Contractor	PIU of Bhola Municipality and PMU of MGSP under BMDF
Impact on labor influx	• Laborers from the local community should be employed in construction activities. • Female laborers from poor households should be given highest priority to employ in construction activities.	At the Construction site	During construction period	Contractor	PIU of Bhola Municipality and PMU of MGSP under BMDF

Issues/ Environmental impact	Mitigation and enhancement measures to be taken	Location	Timing	Responsible organization	
				Implementation	Supervision/ Monitoring
Operation phase					
Air quality degradation	• Odorless paints available in the market should be used; • Avoid any likely bad odor generated from the waste materials; • Ensure effective solid waste management facilities. • The operational phase condition of Air quality should be tested in laboratory.	At the market	During operational period	Market management committee	PIU of Bhola Municipality
Noise pollution	• The traffic control authority should control the use of hydraulic horn in cars and minimize the traffic congestion at peak-hours at the parking place. • The operational phase condition of noise level should be tested in laboratory.	At the market	During operational period	Market management committee	PIU of Bhola Municipality
Solid wastes generation and disposal	• Sufficient numbers of waste bins should be in place at market premises. • Solid wastes to be generated at the market should be collected and disposed in selected landfill.	At the market	During operational period	Market management committee	PIU of Bhola Municipality
Traffic congestion	• Proper traffic control mechanism should be in place.	At the parking lot	During operational period	Market management committee	PIU of Bhola Municipality

Issues/ Environmental impact	Mitigation and enhancement measures to be taken	Location	Timing	Responsible organization	
				Implementation	Supervision/ Monitoring
Accident due to fire hazard and electric short circuit	• Fire extinguisher should be used and be placed at the stair-case site in every floor. • Touching electrical appliances with wet hands should be prohibited with properly visible danger sign. • Faulty or malfunctioning electrical products should not be used. • Training should be provided to use firefighting equipment when necessary. • Regularly checking and maintenance the electrical line of the bus terminal should be done.	At the market	During operational period	Market management committee	PIU of Bhola Municipality
Fecal sludge management	• The Municipality's conservancy unit will clean the septic tanks in regular interval; • The collected fecal sludge must be transported to fecal sludge treatment plant by using a vacuum truck.	At the market	During operational period	Conservancy Unit of the Municipality	PIU of Bhola Municipality

8.2. Environmental Monitoring Plan

The Environmental Monitoring is important to record environmental impacts resulting from the subproject activities and to ensure implementation of the mitigation measures identified earlier in order to reduce adverse impacts and enhance positive impacts from the subproject activities. The environmental monitoring should be done at both constructional and operational phases.

Environmental monitoring requires a set of indicators that could be conveniently measured, assessed and evaluated periodically to observe the trends of change in base line environmental quality.

The following environmental monitoring plan should be adopted to monitor the activities of both construction and operational phases mentioned in the environmental management plan.

8.2.1. Monitoring during construction phase

The mitigation or enhancement measures outlines in EMP should be monitoring during construction period with regular interval in order to ensure its effective implementation to avoid the adverse effect of subproject activities and to gain the positive impacts resulting for the activities. The environmental monitoring plan during the construction period is given in Table 8-2 as below:

Table 8-2: Environmental Monitoring Plan during construction phase (visual observation)

Monitored Parameter/ Issues	Monitoring Method/ Key Aspects	Location of Monitoring	Frequency of Monitoring
Safety orientation and training of workers	Frequency of training & orientation of workers for safety	Subproject site	• Once in a month • Reporting: Once in a month
Personal Protective Equipment	Ensure every single person involved in the activities wear and use safety equipment	Subproject site	• Daily • Reporting: Once in a month
Worker's health	Monitoring process of worker's health	Subproject site	• Daily • Reporting: Once in a month
Sanitation & drinking water facility to the workers	Availability of safe drinking water and sanitation to the workers	Subproject site	• Daily • Reporting: Once in a month
Incident record and reporting	Documented record of all incident, accident, and its remedial process	Subproject site	• Daily • Reporting: Once in a month

Site security/ Fencing at the site	Isolation of site from general access by fencing, restriction of the un-authorized entry in the site.	Subproject site	• Daily • Reporting: Once in a month
Bulletin/ announcement boards/ prohibition signs	Visible in good condition or not	Subproject site	• Daily • Reporting: Once in a month
Equipment /vehicles	-Switched-off diesel engines when not in use; -Search any possible leakage; -Fuelling.	Subproject site	• Daily • Reporting: Once in a month
Solid waste generation	Quantity of solid wastes and disposal	Subproject site	• Daily • Reporting: Once in a month
Gender equity	Direct survey in the field by interviews with the women in order to ensure that there is no any gaps between man and women	Subproject site	• Daily • Reporting: Once in a month
Child labor	No child will be engaged in the activities	Subproject site	• Daily • Reporting: Once in a month
Handling of hazardous materials	Fuelling, storage, operation	Subproject site	• Daily • Reporting: Once in a month

The environmental parameters to be monitored during construction phases are given in Table 8-3 as below:

Table 8-3: Environmental parameters to be monitored (during construction phase)

Monitored Parameter / Issues	Monitoring Method/Key Aspects	Location of Monitoring	Period & Monitoring Frequency
Air quality (SPM, PM_{10}, and $PM_{2.5}$)	• Visually-black smoke; • Sampling; • Analysis at laboratory; • analysis of merits determination by using quality standards;	Subproject site	• Two times during construction period; • Reporting: Immediately after analysis and once in a month as a regular basis

	• Through digital instruments.		
Noise level	• Through digital noise level meter	Subproject site	• Two times during construction period; • Reporting: Immediately after measurement and once in a month as a regular basis.
Water Quality	• Sampling; • Analysis at laboratory; • Analysis of merits determination by using quality standards; • Through digital instruments	Subproject site	• Two times during construction period; • Reporting: Immediately after measurement and once in a month as a regular basis.

8.2.2. Monitoring during operational phase

Environmental monitoring during operational phase is limited to a number of impact parameters to see the actual performance of the subproject. Monitoring of some issues might be necessary during the operational period of the subproject those are given in Table 8-4 as below.

Table 8-4: Environmental Monitoring plan during operation phase (visual observation)

SL No	Issue	Key aspects	Monitoring frequency per year
1	Complaint from local people	Any significant complain from local people and it's remedial procedure	4
2	Local drainage system	Maintaining proper drainage	4
3	Solid Waste Management	Proper management of solid wastes	4

The environmental parameters to be monitored during operational phase are given in **Table 8-5** as below:

Table 8-5: Environmental parameters to be monitored (monitoring frequency)

Parameter	Location	Monitoring frequency per year
Air quality (SPM, PM_{10}, and $PM_{2.5}$)	At the market areas	2
Water quality (BOD, pH, DO, TDS, Turbidity, NH_3)	At the nearby, surface water, ground water and drain water	2
Noise and Vibration	At the market	2

8.3. Grievance Redress Mechanism

The project-specific Grievance Redress Mechanism (GRM) will be established by the PIU of Bhola Municipality to receive, evaluate, and facilitate the solution of affected people's (Aps) concerns, complaints and grievances concerning the social and environmental performance of the subproject. The GRM is aimed to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the subproject.

The grievance mechanism is related to resolve the risks and adverse impacts of the subproject. It addresses APs' concerns and complaints promptly, using an understandable and transparent process that is also gender responsive, and culturally appropriate. It is readily accessible to all segments of the affected people at no costs and without retribution. The mechanism should not impede access to the country's judicial or administrative remedies. The affected people will be appropriately informed about the mechanism.

BMDF has its own Grievance Redress Procedure (GRP) and they operate it to address any dissatisfaction and complaints by the local people regarding its activities. This procedure is being applied to address any complaints or grievances through negotiations with the community leaders and representatives of the APs during implementation of the MGSP.

8.3.1. Grievance redress committee (GRC)

Bhola Municipality has formed a Grievance Redress Committee (GRC) headed by The Mayor. With the facilitation of Consultant, the Mayor nominated the GRC members and included representative from the Government Agencies, local NGO, and Civil Society. The GRC will nominate a focal person. Complaints will be received through drop box, by post, email and website of Municipality. The grievance box will be set up at construction site to received complaints. The grievance response focal point will be available at the Municipality for recording the complaints and necessary response to an aggrieved person. It will receive complaints or suggestions, and produce them to the GRC for hearing and resolution. If any complaint is not resolved at Municipality level then the complaint will be produced to MD-BMDF. If it is not resolved by the MD-BMDF, then the subproject will be dropped.

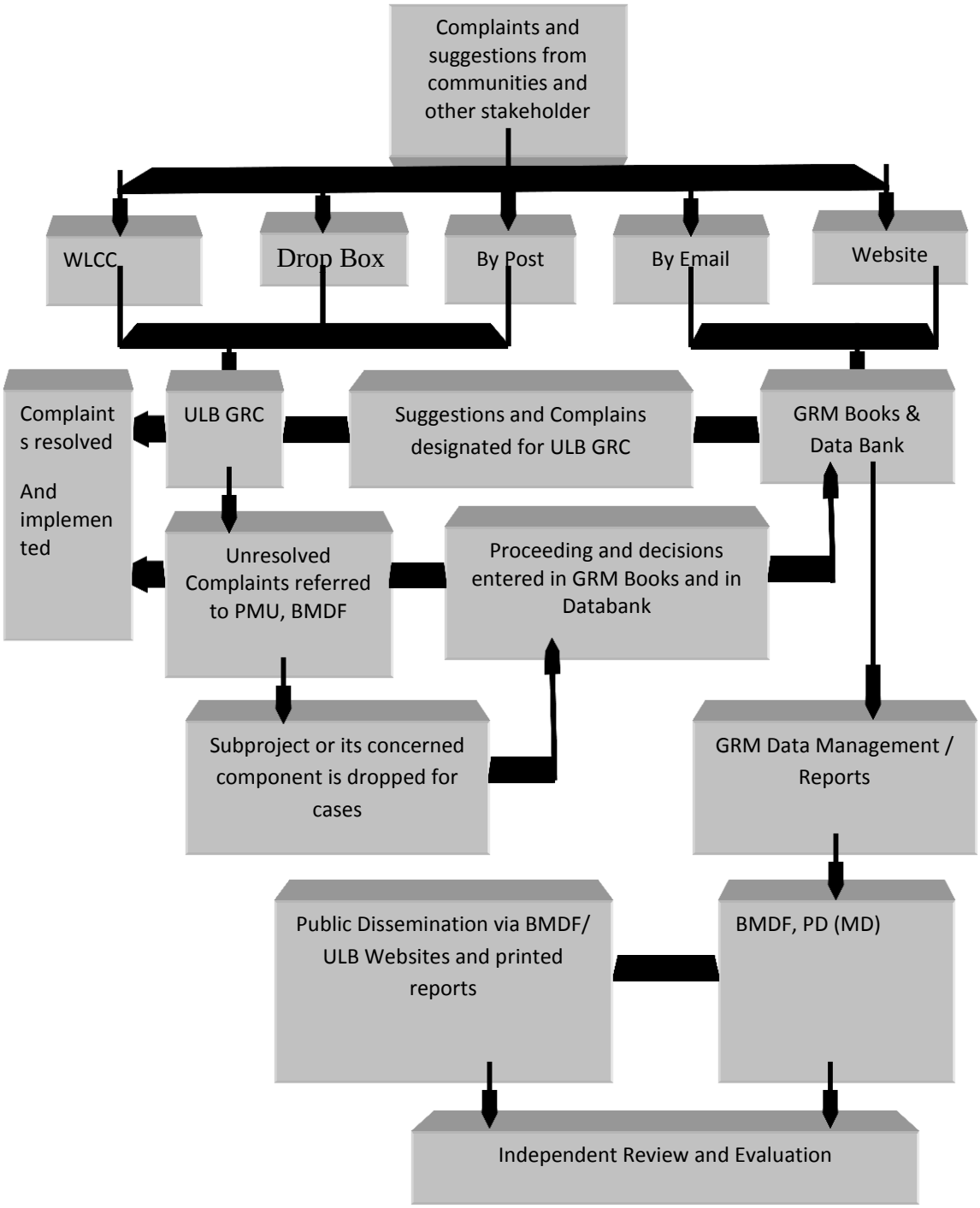
The structure of the GRC and membership are given as below:

Chairman	: ULB Mayor
Member-Secretary	: Head of the Engineering Section of ULB
Member	: Representative from local administration
	: Teacher from a local educational institution
	: Representative of a local NGO
	: Representative of civil society
	: Female ward councilor (of respective area)

The list of GRC members along with the notification from the Mayor is attached in **Annexure 5**.

8.3.2. Grievance resolution process

Given flow chart will be followed for grievance resolution process of this subproject.



Flow diagram 8-1: Grievance resolution process

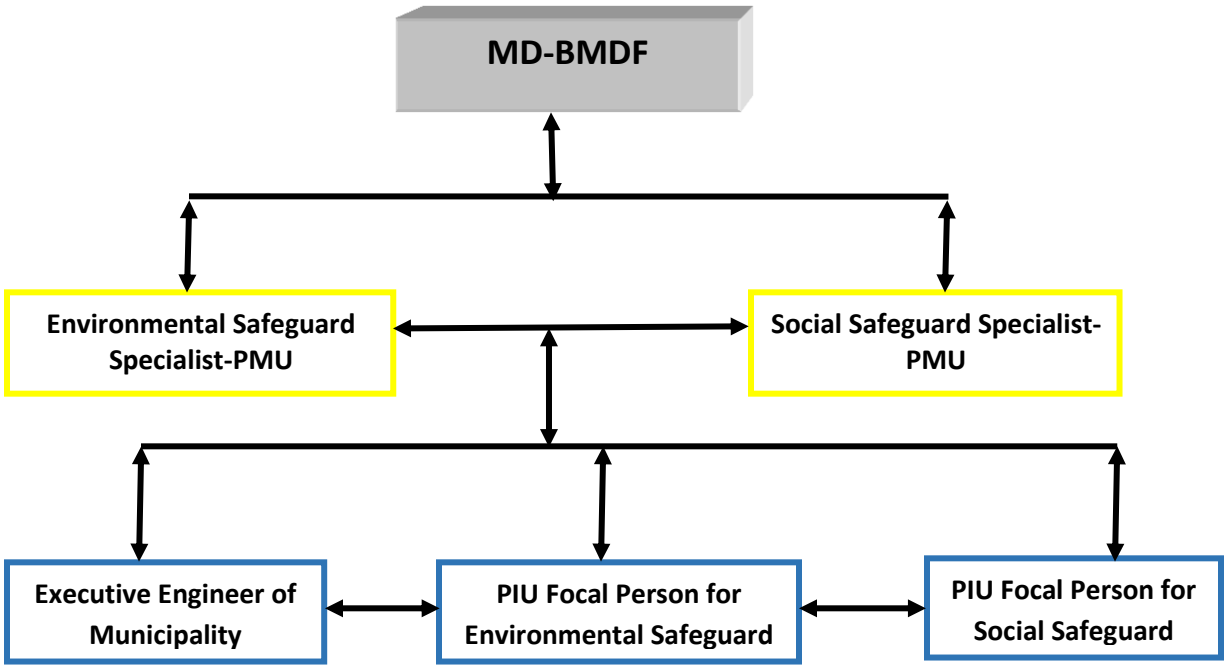
Note: If the appellant is still not satisfied, he or she has the right to take the case to the public courts. Bhola Municipality should also publish the outcome of the cases on the public notice

boards. All costs involved in resolving the complaints (meetings, consultations, communication, and information dissemination) will be borne by the Bhola Municipality. The Municipality authority will try to resolve the issues (in most of the cases, in amicable settlement) within shortest possible time. However, the public court system is always open to resolve the issues.

8.4. Institutional Arrangement for Implementation of EMP

The Environmental Safeguard Compliance issues are directly vested the Municipality Officials; especially the Executive Engineer will be responsible for supporting the construction supervision with the facilitation of BMDF. The civil works contractors will implement the environmental mitigation measures.

The BMDF, with the help of Environmental Safeguard Specialist will submit the monthly monitoring reports on Environmental Compliances to the World Bank.



Flow diagram 8-2: Institutional arrangement for implementation of EMP

8.5. Capacity Building

A two-day long training program in participation of PIU members of Bhola Municipality was organized by the PMU of BMDF to build the capability of PIU of Bhola Municipality. The Consultant, hired by the Bhola Municipality also participated in the training program. The PMU of BMDF organized this training program in order to enhance their capacity to conduct Environmental Assessment and Social Impact Assessment to be done for any proposed subproject. A series of sessions were conducted by the Specialists of the PMU of BMDF. The

major sessions includes: (i) Environmental Screening, (ii) EMP Implementation, including environmental monitoring requirements related to mitigation measures; and (iii) taking immediate action to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of the implementation. The PIU of Bhola Municipality will organized an orientation of contractor, workers and other support staff on environmental issues to be considered and mitigation measures to be taken during pre-construction, construction and operational phases before deploying to the work sites in order to achieve the expected standards.

8.6. Estimation of Environmental Safeguard Cost of EMP

Considering the environmental impacts and their mitigation measures for the subproject, several items are included in the BOQ for the environmental management. **Table 8-6** presents the estimated cost during construction phase and **Table 8-7** presents the estimated cost during operation phase for the environmental management. Cost during construction phase will be included in BOQ but Cost during operation phase will be bearded by Bhola Municipality.

Table 8-6: Environmental Management Budget during construction phase

Item No.	Description of the Items	Costs (BDT)
1	Establishment of labor camp (male shed - 15 ft x 30 ft and female shed 12 ft x 15 ft1) with living arrangement, drinking water facilities, cooking arrangement, mosquito net, waste bin etc.	200,000.00
2	Masonry pucca platform (at least 100 sft size), providing brick soling and net cement finishing for keeping fuel and lubricants for machineries.	15,000.00
3	Arrangement of temporary/ earthen drainage to drain out extra water logging due to rain and during construction works. All the temporary drains shall be filled up properly either at the end of event or at the end of works	50,000.00
4	Dust suppression measures by water spraying throughout the construction period in and around the subproject site, uncovered aggregates and loose materials such as stockpiles of the sands, excavated earth etc.	90,000.00
5	Air quality (SPM, PM_{10}, and PM $_{2.5}$) measurement- it can be measured from the recognized environmental survey company, public institute/ university one time before starting construction, three times during construction phase	120,000.00
6	Noise level measurement- it can be measured from the recognized environmental survey company, public institute/ university three times during construction phase and one time after construction	30,000.00

7	Water quality (pH, DO, TDS, BOD, Turbidity, NH_3)of market side drain and underground water measurement- it can be measured from the recognized environmental survey company, public institute/ university one time before starting the construction and three times during construction phase	40,000
8	Wastes disposal facility during the construction period; collection, transportation, and dumping of the wastes at landfill site and providing sufficient bins; at least 6 bins (500 litre size) to be provided.	90,000.00
9	Water supply facilities (for the labor shed and work site):1 no. of tube well (depending on the site condition the contractor will select the option)	60,000.00
10	Sanitation facilities (at the labor shed): 2 nos. of the toilets preferably portable toilets (1 no. for women and 1 no. for men)	50,000.00
11	Providing PPE like hand gloves, spectacles for eye protection, helmets, masks, visible jacket, ear plug, safety boots for at least 30 person (25 for workers and 5 for visitor) and one first aid box with necessary medicine	100,000.00
12	Cautionary signs - 8 nos.	15000.00
	Total	**840,000.00**

Table 8-7: Environmental Management Budget during operation phase (Annual)

Item No.	Description of the Items	Costs (BDT)
1	Air quality (SPM, PM_{10}, and $PM_{2.5}$) measurement- it can be measured from the recognized environmental survey company, public institute/ university two times per year at operation	60,000.00
2	Noise level measurement- it can be measured from the recognized environmental survey company, public institute/ university two times per year at operation	20000.00
3	Water quality (pH, DO, TDS, BOD, Turbidity, NH_3) measurement. It can be measured from the pre-approved public institute/	30000.00

	university during operation period for waste water at underground water, drain and outfall @Tk. 10,000.00 per sample (2*3*5,000.00 Tk).	

Note: The environmental safeguard compliance issues and cost (like solid waste management, water supply, traffic management, drain cleaning, test of environment parameter etc.) are to be done by Market Management Committee and that is to be supervised by Bhola Municipality.

9. COMPLIANCE WITH ENVIRONMENTAL CODE OF PRACTICES

The environmental code of practices (ECoPs) provides guidelines for environment management of the subprojects to be implemented in different urban local bodies (ULBs) under MGSP. The main objective of the ECoP is to manage construction operations in harmony with the environment in an effort to contribute to the well-being of the community and the environment by (i) minimizing pollution, (ii) sustaining eco-systems, (iii) conserving cultural heritage, and (iv) enhancing amenity. In compliance with ECoP, following issues associated with the proposed subproject are addressed during environmental assessment:

- Planning and design of the subproject;
- Site preparation;
- Construction camps;
- Waste management;
- Water bodies;
- Water quality;
- Drainage;
- Public health and safety;
- Material storage, transport and handling;

In this assessment, it is found that some of the issues are not relevant to this subproject. The issues those are found as relevant are addressed properly in this report.

10. PUBLIC CONSULTATION AND ACCESS TO INFORMATION

10.1. Introduction

Pubic Consultation is an effective tool for maintaining communication among the Municipality authority, BMDF as funding authority, different stakeholders of the subproject and community people where the subproject will be implemented. It helps to facilitate and streamline decision making as well as fosters an atmosphere of common understanding among individuals, group and organizations that could be affected or be affected by the subproject. It also ensures the transparency of the subproject at all levels of planning, design, construction and operation. It is a continuous process by which opinion from public is sought on matters affecting them. Hence, as a part of IEE/EIA, an effective public consultation and access to information is important.

10.2. Objectives

The main objectives of the public consultation and access to information under this subproject are: (i) to generate public awareness by providing information about the subproject to all stakeholders, particularly the subproject affected persons (PAPs) in a timely manner, and (ii) to provide opportunity to the stakeholders to raise their opinions and concerns on different aspects of the subproject.

10.3. Methodology

Public consultation about the planning, design, implementation and operation is done at different stages following different participatory methods. The methods followed in public consultation are: (1) consultative meeting with different stakeholders, (ii) Focus group discussion with community people through the participation of male participants, and (iii) Focus group discussion with community people through the participation of female participants, girls and boys, and disable people.

One consultative meeting was organized at community level through the participation of concern Councilor of Bhola Municipality, traders, shopkeepers, local leaders, community elites and representatives of business men surrounding the market area. The participants were informed about the detail design and activities of subproject going to be implemented. Environmental screening of the subproject was also done in this meeting using the prescribed form mentioned in EMF of BMDF. They were asked to share their opinion, feedback and suggestions on environmental and social impacts of the subprojects as well as the mitigation measures to avoid or reduce the potential impacts.

Picture 2: Consultative meeting with stakeholders

Picture 3: FGD with community people (male)

One focus group discussion was organized with male community participants from different professions residing surrounding the subproject site. The participants were informed about the detail design and activities of subproject going to be implemented and asked about their opinion, feedback and suggestions

on environmental and social impacts of the subprojects as well as the mitigation measures to avoid or reduce the potential impacts.

Another focus group discussion was organized with female community participants came to the market and living around the subproject site. The participants were also informed about the detail design and activities of subproject going to be implemented and asked about their opinion, feedback and suggestions on environmental and social impacts of the subprojects as well as the mitigation measures to avoid or reduce the potential impacts on women's point of view. In this session, boys and girls, and disable people were also present.

Picture 4: Consultation with community people (female)

Special efforts were made to include the elderly, women, and vulnerable groups and to allow them to express their views regarding the subproject implementation. In all cases, the impression of stakeholders and general mass regarding sub-project implementation was positive.

10.4. Issues Raised by the Participants

Following issues were raised during community consultation:

- Noise pollution due to the construction work;
- Protect the spreading of construction materials during construction work;
- Traffic congestion;
- Solid waste management;
- Social security; and
- Quality of construction work.

10.5. Feedback, Suggestions, and Recommendations of the Participants

Local people felt encouraged about the vertical extension of the kitchen cum municipal market where varieties types of commodities will be available. In addition, it will create more business opportunities and employment scope for the local people especially for young people. They suggested making the market environment friendly considering and addressing all predicted adverse effects related to abovementioned issues with the implementation of potential mitigation and enhancement measures during both construction and operational phases. Participants requested the Municipality authority to maintain the quality of the construction work of the building. Adjacent community peoples of the proposed site and the shopkeepers of the adjacent

commercial areas requested the Municipality authority to keep the noise level low and keep the construction work stopped after 10:00 pm at night, restrict the workers to visit adjacent areas, use quality construction materials, ensure proper traffic management and restrict the vehicles to enter into the narrow road, ensure proper solid waste management to be produced by the grocery and vegetable businessmen and customers, and honor the communities' comfort and over tranquility of the environment.

10.6. Access to Information

The environmental assessment report should be translated into Bengali and disseminated locally. The copies of the report (both in English and Bengali) will be sent to all the concerned personnel responsible for subproject implementation. It will also be made available to the public. The final assessment report (both English and Bangla) will also be uploaded in the Bhola Municipality website, BMDF website and the World Bank website after approval.

11. CONCLUSION AND RECOMMENDATIONS

11.1. Conclusion

On the basis of the findings of the environmental, it could be concluded that the subproject is environmentally sound and sustainable. The potential environmental impacts seem very minimum and manageable, and it would be minimized by taking proposed mitigation measures. The adverse environmental impacts from the subproject will mostly take place during the construction stage. No endangered or protected species of flora or fauna are reported at the subproject site. The benefits of the subproject will be significant by creating employment and business opportunities during the construction and operational phases. There is no significant cumulative adverse impact during operation that is identifiable at this stage. The proposed subproject activities have no significant adverse environmental impact so far as a time bound execution program with application of advanced construction technology is ensured. The mitigation measures are well within such codes and practices of construction and operation of the proposed subproject.

11.2.Recommendations

The attitude of the community people towards the vertical extension of kitchen cum municipal market with more facilities is positive as well as they have some recommendations to minimize some impacts of on the environmental and social environment during its construction and operation. The Government of Bangladesh and World Bank have some legal and social safeguard compliances issues those are applicable during constructing and operating the proposed subproject. Considering the above-mentioned issues and findings of the study, following key recommendations are made for smooth construction and successful operation of the bus terminal:

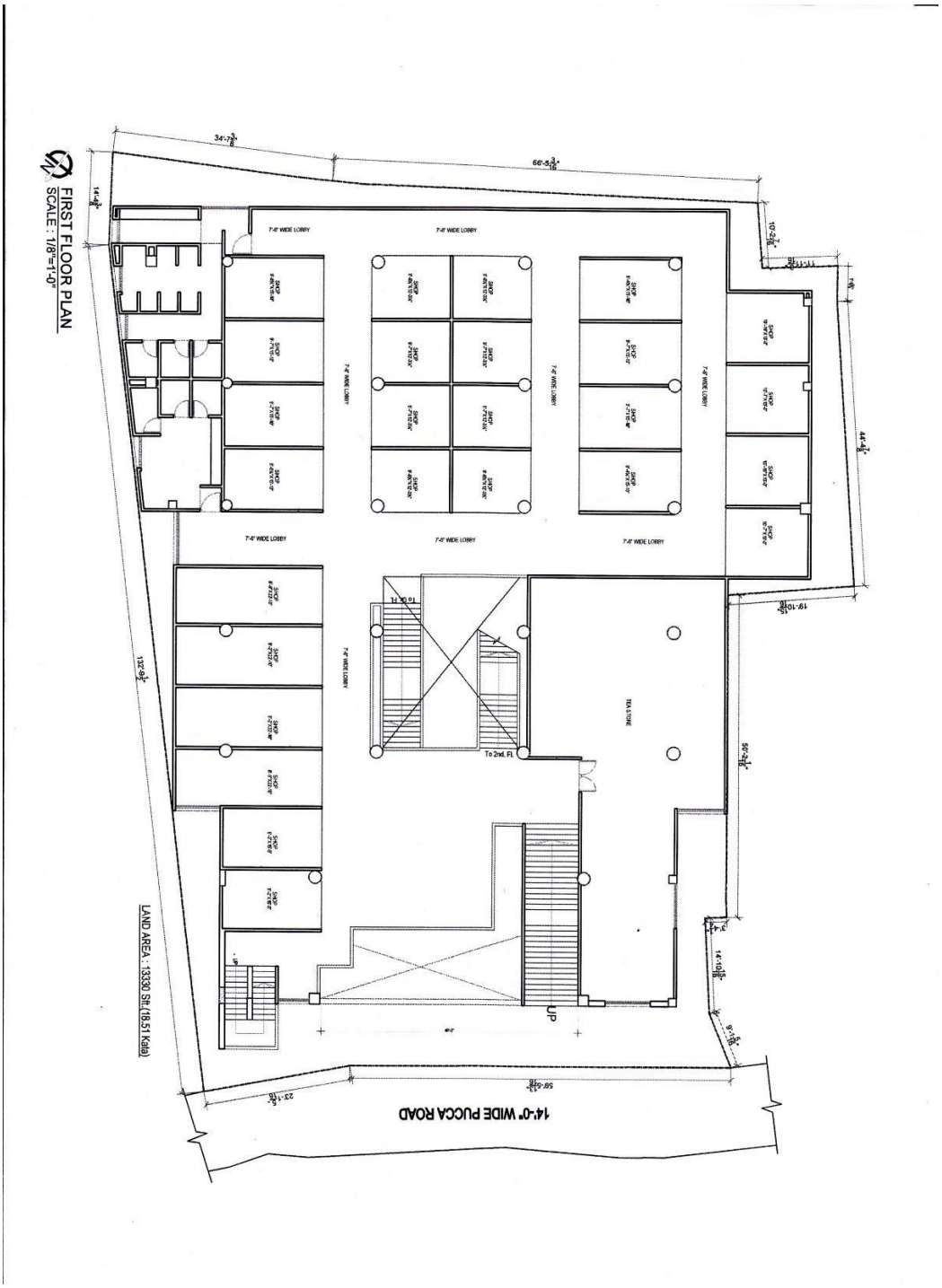
- Separate parking lot for private cars and goods carrying trucks should be established by the municipality maintaining a considerable distance from the market to avoid traffic congestion at the market area.
- A well-defined solid waste collection and disposal system should be in place at the market.
- All waste water should be discharged to the Municipal sewer system. In the absence of such system in the vicinity of the market, the septic tanks should be constructed.
- Fire prevention and fighting equipment should be provided and maintained as well as market management committee should be trained in fire prevention and fighting.
- The market should have facilities for washing, prayer, toilet, waiting, shopping, meals and snacks.
- Contractor will ensure availability of the PPEs and first-aid box, water supply and sanitation facilities to the workers.
- The surrounding people should be informed about the construction and operation of the bus terminal.
- Above all, the EMP should be followed and mitigation measures should be monitored as per EMP.

REFERENCES

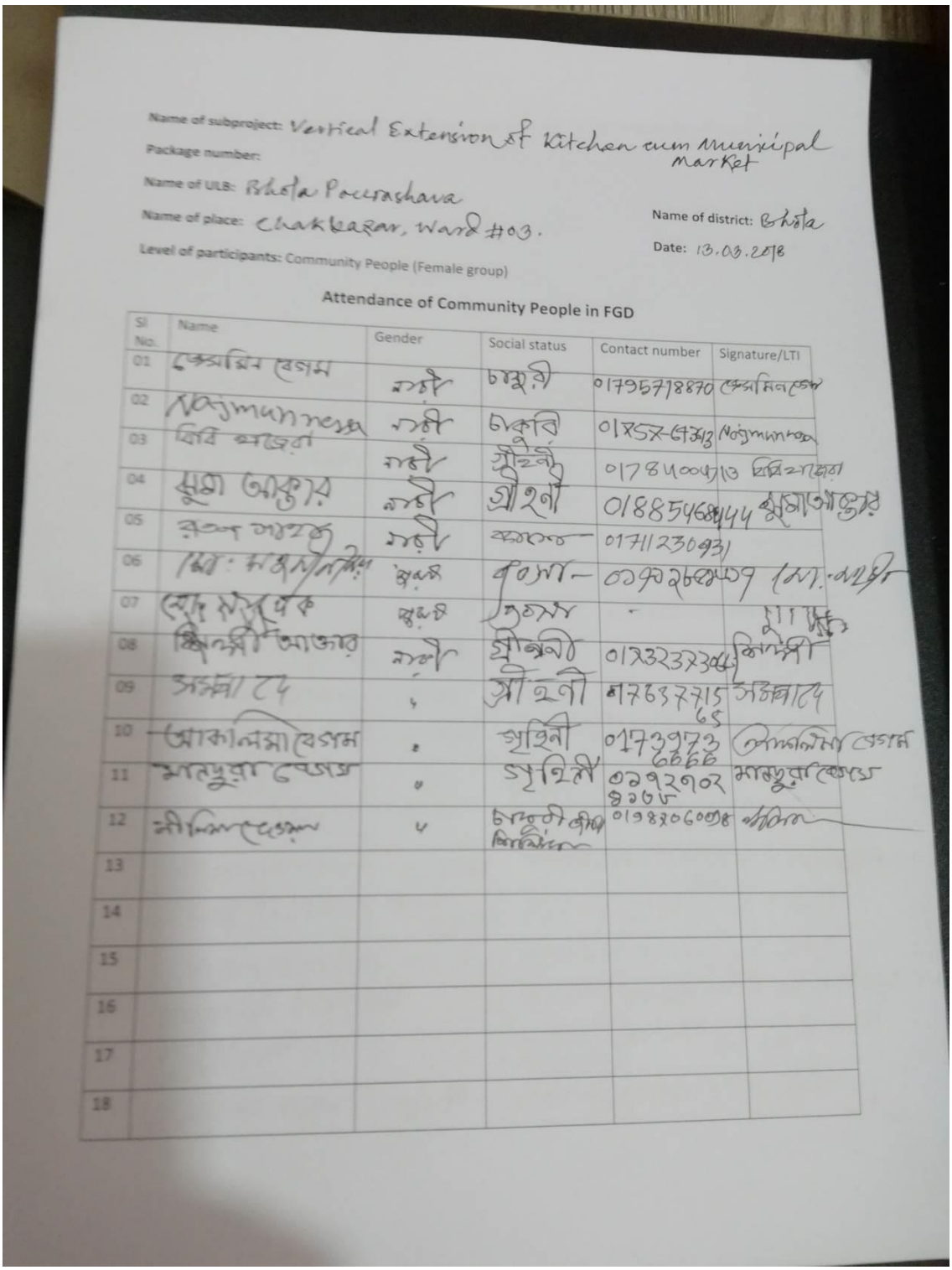
1. Bangladesh Bureau of Statistics. Bangladesh Population Census 2001.
2. Bangladesh Bureau of Statistics. Bangladesh Population and Housing Census 2011.
3. Bangladesh Municipal Development Fund. Environmental Management Framework, 2017.
4. Bhola Municipality Data, 2018.
5. Bhola Municipality. Municipality Development Plan, 2017.
6. http://en.banglapedia.org/index.php?title=Bhola_Sadar_Upazila dated on March 03, 2018

ANNEXURES

Annexure 1: Design of each floor



Annexure 2: Attendance of community people in FGD (female)



Name of subproject: Vertical Extension of Kitchen cum Municipal Market

Package number:

Name of ULB: Bhola Paurashava

Name of place: Chakbazar, Ward #03.

Name of district: Bhola

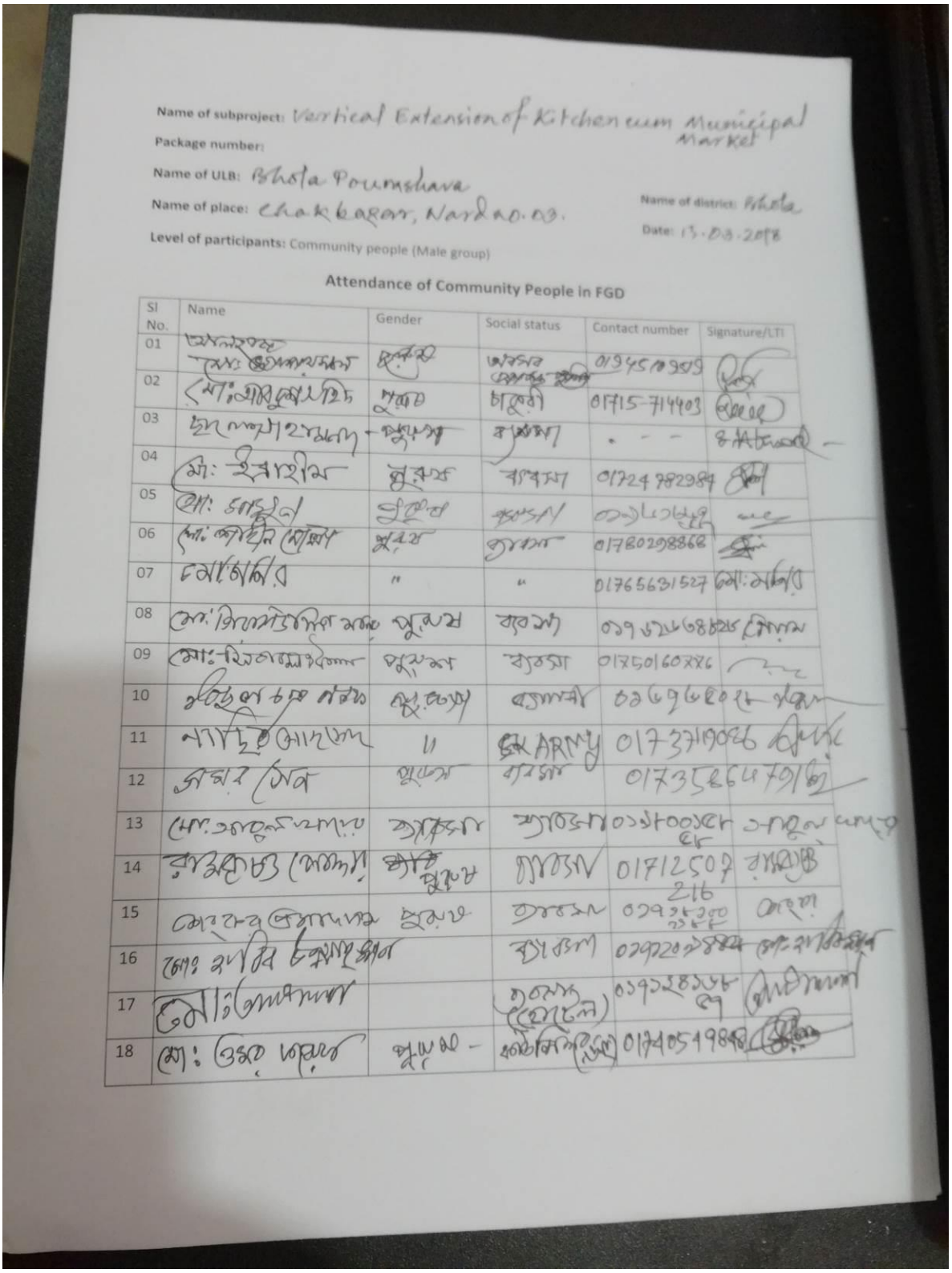
Date: 13.03.2018

Level of participants: Community People (Female group)

Attendance of Community People in FGD

Sl No.	Name	Gender	Social status	Contact number	Signature/LTI
01	[illegible]	[illegible]	[illegible]	01795718870	[illegible]
02	Nojmunnessa	[illegible]	[illegible]	01[illegible]	Nojmunnessa
03	[illegible]	[illegible]	[illegible]	01784004[illegible]	[illegible]
04	[illegible]	[illegible]	[illegible]	01885468[illegible]	[illegible]
05	[illegible]	[illegible]	[illegible]	01711230[illegible]	
06	[illegible]	[illegible]	[illegible]	01[illegible]	[illegible]
07	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
08	[illegible]	[illegible]	[illegible]	01[illegible]	[illegible]
09	[illegible]	[illegible]	[illegible]	01[illegible]	[illegible]
10	[illegible]	[illegible]	[illegible]	01[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]	01[illegible]	[illegible]
12	[illegible]	[illegible]	[illegible]	01[illegible]	[illegible]
13					
14					
15					
16					
17					
18					

Annexure 3: Attendance of community people in FGD (male)



Name of subproject: Vertical Extension of Kitchen cum Municipal Market

Package number:

Name of ULB: Bhola Pourashava

Name of place: Chakbazar, Ward no. 09.

Name of district: Bhola

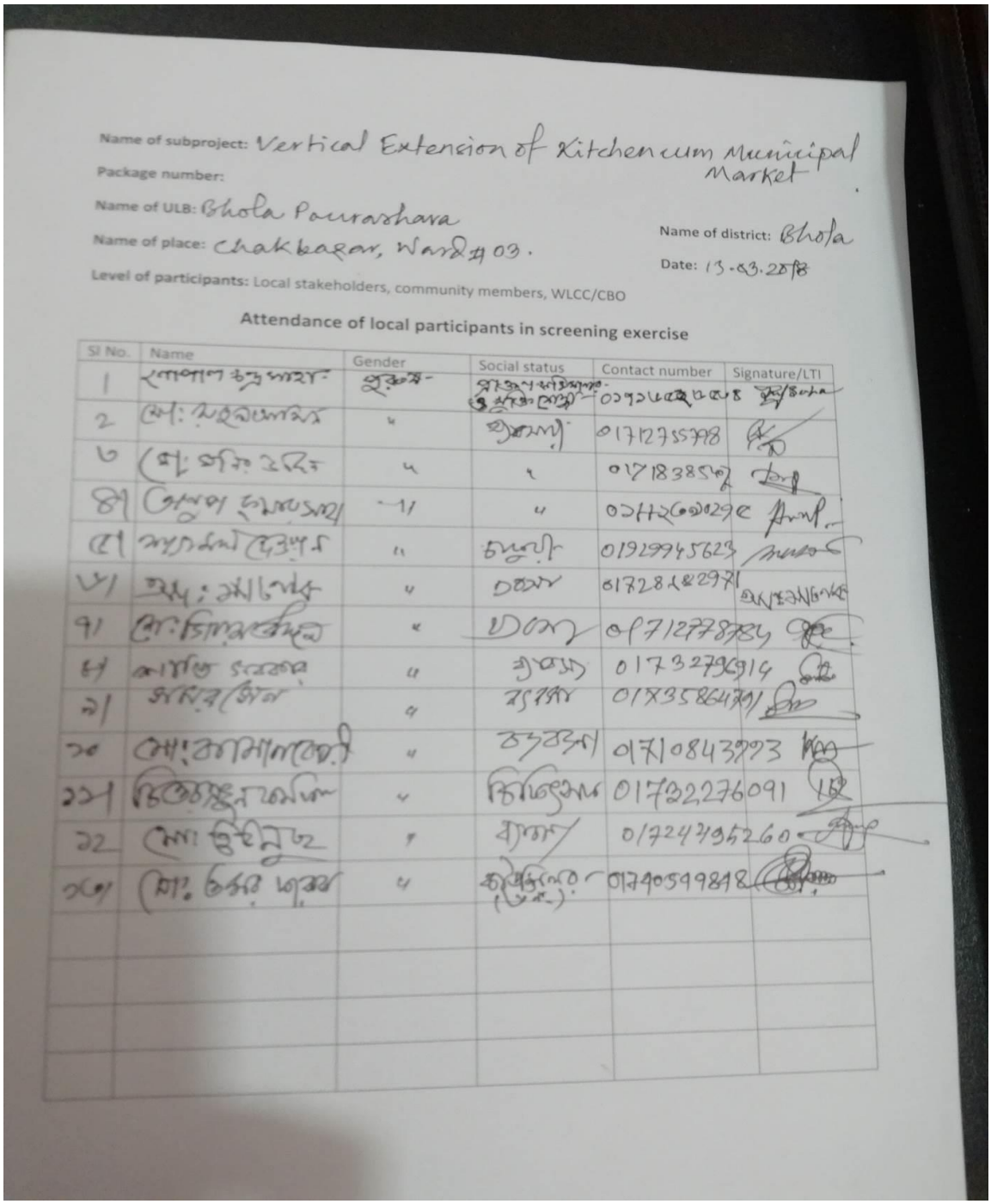
Date: 13.08.2018

Level of participants: Community people (Male group)

Attendance of Community People in FGD

Sl No.	Name	Gender	Social status	Contact number	Signature/LTI
01					
02				01715-714403	
03				- - -	
04				01724782984	
05					
06				01780298868	
07		"	"	01765631527	
08					
09				01750160786	
10					
11		"	EX ARMY	01737190946	
12				01735864791	
13					
14				01712502	
15					
16					
17					
18				01740519848	

Annexure 4: Attendance of local participants in screening exercise



Name of subproject: Vertical Extension of Kitchen cum Municipal Market

Package number:

Name of ULB: Bhola Pourashava

Name of place: Chakbazar, Ward # 03.

Name of district: Bhola

Date: 13.03.2018

Level of participants: Local stakeholders, community members, WLCC/CBO

Attendance of local participants in screening exercise

Sl No.	Name	Gender	Social status	Contact number	Signature/LTI
1					
2				01712755798	
3				01718385	
4					
5				01929945623	
6				01728282971	
7				01712778785	
8				01732796914	
9				01735864791	
10				01710843993	
11				01732276091	
12				01724795260	
13				01740549818	

Annexure 5: List of GRC members along with the notification from the Mayor

Bhola Pourashava
Bhola

Memo No: Bho-Pou/Admin/2018/280 Date: 16 April,2018

Notification

This is to notify for all concern that the following Grievance Redress Committee (GRC) has been constituted in Bhola Pourashava under Municipal Government Services Project (BMDF). The GRC will be an instrument where the community will exercise their basic rights of participation in the project cycle through suggestion and complaints related to social and environmental impacts and the procurement and construction quality issues.

Grievance Redress Committee

Sl. No	Name	Address	Mobile Number	Role in Committee
01	Alhaz Mohammad Moniruzzaman	Mayor Bhola Pourashava	01711111148	Chairman
02	DDLG	Bhola.	049162347	Member
03	Mrs. Shafia Khatun	Principal A.Rob School & College, Bhola Sadar, Bhola.	01711194121	Member
04	Prof. Dulal Chandra Ghosh	Rtrd. Principal Govt. Sheikh Fazilatun Nessa Women College, Bhola.	01712073096	Member
05	Mrs. Josna Yeasmin	Councilor, Reserved Seat-1 Bhola Pourashava.	01753046515	Member
06	Mrs. Amirun Nessa	Chairperson, Sukhi Shahbajpur Samaj Kallan Sangstha, Bhola	01724171283	Member
07	Md. Zasim Uddin Arzu	Executive Engineer, Bhola Pourashava	01715062723	Member Secretary

The committee comes in force immediately.

(Alhaz Mohammad Moniruzzaman)
Mayor
Bhola Pourashava.