GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

Local Government Engineering Department (LGED)

Local Government Division

Ministry of Local Government, Rural Development, and Cooperatives

ENVIRONMENTAL ASSESSMENT (EA) REPORT

Name of the Subprojects: Vp Jasim Road and Raju Bhuiyan Road

Package No: MGSP/MDI/2015-16/W-02

Madhabdi Pourashava, Narsingdi

Municipal Governance and Services Project (MGSP)

Design, Supervision, and Management (DSM) Consultancy Services

Joint Venture of

Hifab International AB, Sweden

AQUA Consultant & Associates Ltd., Bangladesh

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ABBREVIATIONS

AP	Affected person
BDT	Bangladeshi taka
BOQ	Bill of quantity
CC	Cement concrete
CIP	Capital investment plan
CP	Contingency planning
DSM	Design, supervision, and management
EA	Environmental assessment
ECR	Environmental conservation rules
EMP	Environmental management plan
EPP	Emergency preparedness planning
ES	Environmental screening
FGD	Focal group discussion
GoB	Government of Bangladesh
GRC	Grievance redress committee
GRM	Grievance redress mechanism
GRP	Grievance redress procedure
LGED	Local Government Engineering Department
MGSP	Municipal Governance and Services Project
PD	Project director
PMU	Project management unit
RCC	Reinforcement cement concrete
RP	Relevant reports
TL	Team leader
ULB	Urban local body
WB	World Bank
XEN	Executive engineer

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1 SUBPROJECTS DESCRIPTION

1.1 Subprojects background

These are subprojects under the Municipal Governance Services Project (MGSP) which are continuation of Madhabdi Pourashava's infrastructures development. Under these subprojects, the two existing bituminous pavements will be replaced by RCC pavements. The name of the subprojects (a) Rehabilitation of R.C.C road starting from Dhaka-Sylhet high way (near H/O VP Jasim) to H/O Akbar Miah at Tatapara under Madhabdi Pourashava (Ch. 0.00 - 450.00 m), and (b) Rehabilitation of R.C.C road starting from Dhaka-Sylhet Highway (New Bus Stand) to H/O Raju Bhuyan via Surjer Hashi Clinic at Tatapara (Ch. 0.00 – 770.00 m) under Madhabdi Pourashava.

The significant features of the subprojects are mentioned below:

Name of the subprojects	Vp Jasim Road, and Raju Bhuiyan Road
Package No.	MGSP/MDI/2015-16/W-02
District Name	Narsingdi
ULB Name	Madhabdi Pourashava
Road side Wards Number	5 and 6
Structural design option	RCC Road
Design traffic volume	200 vehicles per day
Wards population	About 35,000
Tribal people	No tribal people found in the subprojects area
Land acquisition	Mostly ULB owned, therefore land acquisition is not
Estimated cost of the	11.72 and 18.86 million BDT accordingly
Subproject duration	6 months
Tentative start date	1 May, 2016
Tentative completion date	31 October, 2016

1.2 Location of the subprojects

These subprojects are located at Madhabdi Pourashava within the core Pourashava area. Madhabdi Pourashava is located at 24° 0' 0" North, 90° 42' 0" East. Vp Jasim Road is 450 m long and starts from Dhaka-Sylhet Highway at Tatapara. Raju Bhuiyan Road is 770 m long and starts from Dhaka-Sylhet Highway at Tatapara as well. The location map of these subprojects is shown in ***Figure 1.2.1.***

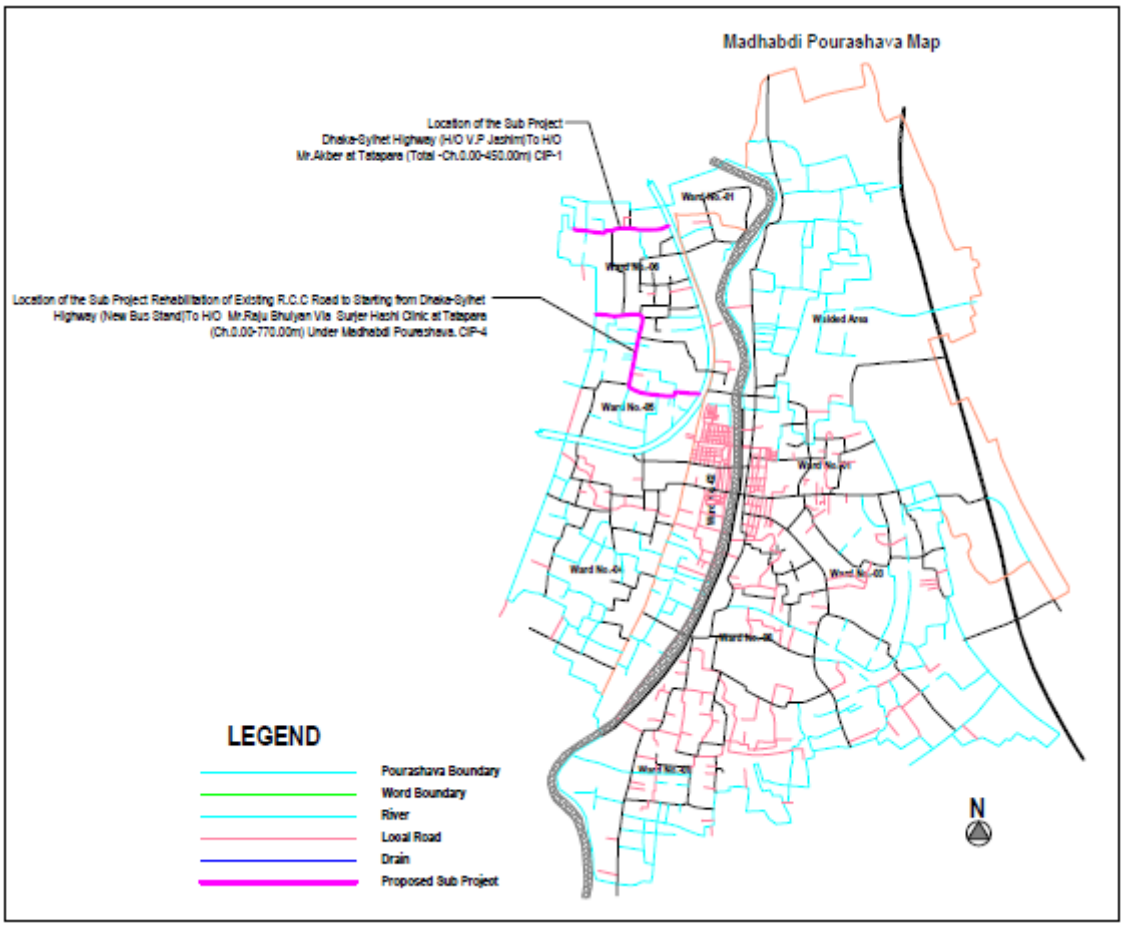

Figure 1.2.1: Location map of the subprojects

1.3 Present status of the subprojects sites

Vp Jasim is situated within the jurisdiction of Ward no. 6 and the present population of this area is about 12000. There are built-up areas both sides of the road which includes shops, semi-pucca houses, pucca houses and tin-shed houses. A pipe drain with inspection pit exists along the center of the road. In fact, this road is passing through busy area and the access road from both the sides is also busy. The existing BC road width varies from 4.00 to 4.50 m. The proposed road is 450.00 m long and 6.00 m wide. The proposed project needs widening works varies from 0.50 m to 2.85 m. Therefore, obviously ULB needs demolition of road-side boundary walls, shops, built structures for widening of the road. There are 17 nos. of electrical poles need to be relocated prior to the construction work.

Raju Bhuiyan Road is situated within the jurisdiction of Ward no. 5 and the present population of this area is about 12500. There are built-up areas both sides of the road which basically includes small industries, shops, semi-pucca houses, pucca houses, mosque, grave yards, and Eid-gah. Surjer Hasi Clinic (under USAID-DFID NGO Health Service Delivery Project) is situated adjacent to this subproject. There is wide range of variation of

the width (width varies from 3.40 to 6.00 m). In fact, this road is more or less passing through moderate busy residential areas. The proposed road is 770.00 m long and 6.00 m wide. The proposed subproject needs wide range of widening works varies from 0.1 m to 2.6 m. It means that the existing road has non-symmetric alignment. ULB needs demolishing works for road-side boundary walls, shops, and built structures for widening of the road.

The site inspection revealed that though these roads are not badly damaged in all sections. However, these roads are not good enough to carry the heavy loaded vehicles. The following ***photographs 1.3.1*** present the existing condition of these road subprojects.

Photographs 1.3.1: Present situation of the road subprojects

1.4 Objectives and justification of selection of these subprojects

The CIP lists several subprojects. The consultant team has inspected and evaluated existing site conditions of all the subprojects. Based on the environmental and social conditions which are not complex and have low environmental and social negative impacts, the ULB priority subproject list has been specified. For quick preparation of the Project and as well as meeting the ULB demand and requirement, these road subprojects have been selected. Furthermore, these are basically reconstruction of the roads where lands are mostly owned

by the ULB. Therefore, land acquisition is not an issue. The roads side's trees and built-up infrastructure will not be severely affected by the implementation of these subprojects.

In fact, after completion of the subprojects, they will provide easy movement facilities for both the local and outside people. Agricultural products as well as export and import goods will be transported easily with less time. This will have significant impact on poverty reduction by enhancing economic and business activities. The land price will increase and it will accelerate the urbanization of this municipality. Therefore, as a priority, these roads can be considered for improvement by rigid pavements.

1.5 Key subprojects activities and implementation process

The key activities of these road subprojects will include earth work in box cutting on road crest up to 450 mm depth, preparation of hard bed by scarifying and loosening of existing bituminous surface, sand filling, laying polythene sheet on road surface, laying reinforced, plain cement concrete work in foundation, providing project profile signboard, filling of expansion joints up to a depth of 40 mm with bitumen course, reinforcement cement concrete works.

The materials to be used for the key activities are soil in earth work, sand, bricks chips, stone chips, polythene sheets and, reinforcement. Furthermore, kerosene or diesel will be used for vibrator. Water will be consumed in two ways for domestic purposes and for construction works such as for mixing concrete and curing. Electricity will be used for reinforcement fabrication and domestic purposes. The wood will be used for cooking by the workers at the Labor sheds.

These subprojects need low scale demolition works for widening the roads. Under these subprojects, the two existing bituminous surfaces will be removed and replaced by RCC pavements.

The major equipment to be used for the implementing the subprojects are brick breaking or stone breaking machine, steel cutter, dump truck, water tanker, excavator and trucks for carrying construction materials.

The detailed design of these two road subprojects are given in the subprojects scheme and are not included in this report to avoid repetition.

2 DETAILED ENVIRONMENTAL FEATURES

Generally, preparations for these road subprojects need a detailed conditional survey to get a clear profile. However, due to immediate requirement for the ULB and the client, the consultant team prepared these subprojects scheme without any real conditional survey. For prompt action, the consulting team just visited the subprojects. The data collected from this visit are used for subprojects scheme preparation. Therefore, minor adjustments may be needed at a later stage.

Efforts have been given for obtaining environmental features within 100 m from the center line at 100 m longitudinal intervals. The findings of these efforts starting from the Dhaka-Sylhet Highway for Vp Jasim Road are given in ***Table 2.1*** and Raju Bhuiyan Road are given in ***Table 2.2***:

Table 2.1: Major environmental features of Vp Jasim Road

Chainage (m)	Left	Right	Major Environmental Features
0-100	√		Shops, semi-pucca structures, boundary wall, trees
		√	Pucca buildings, shop, boundary walls, trees
100-200	√		Semi-pucca structure, shops, boundary wall
		√	Semi-pucca structures, shops, boundary wall, tin shed house
200-300	√		Shops, boundary wall, tree
		√	Semi-pucca, shops, boundary wall, tin-sheds house
300-400	√		Semi-pucca structure, shop, boundary walls
		√	Building, shop, trees
400-450	√		Semi-pucca structures
		√	Semi-pucca structure, boundary wall

There are17 electrical poles both sides of the road at regular intervals.

Table 2.2: Major environmental features of Raju Bhuiyan Road

Chainage (m)	Left	Right	Major Environmental Features
0-100	√		EPs, boundary walls, semi-pucca houses, shops, small industry (power loom)
		√	EPs, boundary wall, shops, small industry, open yard, grave yards
100-200	√		EPs, boundary walls, semi-pucca houses and open yards

		√	Building, EPs, boundary walls, semi-pucca houses and open yard
200-300	√		Building, EP, shops, boundary walls, Eid-gah field
		√	EP, trees, semi-pucca house, boundary wall, tin-shed house
300-400	√		EPs, semi-pucca houses
		√	Mosque, grave yard, boundary wall, semi-pucca house
400-500	√		EPs, semi-pucca houses
		√	EPs, boundary wall, tree, open yard, semi-pucca house
500-600	√		EP, boundary walls, semi-pucca house
		√	EPs, boundary walls, shop, open yard, semi-pucca house
600-700	√		EPs, boundary wall, open yard, shop, industry
		√	EPs, industry, boundary wall, shop, tin-shed house
700-770	√		EPs, industries
		√	Boundary wall, tree

There are 32 electrical poles both sides of the road at regular intervals.

3 BASELINE ANALYSIS OF ENVIRONMENTAL CONDITION

3.1 Physical environment

Geology, topography, and soils

The subprojects area is located almost flat plain with few undulations. Local differences in elevation generally vary below 1m with only a very gentle slope. The presence of organic matter in the soil is moderate. The soils are basically non-saline.

Climate and meteorology

The climate of the subprojects area can be described as Tropical Monsoon. It is characterized by warm, humid summers and cool, and dry winters. From November to March, it is dry and cool while from April to May it is extremely hot during the pre-monsoon season. From June to October, the monsoon season is warm, cloudy, and wet. The warmest month is April, the coolest is January, the wettest is July and the driest is January.

Meteorological conditions of the area are more or less similar to the middle part of the country with respect to temperature, rainfall, and humidity.

The average annual rainfall is around 2,100 mm and around 70% to 80% of the rain falls during the rainy season from April to October. The highest annual rainfall during the last ten years (2002–11) was 2197 mm in 2008, and the lowest was 1181 mm in 2011. The minimum temperature was 12.2°C in 2008 and maximum temperature was 35.6°C in 2011. The minimum humidity was 55.3% in 2010 and the maximum humidity was 71.0% in 2008.

According to the statistics of wind data from the Bangladesh Meteorological Department Climate Division, wind direction changes by month, Nevertheless, the northwest, south, and northeast winds are predominant. ***Table 3.1.1*** shows the key meteorological data from 2008 to 2011.

Table 3.1.1: Temperature, rainfall, and humidity during 2008-2011

Years	Temperature(centigrade)		Rainfall (millimeter)	Humidity (%)
	Maximum	Minimum		
2008	34.2	12.5	2197	71.0
2009	35.6	14.8	1912	66.0
2010	35.0	12.8	1181	55.3
2011	23.4	12.2	1777	68.2

The construction works can be influenced by the climatic condition and meteorological components like humidity, temperature, sudden rainfall, and wind speed. During high winds, there might be possibility of quick spreading of dust generated from the construction activities. It is very risky to work during rain and in high winds because the possibility of getting injury increases. Furthermore, work under high temperature and excess humidity is extremely difficult, and may create health hazards.

Hydrology (surface water, ground water, and rainwater)

There is no pond or ditch or any kind of surface water source located adjacent to these road subprojects.

Groundwater is the main source of potable water in the subprojects area. Deep groundwater is not saline and normally arsenic (<0.01mg/l) and iron-free. Local people usually use deep tube-well water for drinking and other domestic purposes. Salinity problems are not commonly visible. Rain water harvesting system is not common in and around the subprojects area.

The construction period normally in summer season and during the summer season, generally the ground water level goes down. Therefore, ensuring the water requirements for the construction works and domestic uses are the key issue in dry summer. On the contrary, if the construction period also includes wet summer, there might be less complexity for ensuring the water requirements.

Flooding, water logging, and drainage pattern

According to the historical data, this area is not affected in severe flood events such as 1988, 1998, 2004, and 2007; therefore, this area is considered as a flood free zone. Due to continuous heavy rain, temporarily this area is subjected to water logging problems. Structured drainage system in these subprojects area is basically absent except for a few narrow drains that are not enough to carry storm and domestic waste water. The existing drainage system is not functional because people throw and dispose wastes in the drains. Therefore, the drain is being filled up and the land floods when it rains heavily.

Air quality and dust

Ambient air quality data have not been found. Air seems to be clean. However, due to poor maintenance of the road dust is generated especially during the movement of the vehicles and windblown dust that cause air pollution. There are no remarkable sources of air pollution such as heavy and small industries and brick fields observed in the subprojects area.

Noise level

Noise is not a major impediment for the quality of the environment in the subprojects area. Vehicles such as trolleys, motor cycles, mini trucks, and private cars generally move on the road during day and night. These vehicles generate noise in the subprojects area. However, they are tolerable limits in most cases. No other perceptible sources of noise generation such as factories or industries were found near the subprojects area.

Solid waste managementt

There is no structured solid waste management system in the subprojects area. People dispose their wastes in the darkness of night and throw their solid wastes in the neighbourhood. The canal side and drain side households usually throw their solid wastes into the canal and open drains. Therefore, improper solid waste disposal by the community people creates severe public health hazards and environmental degradation.

3.2 Biotic environment

Flora and fauna

There are about 30 road side planted trees which include Sishu, Mango, Jackfruit, and Coconut.

The common local birds such as Doel, Shalik, Chil, Pecha, Kak, Tuntuni, Bulbuli, and Kokil in Bengali were found. Wild animals and endangered fauna species were not found. Inside the proposed subprojects area, no fauna species except some local birds were found.

Biodiversity status

Public consultations discussed the outcomes and there are no special or site specific terrestrial and aquatic ecosystems heavily disturbed by the development activities. However, the populations of floral and faunal species have declined generally due to regional and national climate change (low rainfall, high temperature, high humidity, short winter period, and long dry season) due to over exploitation, poor management, demographic pressure, natural calamities, and deterioration of law and order.

3.3 Socio-economic and socio-cultural environment

Land use

Madhabdi Pourashava is basically semi-urban area (low to medium densely populated residential areas) with pucca and semi-pucca built structures include residential buildings, and small to large scale business facilities such as shops, markets, and bazaar. There are

few roadside small industries were also found during site inspection. Presently, due to better economic condition, the industrial activities are increasing.

Beneficiary population

These roads go through Wards number 5 and 6. As per information by the municipality, considering the wards' population, about 30,000 people will benefit directly and many others indirectly.

Education

In the subprojects area, literacy among the population is about 50%. This is less than the national average (51.8%). Literacy rate among males is still higher than females. (Ref: Population and Housing Census 2011).

Tribal communities

There are no indigenous or tribal people live in the subprojects area. Therefore, there are no measures needed for indigenous peoples' safeguard.

Land acquisition and resettlement

These subprojects are basically construction of RCC pavements by replacing bituminous pavements. Therefore, land acquisition and resettlement activities are not actively involved in the subprojects intervention. Moreover, the MGSP social experts will evaluate this issue and measures will be given accordingly.

Status of housing and built-up infrastructure

Madhabdi Pourashava is still in semi-urban area where built-up infrastructure includes semi-pucca houses, pucca houses, and recently developed few high-rise apartment buildings. In recent years, due to improvement of economic conditions people are building pucca houses instead of semi pucca houses. The houses of the market area are a combination of semi-pucca, and pucca. Pucca buildings are manifestation of the better economic status and higher occupational class.

Principal livelihoods and economic activities

The subprojects areas are now inhabited by the mixed occupational people where major income comes from non-farm activities such as small business, enterprises, jobs, transport vehicle ownership, and operation. Presently, a significant number of people work in small trades, private sector jobs, and government jobs in the town, and transport operations. Increased awareness of the social issues and NGO activities has changed the poverty

scenarios of the subprojects area. Now-a-days, increasing industrial activities are major income source.

Cultural heritage and protected areas

There are no protected areas and no important cultural or historical sites identified in the subprojects area. The local cultural structures are mosques, graveyards, Eid-gahs, academic institutions, religious spots, play grounds, post offices, and a dispensary.

Social conflicts, development activities, and political condition

There are no visible conflicts between the local communities regarding these subprojects implementation. There are many development activities implemented by the Pourashava under MGSP and other agencies. Political instability has been found in recent years in Bangladesh. However, from the middle of the 2015, the political situation seems stable. This creates a positive situation for the development activities.

4 ENVIRONMENTAL SCREENING

Environmental Screening (ES) for the subprojects have been conducted with the purpose of fulfilling the requirements of GoB and WB. ES ensures that environmental issues are properly identified in terms of extent of the impacts. A field visit for preparing the ES was carried out on 20January 2016 in the subprojects area. Environmental Screening Checklist, as adopted in Appendix C of the Environmental Management Framework of MGSP, was administered for identifying the impacts and their extents. The screening data and information ***for Vp Jasim Road*** have been formulated and are shown in below.

1) Potential environmental impacts during the construction phase:

(a) Ecological impacts:

➢ Felling of trees	Significant □	Moderate □	Minor □ √	Number of tress 30
➢ Clearing of vegetation	Significant □	Moderate □	Minor □ √	
➢ Potential impact on species of Aquatic (i.e., water) environment	Significant □	Moderate □	Minor □ √	

(b) Physicochemical impacts:

➢ Noise pollution	Significant □	Moderate □ √	Insignificant □
➢ Air pollution	Significant □	Moderate □ √	Insignificant □
➢ Drainage congestion	Very likely □	Likely □	Unlikely □ √
➢ Water pollution	Significant □	Moderate □	Insignificant □ √
➢ Pollution from solid/ construction wastes	Significant □	Moderate □ √	Insignificant □
➢ Water logging	Significant □	Moderate □	Insignificant □ √

(c) Socio-economic impacts:

➢ Traffic congestion	Very likely □	Likely □	Unlikely □ √
➢ Health and safety	Significant □	Moderate □ √	Insignificant □
➢ Impact on archaeological and historical	Significant □	Moderate □	Insignificant □ √
➢ Employment generation	Significant □	Moderate □ √	Insignificant □

2) Potential environmental impacts during the operational phase:

(d) Ecological impacts:

➢ Potential impact on species of aquatic (i.e., water) environment	Significant □	Moderate □	Minor □ √

(e) Physicochemical impacts:

- Potential air quality — Improvement □ √ No-improvement □ Deterioration □
- Potential 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 □

(f) Socio-economic impacts:

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

The screening data and information ***for Raju Bhuiyan Road*** have been formulated and are shown in below.

1) Potential environmental impacts during the construction phase:

(a) Ecological impacts:

- Felling of trees — Significant □ Moderate □ Minor □ √ Number of tress: Nil
- Clearing of vegetation — Significant □ Moderate □ Minor □ √
- Potential impact on species of Aquatic (i.e., water) environment — Significant □ Moderate □ Minor □ √

(d) Physicochemical impacts:

- Noise pollution — Significant □ Moderate □ √ Insignificant □
- Air pollution — Significant □ Moderate □ √ Insignificant □
- Drainage congestion — Very likely □ Likely □ Unlikely □ √
- Water pollution — Significant □ Moderate □ Insignificant □ √
- Pollution from solid/ construction wastes — Significant □ Moderate □ √ Insignificant □
- Water logging — Significant □ Moderate □ Insignificant □ √

(e) Socio-economic impacts:

- Traffic congestion — Very likely □ Likely □ Unlikely □ √
- Health and safety — Significant □ Moderate □ √ Insignificant □

- Impact on archaeological and historical — Significant □ Moderate □ Insignificant □ √
- Employment generation — Significant □ Moderate □ √ Insignificant □

2) Potential environmental impacts during the operational phase:

(d) Ecological impacts:

- Potential impact on species of aquatic (i.e., water) environment — Significant □ Moderate □ Minor □ √

(e) Physicochemical impacts:

- Potential air quality — Improvement □ No-improvement □ √ Deterioration □
- Potential 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 □

f) Socio-economic impacts:

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

3) Summary of possible environmental impacts of the subprojects

The proposed subprojects (road improvement) are not located within any environmentally sensitive area. Thus, they are not going to create intimidation to important environmental features. In some places, drainage congestion has been observed and drainage system should be developed to minimize the water logging problem. Some earthwork will be involved; however, no agricultural productive soil will be used for the purpose. The inputs will be mainly at construction phase and limited within the subprojects boundary. Moreover, mitigation measures will be taken according to the EMP for minimizing the air, dust, and noise pollution.

To get the 6.00 m width, the subprojects need low to medium scale demolition works which will have socio-economic impacts. This demolition works will generate solid waste, construction debris that should be examined and disposal should be performed accordingly. The anticipated social issues should be investigated and examined by the social experts and guidelines should be given as per requirements.

Seeing that there are no adverse impacts to be caused by the implementation of these subprojects, and considering the environmental impacts, these subprojects can be considered as Orange-B category as per ECR-97. According to the WB classification, these subprojects can be classified as Category B. As per ECR-97, an IEE will fulfill the requirements for getting the environmental clearance certificate from DoE.

5 SPECIFIC IMPACT, MITIGATION AND ENHANCEMENT MEASURES TO SAFEGUARD ENVIRONMENT

These subprojects involve the improvement work of 1.22 km road, which pass through different types of environmental features like small shops, bazaars, markets, mosques, grave yards, and small industries. From the environmental study, the possible impacts of the works are mainly caused by the key activities of the subprojects earth work, bed preparation, sand filling, palisading work, cement concrete, and reinforcement cement concrete works. This section describes some specific impacts due to the subprojects activities and their mitigation measures.

5.1 Earthwork

The road improvement work consists of earth excavation, earth filling and cutting, and removal of unsuitable materials. These works lead dust blowing, noise and vibration which disturb the local people. As no massive earthwork is involved at any specific location, several small volumes of earth from different areas will be arranged by the contractor.

Mitigation

- Proper care will be taken by the contractor as well as the ULB, during cutting and filling so that this activity does not disturb the roadside area;
- Avoid loss of topsoil for the earth work.

5.2 Tree plantation

There are about 30 planted trees along the roadsides (Sishu, Mango, Jackfruit, and Coconut) that will cut down for implementing of these subprojects.

Mitigation

- 150 (5 times of the trees to be cut) trees should be planted to compensate the ecological imbalance to be caused due to cutting of the existing trees.

Planting many trees will enhance ecological balance of the area after their successful growth.

5.3 Pollution from construction materials

Dumping of construction spoils, including accidental leakage of oil, grease, and fuel in equipment yards is a significant hazard. Both surface and groundwater might be polluted from these contaminants. Even the people to be engaged for the construction activities might endanger the physical and human habitats of the area.

Mitigation

- Safe transport, storage, and disposal provisions for construction materials, and equipment have to be carried out in order to avoid accidental spillage and loss;
- Fuels, lubricants, and other hazardous materials should be stored over raised platforms and not directly on the ground;
- The playgrounds of the educational institutions should not be used as a stockyard or work campsite.

5.4 Air quality and dust

During the construction phase, negligible amounts of air pollutants will be emitted from the equipment and construction vehicles. Local residents in the vicinity of the work sites will be temporarily disturbed by the limited dust pollution. The overall impacts, however, are expected to remain low.

Mitigation:

- Water should be sprayed to control the dust, which is the main way to suppress dust in the worksite. At the operational phase, there is no real risk of pollution, since the current traffic volume of motor vehicles is too small to cause severe air pollution.

5.5 Noise and vibration

Noise and vibration caused by the equipment and movement of the construction vehicles may temporarily disturb nearby residents and the sensitive areas. In these subprojects, sensitive areas like mosques, roadsides houses, and Eid-gah are likely to be affected from the roadside noise, though the impacts are limited.

Mitigation:

- Transportation of the construction materials have to be carried during the scheduled times, and mainly during the day;

- If needed, all powered mechanical equipment and machinery will be fitted with noise abating gear such as mufflers for effective sound reduction.

5.6 Water quality

There is no remarkable sources of water pollution have been found. The water quality may deteriorate if construction materials, including borrow and fill materials, sand, construction waste, effluent from work camps, and food waste are dumped in the drains and water bodies.

Mitigation

- Proper construction management including waste management as well as training of operators and other workers will be provided to avoid pollution of water bodies;
- Construction waste will be disposed in specified bins (not in water bodies or lowland), for which contractor will be responsible.

5.7 Occupational health and safety

The most important risks associated with the construction activities are listed below:

- Exposure to sunlight- workers are being exposed to the sun for long hours;
- Exposure to high temperature, and humidity for a long time resulting in dehydration;
- Contact with hazardous substances and wastes pose risks of infections and diseases;
- Risk of poor air quality due to dust;
- Risk of collision (traffic);
- Risks from head loads for carrying soil and construction equipment;
- Risks of using of the machinery in motion;
- Risk associated to the sudden bad weather working conditions.

General requirements for the workers' health and safety

The key salient features of the general requirements for the workers' health and safety stated is presented in ***Table 5.7.1.***

Table 5.7.1: General requirements for the workers health and safety

Issues	Requirements
Health and Hygiene	• Cleanliness at the site premises and workers living places; • Arrangement of the proper ventilation and temperature at the labor sheds; • Protection against dust and furnace by using of nose masks and covering of the head and body;

Issues	Requirements
	• Proper disposal of wastes and effluents; • Provision of adequate latrines and separate toilets for the women; • Sufficient dustbins for the solid waste management system.
Safety and first aid	• Using of personal protective equipment (helmet, gloves, goggles, nose mask, safety boots); • Precautions during work on or near machinery in motion; • Head loads are prohibited; however, availability of any alternative monitoring against carrying of excessive weights is needed; • First aid facilities should be provided and maintained; • Ensure one first aid box for every one hundred workers; • The first aid kit should include adhesive bandages, regular strength pain medication, gauze, and low grade disinfectant.
Compensation for accidents at work	• Contractor's responsibility for compensation- amount of compensation depends on the type of accidents (the amount of compensation should be between 50,000 BDT to 100,000 BDT and even more).
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 workers.
Overcrowding	• No labor room should be overcrowded.
Latrines and urinals	• Sufficient latrines shall be provided; • Latrines shall be maintained in clean and sanitary condition; • Latrines shall be adequately lighted and ventilated.
Disposal of wastes and effluents	• Proper disposal system for solid waste and effluent is required.

6 ENVIRONMENTAL MANAGEMENTPLAN (EMP)

The purpose of the Environmental Management Plan (EMP) is to ensure that the activities are undertaken in a responsible and non-detrimental manner. The EMP will guide the environmentally sound construction of the subprojects and ensure efficient lines of communication between the PMU (LGED), DSM, and the contractors.

6.1 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 field offices of the LGED and ULB. It will also be made available to the public. The final assessment report will also be uploaded in the LGED website and the World Bank website after approval.

6.2 Grievance redress mechanism

The project-specific Grievance Redress Mechanism (GRM) will be established by the PMU to receive, evaluate, and facilitate the solution of APs concerns, complaints, and grievances concerning the social and environmental performance of the subprojects. The GRM will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the subprojects.

The grievance mechanism should be related to the risks and adverse impacts of the subprojects. It should address APs' concerns and complaints promptly, using an understandable and transparent process that is gender responsive, and culturally appropriate. It should be 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.

LGED has its own Grievance Redress Procedure (GRP), which it operates to address any dissatisfaction and complaints by the local people regarding its activities. This procedure will be applied to address any complaints or grievances through negotiations with the community leaders and representatives of APs during implementation of the MGSP.

6.2.1 Grievance redress committee (GRC)

The discussions and negotiation will be conducted by the Project Implementation Unit (PIU), and will involve the APs and Grievance Redress Committee (GRC) led by the Project Director of Project Management Unit (PMU) of LGED. The GRC will be formed and established at Madhabdi Pourashava. The grievance response focal point will be available at Madhabdi Pourashava for instant response to an aggrieved person. It will receive written complaints or suggestions, and produce them to the GRC for hearing and resolution. The GRC will have the following key members:

i.	Project Director (LGED head office)	: Director
ii.	Pourashava Mayor (ULB)	: Chairman
iii.	Assistant Engineer at ULB office	: Member Secretary
iv.	Environmental Safeguard Specialist (Consultant)	: Technical Facilitator
v.	Social Management Specialist (Consultant)	: Technical Facilitator
vi.	Senior Municipal Engineer (Consultant)	: Technical Facilitator

6.2.2 Grievance resolution process

All complaints and suggestions will be received formally in the Pourashava office by the GRC Member Secretary. The complaints will largely be channeled through the GRC. Complaints may also be received directly at the Secretariat of the GRC at the Executive Engineer's office at the district level but it is more preferable to submit grievance at the ULB office. A sample Grievance Redress Form will be prepared and will be sent to the GRC and ULB prior to the implementation of the subprojects.

An intake register will be maintained at the office of the Member Secretary. The Pourashava Assistant Engineer (Member Secretary) will record the details of the grievances in the intake register for documentation and ensure impartiality, fairness, and transparency. The intake register will have data and information columns including (i) Case no., (ii) date of receipt, (iii) name, type of complaint, grievance, (iv) father's name, husband's name, (v) sex, (vi) complete address of the person raising the complaint, grievance, (vii) main objection (loss of land, property, or entitlement), (viii) detailed complaint story, (ix) expectation with documentary evidence and previous records of similar grievances, etc.

No GRC members are allowed to contact the aggrieved persons in advance. Rather, the concerned persons are informed to attend formal hearings at an appointed date. The GRC committee will sit for hearing the complaints of the aggrieved persons. The GRC will record salient points presented by the aggrieved person and will examine documentary evidence submitted during informal hearings. A resolution register may also be maintained by the Secretariat of GRC at the Executive Engineer's office at the district level but it is more preferable to maintain the register at the ULB office. The resolution register will contain (i) serial no., (ii) case no., (iii) name of complaint, (iv) complaint story and expectation, (v) date of hearing, (vi) date of field investigation (if any), (vii) results of hearing and field investigation, (viii) decision of GRC, (ix) progress (pending, solved) and (x) agreement or commitments. Closing register will keep records such as, (i) serial no., (ii) case no., (iii) name of complaint, (iv) decision and response to complaints, (v) mode and medium of communication, (vi) date of closing, (vi) confirmation of complaintant's satisfaction, and (vii) management actions to avoid recurrence.

The GRC will decide within 30 days of receiving a complaint. There will also be an appeals procedure where, if a person is dissatisfied with the ruling of the GRC, he or she or a representative may attend their next meeting to present the case again. The committee will then reconsider the case in private, after which their decision is final. If the appellant is still not satisfied, he or she has the right to take the case to the public courts. A person will be responsible in the PMU to record of all the grievance cases and examine these for recurring complaints and solutions, as well as to incorporate these complaintants in the relevant reports (RPs, and IEEs or EAs). LGED and ULB should also publish the outcome of cases on public notice boards and websites. All costs involved in resolving the complaints (meetings, consultations, communication, and information dissemination) will be borne by the PMU. The cost estimates for grievance redress are included in the cost estimates in the report.

Based on consensus, this procedure will help to resolve issues or conflicts amicably and quickly, saving the aggrieved persons from having to resort to expensive, time consuming legal action. The procedure will however, not pre-empt a person's right to go to the courts of law.

6.3 Institutional arrangement for safeguard compliance

In the institutional arrangement procedure, Project Director and Team Leader should be directly involved. The PD and TL would be supported by an environment safeguard specialist and social management expert. The ULB officials, especially engineers, would be responsible for supporting the construction supervision as well as environment and social

management with the help of the DSM consultants. The civil works contractors will implement these environmental mitigation measures.

The PMU, with help of environment and social management specialist, will submit the monthly and quarterly progress reports on environmental and social compliances to the World Bank.

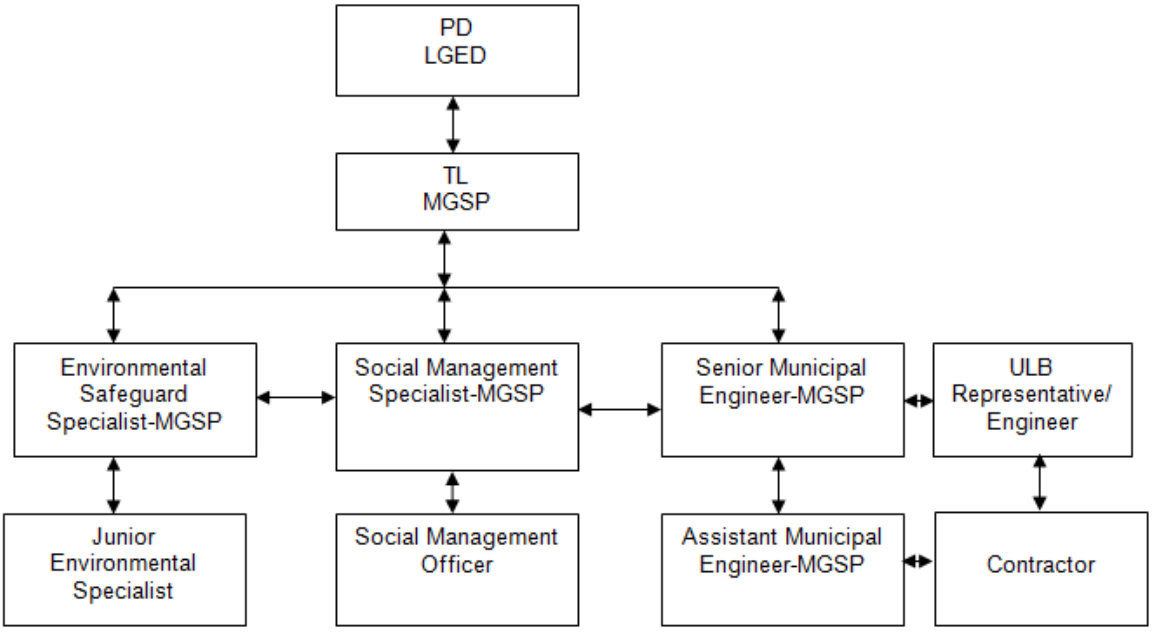

Figure 6.3.1: Environmental and social management team (Tentative)

6.4 Capacity building

A training program will be developed by the PMU to build the capability of PMU and PIU. This will be conducted by the PMU and DSM Consultants. PMU and the DSM will organize an introductory course for the training the ULBs officials, preparing them on: (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 contractor will be required to conduct environmental awareness and orientation of the workers and other support staff before deploying to the work sites in order to achieve the expected standards. A detailed training manual will be developed by the Environmental Safeguard Specialist and Social Management Specialist prior to the training program.

6.5 Emergency response and disaster management

Disaster management can be defined as the organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular the preparedness, response, and recovery to lessen the impact of disasters. Emergency Preparedness Planning (EPP) and Contingency Planning (CP) are the processes of disaster management plan for developing strategies, arrangements, and procedures to address the humanitarian needs of those adversely affected by the crisis. There are four main types of disasters, namely: Natural disasters, Environmental Emergencies, Complex Emergencies, and Pandemic Emergencies.

For MGSP activities, ULB would identify the immediate needs, prioritize the tasks, and identify resource requirements to address the humanitarian needs of those adversely affected by the crisis. The indication of disaster and post-disaster impacts and their management have been shown in this report in the relevant impacts and mitigation section.

6.6 Environmental management action plan

The environmental management action plan has been outlined in ***Table 6.6.1***. The mitigation measures as well as monitoring program of the EMP are also incorporated in the environmental management action plan.

Table 6.6.1: Environmental Management Action Plan						
Sl. No.	**Activity/ Issues**	**Potential Impacts**	**Proposed Mitigation & Enhancement Measures**	**Responsible for implementation**	**Responsible for monitoring**	**Frequency of monitoring**
1.	Contractor's proposal for site specific temporary works	- Accurate/ proper implementation of EMP.	- Preparation of work schedule, labor camp, materials storage area, access road, waste dumping/ disposal area etc.	Contractor	-LGED/ULB -DSM	- Prior to start of construction works.
2.	Construction and operation of labor shed/ camp for workers	- Generation of sewage waste; - Generation of solid waste; - Water, soil, air & dust pollution/ environmental pollution.	- Construction of sanitary latrine/ Pit latrine with septic tank/ Ring slab system; - Erection of "no litter" sign; - Open areas/ surrounding bushes if any are not being used as toilet facility; - Provision of waste bins/ cans, where appropriate; - Litter is to be collected daily; - Bins and/or skips should be emptied regularly and waste/ debris should be disposed of at the site pre-approved by Environmental Safeguard Specialist of DSM; - Camp and working areas are kept clean and tidy at all times; - Camp is to be checked for spills of substances i.e. chemical, oil, paint, etc.	Contractor	-LGED/ULB -DSM	- Prior to start of construction works.
		- Health of workers (Occupational health and safety)	- Raising awareness about hygiene practices among workers; - Environmental awareness & safety training for all staffs; - Staff must be trained up for operating equipment. ***See Table 5.7.1 (General requirements for the workers health and safety) for details***	Contractor	-LGED/ULB -DSM	As work progresses (Daily).
		- Possible development of labor camp into permanent settlement.	- Contractor to remove labor camp at the completion of contract.	Contractor	-LGED/ULB -DSM	After completion of construction.
		Outside labor force causing negative impact on health and social well-being of local people.	- Contractor to employ local work force, where appropriate; - Promote health, sanitation and road safety awareness.	Contractor	-LGED/ULB -DSM	- As work progresses during construction phase (Daily).
3.	Construction materials storage areas	- Use of surrounding open area, play ground, road side for stockpiling of	- Proper stockpiling/ storage of construction materials at the site pre-approved by Environmental Safeguard Specialist of DSM;	Contractor	-LGED/ULB -DSM	- Prior to start of construction works,

Table 6.6.1: Environmental Management Action Plan						
Sl. No.	**Activity/ Issues**	**Potential Impacts**	**Proposed Mitigation & Enhancement Measures**	**Responsible for implementation**	**Responsible for monitoring**	**Frequency of monitoring**
		construction materials; - Creating dust/ air pollution; - Spillage of liquid/ hazardous substances i.e. oil, chemicals; - Risk of crime; - Access of students, children, animals; - Not cleaning of construction materials storage areas after completion of construction.	- Proper covering of dust producing materials with polythene sheet; - Proper fencing around the storage area if possible; - Spills/ hazardous substances should be kept at safe place to avoid soil/ water contamination; -Storage areas should be secure to minimize the risk of crime and should be safe from access by students, children, animals; - Materials storage area must be cleaned after completion of construction.			- As work progresses during construction phase (Daily).
4.	General construction works for the subproject	Drainage congestion, water logging and flooding	- Provision for adequate drainage facilities of storm water if needed; - Provision for pumping of congested water, if needed; - Ensure adequate monitoring of drainage effects, especially if construction works are carried out during the wet season.	Contractor	-LGED/ULB -DSM	As work progresses (Daily).
		Air/ Dust pollution	- Ensuring of vehicles/ equipments in well operating condition; - Sprinkle of water on dry surfaces/ unpaved roads, loose stockpile materials when dust is visible to reduce dust generation; - Maintain adequate moisture content of soil during transportation, compaction and handling; - Sprinkling and covering of loose materials of stockpiles (e.g. fine aggregates); - Avoid use of equipment e.g. stone crushers at site, which produce significant amount of particulate matter.	Contractor	- LGED/ULB - DSM	- As work progresses (Daily). - Air quality can be measured once during construction phase.
		Traffic congestion, traffic problems	- Schedule deliveries of material/ equipment during off-peak hours; - Selection of alternative routes, where possible for subproject vehicles.	Contractor	- LGED/ULB - DSM	- As work progresses (Daily).
		Noise pollution	- Use of noise suppressors, ear plug, silencer and mufflers in heavy construction equipment; - Avoid using of construction equipment producing excessive noise at night; -Avoid prolonged exposure to noise (produced by equipment) by workers;	Contractor	- LGED/ULB - DSM	As work progresses (Daily). - Noise level can be measured once during

Table 6.6.1: Environmental Management Action Plan						
Sl. No.	**Activity/ Issues**	**Potential Impacts**	**Proposed Mitigation & Enhancement Measures**	**Responsible for implementation**	**Responsible for monitoring**	**Frequency of monitoring**
			- Regulate use of horns and avoid use of hydraulic horns for the subproject vehicles.			construction phase.
		Water & Soil pollution	- Prevent discharge of fuel, lubricants, chemicals, and wastes into adjacent ponds.	Contractor	- LGED/ULB - DSM	- As work progresses (Daily); - Water quality can be measured once during construction phase.
		- Cutting down of 30 nos. of trees (Mango, Coconut, and Jackfruit).	- Re-plantation of trees (30*5=150 nos, as same species as fallen down) in the school premises & road sides.	Contractor	-LGED/ULB -DSM	-Mainly after completion of construction.
		Accidents	- Following standard safety protocol; - Environmental health and safety briefing; - Provision of protective gear.	Contractor	-LGED/ULB -DSM	Once in a week
		Spills and leaks of oil, toxic chemicals etc.	- Good housekeeping; - Proper handling of lubricating oil, chemical and fuel; - Collection, treatment & disposal of spills.	Contractor	- LGED/ULB - DSM	As work progresses (Daily).
		Improper stockpiling/ disposal of construction wastes & debris.	- Proper stockpiling/ storage of construction materials at the site pre-approved by Environmental Safeguard Specialist of DSM; -Proper covering of dust producing wastes with polythene sheet; - Proper fencing around the wastes stockpiling/ disposal area if possible; -Spills/ hazardous substances should be kept at safe place to avoid environmental contamination.	Contractor	-LGED/ULB -DSM	- As work progresses during construction phase (Daily).
	All construction works	Beneficial impact on employment generation	- Employ local people in the subproject activities as much as possible; - Give priority to poor people living in/around the Subprojects areas for the works e.g. excavation which do not require skilled manpower.	Contractor	-LGED/ULB -DSM	As work progresses (Daily).

Table 6.6.1: Environmental Management Action Plan						
Sl. No.	**Activity/ Issues**	**Potential Impacts**	**Proposed Mitigation & Enhancement Measures**	**Responsible for implementation**	**Responsible for monitoring**	**Frequency of monitoring**
		General degradation of environment	Environmental enhancement measures, such as plantation, landscaping, traffic and safe signs, construction site fencing (where appropriate).	Contractor	-LGED/ULB -DSM	-Once in a week for traffic and safe signs; -Plantation and landscaping after construction work.
5.	Excavation/ Earth work/	Erosion and dust blowing	-Proper care will be taken to reduce erosion and dust.	Contractor	-LGED/ULB -DSM	As work progresses (Daily).
6.	Issues/ activities during operation & maintenance of the road	-Increase in traffic speed and accidents; -Increased traffic congestion due to movement of increased number of vehicles; -Damage to road by movement of heavy vehicles; spillage of water.	-Better traffic management; -Avoiding spillage of water on road from vehicles carrying fish/ fresh produce (through monitoring, creation of awareness).	ULB	-LGED/DSM	Once in a month
		-Increased air and noise pollution affecting surrounding areas	Traffic management, increased vehicle.	ULB	-LGED/DSM	Once in a month

6.7 Cost of environmental enhancement works in BOQ

Considering the environmental impacts and their mitigation measures for these subprojects, several items are included in the BOQ to address these issues. ***Table 6.7.1*** presents the estimated cost to implement the EMP.

Table 6.7.1: Cost of environmental enhancement works in BOQ

Item No.	Description of Item	Costs (Tk)
	ENVIRONMENTAL MITIGATION & ENHANCEMENT WORKS	
	Overall environmental management in addition to compliance to the clauses 27 & 28 of GCC to the entire satisfaction of E-I-C.	
1	a) Dust suppression measures like water spraying in and around the site	25,000
	b) Dust suppression measures like water sprinkling on aggregates / unpaved roads in the work site	
	c) Air quality (SPM/ PM $_{10}$/ PM $_{2.5}$) Measurement. It can be measured from the pre-approved public institute/ university once during construction phase for two subprojects @Tk. 10000 per sample (2*3*10000)	60,000
	d) Noise level measurement. It can be measured from the pre-approved public institute/ university at three times during construction phase for two subprojects @Tk. 5000 per measurement (2*3*5000)	30,000
	e) Water quality (pH, BOD5/COD, NH3) measurement. It can be measured from the pre-approved public institute/ university once in construction period for two subprojects @Tk. 10000 per sample (2*4*10000).	80,000
	f) Prevention of spillage, leakage of polluting materials for two subprojects	10,000
	g) Temporary camp site waste disposal facility improvement 2 nos (1 no of organic waste and 1 no of inorganic waste disposal facility) for two subprojects@Tk.20,000.00 (2*2*20000)	80,000
	Providing and maintaining adequate potable water supply and sanitation facilities at camp site and work site to the entire satisfaction of E-I-C.	
2	a)Water supply: 2nos. of tube well for two subprojects@ 20,000.00	40,000
	b) Sanitation facilities: 3nos. of toilets preferably portable toilets for two subprojects (1 no. for women and 2 nos. for men) @ 15,000.00 (3* 15000)	45,000
	c) Providing safety gear package like hand gloves, spectacles for eye protection, helmets, rubber shoes, first aid boxes for two subprojects	25,000
3	Tree plantation for two subprojects (including protection, fencing and conservation during project period) @1000.00 per tree (30*5*1000)	150,000
4	Clearing and grubbing for two subprojects	15,000
	Total	560,000

7 PUBLIC CONSULTATION AND PARTICIPATION

7.1 Methodology

In the context of preparing the Environmental Assessment (EA), participatory public consultation was conducted in the subprojects sites. The Madhabdi Pourashava Mayor, Pourashava Officials, and local individuals as well as LGED and Consultant participants participated. Informal Focus Group Discussions (FGD) and a formal CIP were conducted involving the participants (Participant list is shown in ***Appendix-1***). In addition, walk-through informal group consultations were also held. The local communities were informed about subprojects interventions including their benefits. Suggestions made by the participants were listed and incorporated in the EMP accordingly.


Photographs 7.1.1: Consultation meeting at Madhabdi Pourashava with Mayor, other ULB Officials and Consultants Participants


Photographs 7.1.2: Consultant team visited the sites with the ULB representatives

7.2 Issues raised by the participants

The participants raised the issues related to infrastructure development of Madhabdi Pourashava which mainly includes roads and drains. They have also discussed about the quality of the construction works that been already have implemented. In the CIP and FGD, the participants discussed about the requirements for the ULB's future development through a list of the subprojects that is included in ***Appendix-II.***

7.3 Feedback, suggestions, and recommendations of the participants

The participants were presented with feedback, suggestions, and recommendations listed below:

- The FGD results confirmed that an improved communication network is needed for future development of Madhabdi Pourashava;
- Most of the participants expressed that the number of subprojects that have been selected for each financial year is insufficient;
- The participants informed that the provision of water supply, toilet, hygienic facilities, and access road is not adequate;
- Construction works should be scheduled properly and the quality of construction work should be improved;
- The participants also addressed the solid waste management issue to reduce environmental and public health hazards.

8 CONCLUSIONS AND RECOMMENDATIONS

This study enables the MGSP to understand the initial environmental impacts for the subprojects as well as to formulate the relevant mitigation and monitoring plans. Based on the environmental assessment, all possible environment aspects have been adequately assessed and necessary control measures have been formulated to meet with statutory requirements.

The overall conclusion is that if the mitigation, compensation, and enhancement measures are entirely implemented, there will be no significant negative environmental impacts as a result of location, design, construction, and or operation of the proposed subprojects. In fact, there will be tremendous benefits from the recommended mitigation and enhancement measures and major improvements in quality of the life that enhance economic activities, education, job creation and public health once the scheme is in operation.

The conclusions of the environmental assessment can be summarized as follows:

- The short-term negative impacts that may come such as air quality, noise, solid waste, occupational health and safety will be minimized through the mitigation plan;
- The subprojects will create employment for the workforce who live in the vicinity of the construction sites and will provide them a short-term economic gain.

A few key recommendations are outlined below:

- All mitigation, compensation, and enhancement measures proposed in this report should be followed by the concern authorities for implementing these subprojects;
- The environmental management and monitoring plan proposed in this report also needs to be followed;
- A training program should be carried out for ULBs staff to deliver overall knowledge for environmental safeguards;
- Natural resources such as water, wood, and fuel should properly use.

APPENDIX

Appendix 1: List of the participants

Appendix 2: CIP details