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: Kazi Nazrul Road with Drain and Beautification of Pond

Package No: ***MGSP/NCC/2015-16/W-06***

Narayanganj City Corporation, Narayanganj

Municipal Governance and Services Project (MGSP)

Design, Supervision, and Management (DSM) Consultancy Services

Joint Venture of

Hifab International AB, Sweden

AQUA Consultant and Associates Ltd., Bangladesh

April, 2016

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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 the Narayanganj City Corporation's infrastructures development. Under these subprojects, the existing damaged bituminous pavement of the Kazi Nazrul Islam Road will be replaced by the new bituminous carpeting. A one side RCC drain is also included in these subprojects which will be constructed along the Kazi Nazrul Islam Road. This package is also included beautification of the NCC Pond with Coffee Shop and Electrification. The name of the subprojects are a) Construction of the Kazi Nazrul Islam Road with the Drain under Narayanganj City Corporation, Narayanganj (Ch. 00.00~Ch. 0+700.00 m) in ward No. 24, (b) Beautification of the NCC own Pond with Coffee Shop and Electrification at North Lakhyankhola under Narayanganj City Corporation, Narayanganj in Ward No. 25.

The significant features of these subprojects are mentioned below:

Name of the Subprojects	Kazi Nazrul Islam Road with RCC Drain	Beautification of the Pond with Coffee Shop and Electrification
Package No.	MGSP/NCC/2015-16/W-06	
District Name	Narayanganj	
ULB Name	Narayanganj City Corporation	
Wards Number	24 and 25	25
Structural Design Option/ Key Components	RCC Road	Tiles Work, Ceramic Brick Work, CC Work, RCC Work, and Electrification Work
Design Traffic Volume/Design Capacity	About 300 vehicles per day (Mostly trolley, trucks, and pick-up)	Accommodation capacity about 100 people at a time
Wards Population	About 40,000	About 15,000
Tribal People	No tribal people found in the subprojects area	
Land Acquisition	Mostly ULB owned; No land acquisition is needed.	
Estimated Cost	25,195,847.00 in BDT	19,782, 975.00 in BDT
Subproject Duration	6 months	12 months
Tentative Start Date	25 April, 2016	25 April, 2016
Tentative Completion Date	24 October, 2016	24 April, 2017

1.2 Location of the Subprojects

Kazi Nazrul Islam Road is situated at the jurisdiction of Wards number 24 and 25. The starting point of this road is located at 23°38'43.24"N (Latitude) and 90°31'43.07"E (longitude) and connect to the Lakkhonkhola-Sombariya Road. The end point of this road is located at 23°38'43.07"N (Latitude) and 90°31'44.15"E (longitude) and connect to the Madanpur-Madanganj Syedpur Road. This subproject is 700 m long and 5 m wide reinforcement cement concrete pavement. The proposed RCC drain width is 1.05 m. Therefore, with the drain the proposed width will be 6.05 m. The Location Map and Topographic View of the Kazi Nazrul Islam Road are shown in ***Figure 1.2.1 and 1.2.2***.

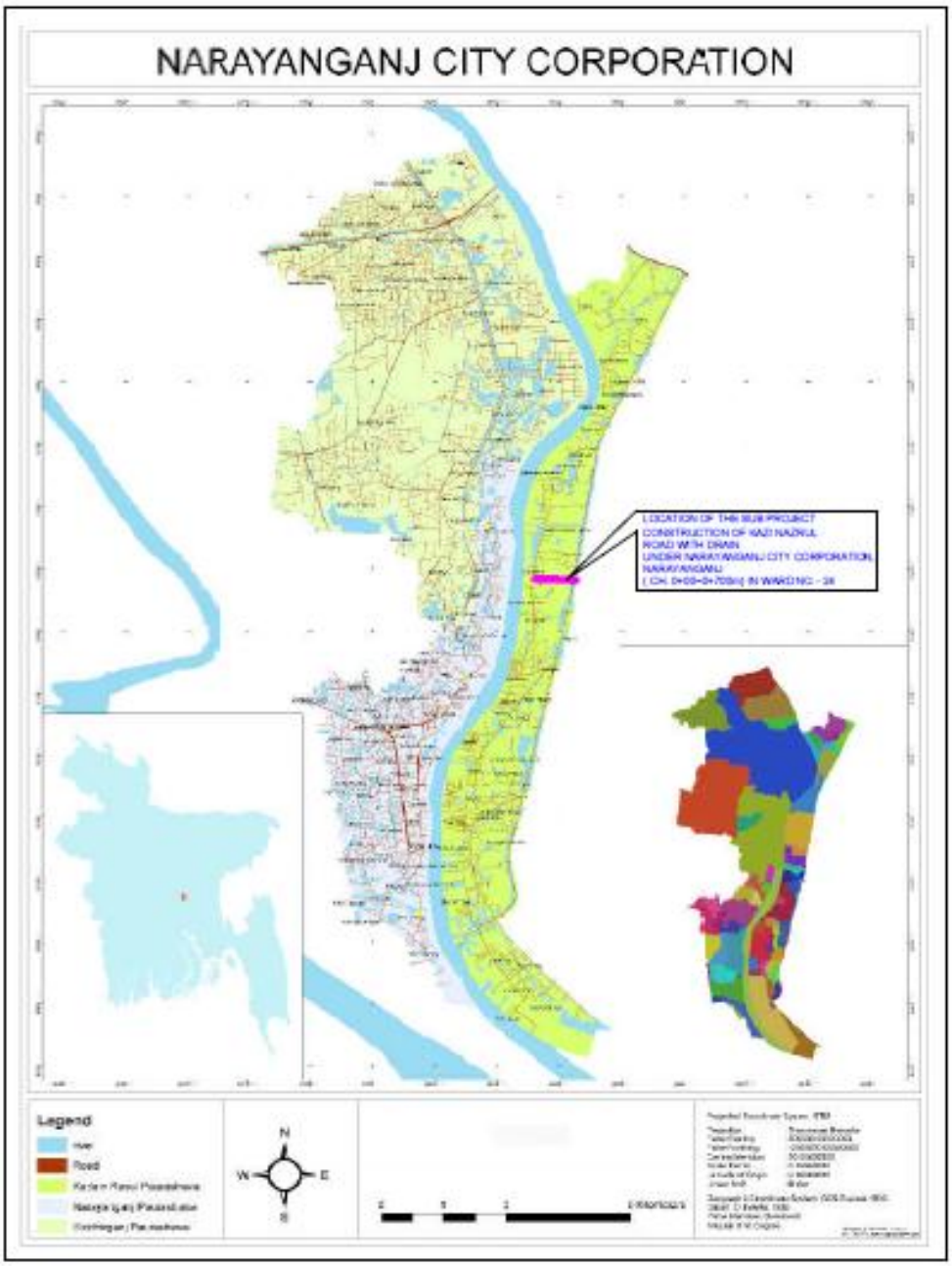

Figure 1.2.1: Location Map of the Kazi Nazrul Islam Road

Figure 1.2.2: Topographic View of the Kazi Nazrul Islam Road

The proposed Pond is situated at the jurisdiction of Ward number 25 and near the Shitalkya Spinning Mills Ltd. and the Local Ward Commissioner Office. The Pond is positioned at 23°39'11.37"N (Latitude) and 90°31'25.02"E (longitude). The area of the Pond is about 2.50 acre (1 hector). The Topographic View and Location Map of the Pond are shown in ***Figure 1.2.3 and Figure 1.2.4***.

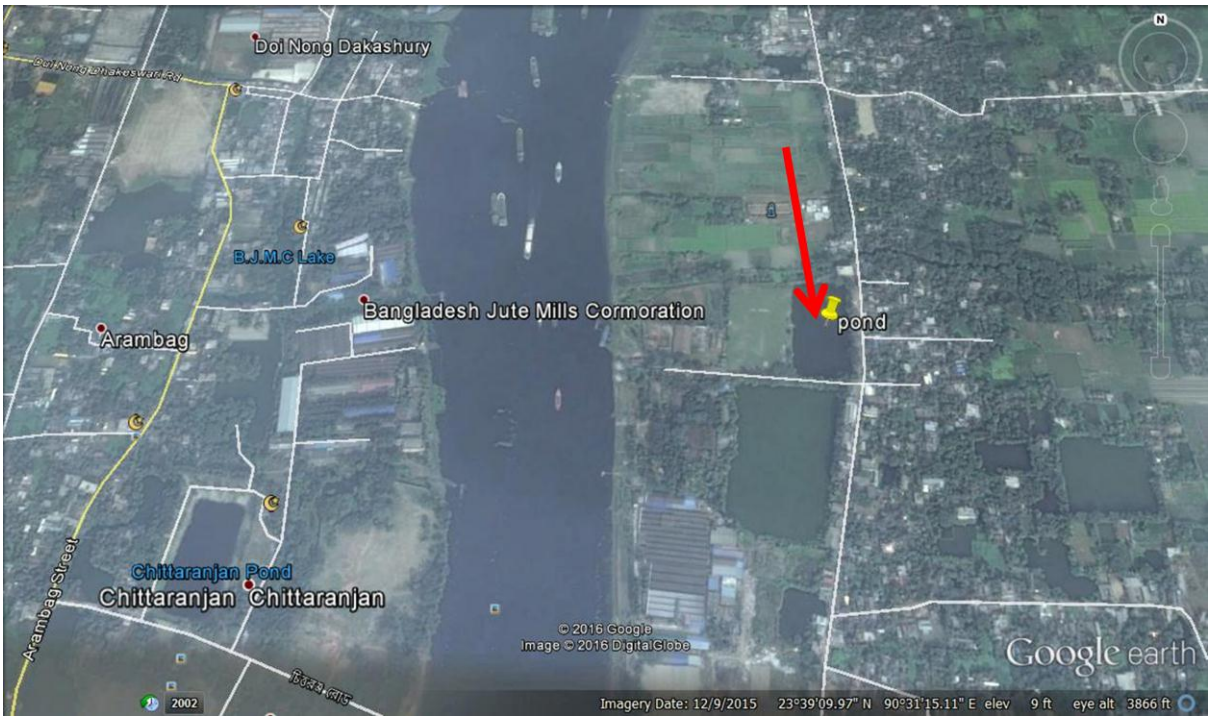

Figure 1.2.3: Topographic View of the Proposed Pond

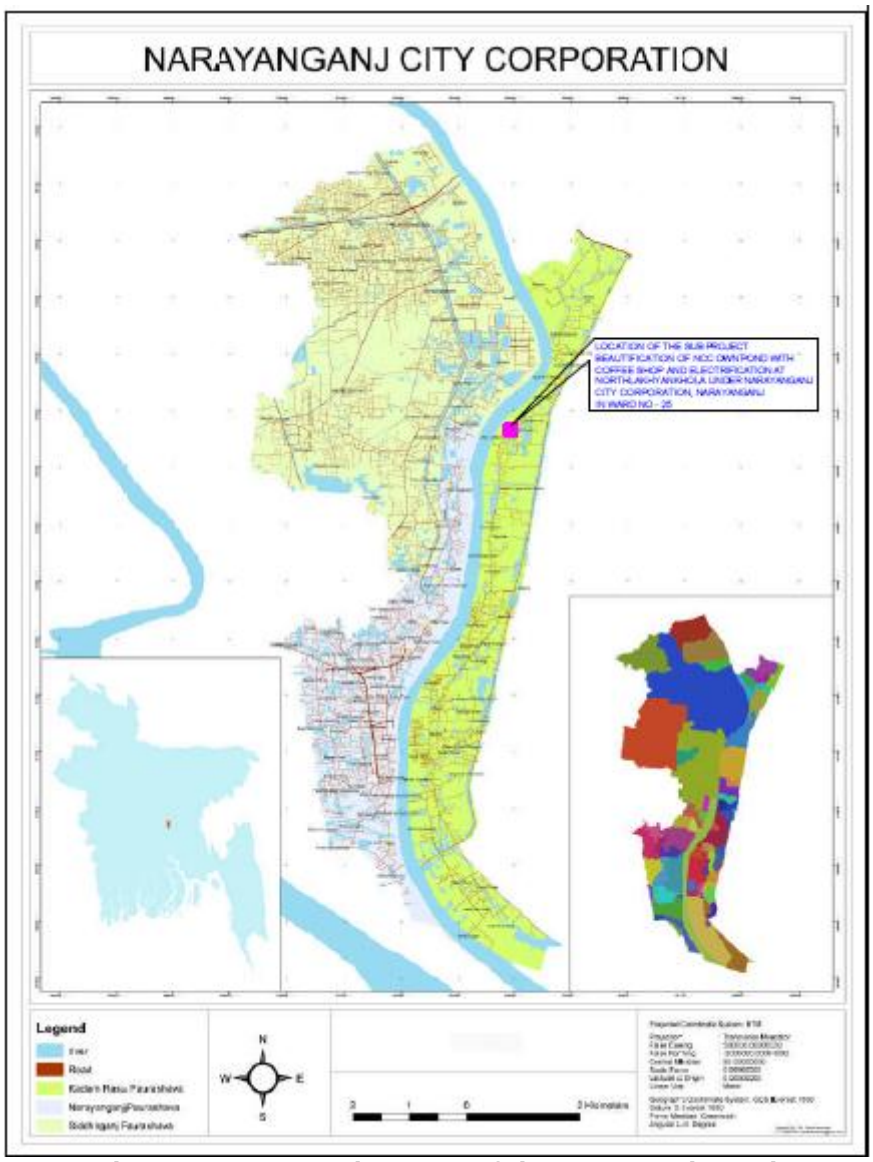

Figure 1.2.4: Location Map of the Proposed Pond

1.3 Present Status of the Subprojects Sites

Kazi Nazrul Islam Road passes through medium densely residential areas. The road side built infrastructure includes tin-shed, semi-pucca, pucca residential houses, school and small scale business facilities for instance shops. This road acts as a connecting way of Madanpur-Madanganj to Lakkhonkhola Road. Therefore, this road is very busy with various kinds of vehicles. Furthermore, volume of motorized traffic and daily necessities of the City Dwellers increase day by day. Therefore, heavily loaded vehicles such as trucks, trolley, and pick-up pass over the road regularly for carrying goods.

Presently, the road condition is very bad which hampers the normal traffic. All types of vehicles especially rickshaw pullers faces frequent accidents due to potholes and rough surfaces in various segments. Furthermore, the road generates huge dust during the vehicle movement which has severe bad effects on public health. In rainy reason, water

accumulates on top of the road which causes severe damage to the top surface. Furthermore, there is no proper drainage system. Therefore, this area suffers a lot due to the water logging problem especially during the monsoon period.

The site inspection revealed that this road is damaged, very much inconvenience to the traffic, and is not able to carry the heavy loaded vehicles. The following ***photographs 1.3.1*** present the existing condition of the Kazi Nazrul Islam Road.

Photographs 1.3.1: Present Situation of the Kazi Nazrul Islam Road

The proposed NCC Pond is not surrounded by too many built infrastructures. It is not within the densely populated area. It is very close to the Shitalkya River. Nevertheless, the local people informed that this area is above the flood level. Therefore, generally there is no flood event. Even there is no major water logging problem is prominent here. There is a under construction hospital in the North side. In the West side, there are sports ground and Eid-gah. The Lakkhonkhola-Sombariya Road passes through the East side of the Pond where road side tin-shed and semi-pucca shops provide local business facilities for the community people.

The Pond is itself a water body which is presently used by the local people for bathing, washing cloths and cleaning cooking stuffs. The pond water seems not polluted with any industrial effluents. However; there might be possibility of low to moderate degradation of the

water quality due to surface run-off and domestic activities. Presently, the pond is not formally used for fish cultivation. Nevertheless, there are some fish species exist in this pond as per information by the local people. The local ward commissioner office planted trees around the pond among them coconut trees were dominating others. There are not really historical or culturally important sites adjacent to the pond. The following ***photographs 1.3.2*** present the existing condition of the Pond.

Photographs 1.3.2: Present Situation of the Pond

1.4 Objectives and Justification of Selection of these Subprojects

There are several subprojects in the CIP lists. The consultant team 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 subprojects list has been specified. For quick preparation of the Project and as well as meeting the ULB demand and requirement, Kazi Nazrul Islam Road subproject and beautification of the Pond have been selected. Furthermore, land acquisition is not an issue for implementation of these subprojects. 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 road subproject, it will provide easy movement facilities for both the local and outside people. This road with RCC drain subproject will provide advanced transport and drainage facilities for the municipality and will enhance economic and business activities which will have significant impact on poverty reduction. It will also

accelerate rapid urbanization of the municipality. By reducing dust and water logging problems, it will reduce public health hazards resulting in improved environmental conditions of the surrounding area. After constructions, this subproject will also reduce potential traffic accidents by reducing rough surface and potholes. The existing width of the road is variable in nature whereas after construction it will provide a uniform width all along the road.

Furthermore, there is no other significant recreational center for Instance Park. Therefore, of course beautification of the Pond with coffee shop and electrification will provide recreational facilities for the local people. These subprojects will also accelerate economic activities. Therefore, living standard may also increase. There are no historical or culturally important sites adjacent to the subprojects area.

These subprojects have no adverse environmental and social impacts. However, after implementation they will provide tremendous benefit to the community people. Therefore, as a priority basis, these subprojects selected for the implementation for the financial year 2015-16.

1.5 Key Subprojects Activities and Implementation Process

The key activities of the RCC drain includes earth work in excavation of the foundation structures by Long Boom hydraulic structures up to the specified depth as per design, sand filling on the foundation bed, single layer brick flat soling, providing and laying polythene sheet, reinforcement cement work for base, vertical wall, RCC drain top slab, fabrication, bending, and binding of ribbed or deformed bar, removal of telephone or electric poles including excavation and dismantling of the foundation concrete, supplying, fitting and fixing best quality grating with MS rod, environmental enhancement activities such as tree plantation.

The key activities of the RCC road includes earth work in excavation of the foundation structures by Long Boom hydraulic structures up to the specified depth as per design, sand filling on the foundation bed, single layer brick flat soling, providing and laying polythene sheet, plain cement concrete work in foundation, brick work, providing and laying reinforced, cement concrete pavement over a prepared sub-base with crushed stone chips, fabrication, bending, and binding of ribbed or deformed bar, fitting of uPVC pipes, environmental enhancement activities such as tree plantation, filling of expansion joints, Palisading work, earth filling in Palisading side, placing compacted aggregate sub-base course with 38 mm down crusher, clearing and grubbing works, fitting and fixing of RCC G-post.

The key activities of the beautification of pond includes earth work in excavation of the foundation structures by Long Boom hydraulic structures up to the specified depth as per design, sand filling on the foundation bed, single layer brick flat soling, providing and laying polythene sheet, reinforcement cement work for base, fabrication, bending, and binding of ribbed or deformed bar, fitting and fixing 1.5 mm fiber glass, fitting and fixing GP (homogeneous) glazed floor tiles, fitting and fixing thick Burma Teak Veneered/Particle Board in walling, clearing and grubbing works, turfing on slope, plain cement concrete work, environmental enhancement activities such as tree plantation.

The key activities of the electrification work includes-installation of GI pole, fixing 50 mm diameter GI pipe bracket, water tight street light fittings, fixing of wire, cement concrete foundation work, fencing the poles, fixing of automatic solar switch, fixing of change-over switch, fixing of distribution or sub-distribution board, fabrication, bending, and binding of MS high strength deformed bar, fixing 500V grade re-wearable fuse link porcelain.

2 DETAILED ENVIRONMENTAL FEATURES

Generally, preparations for these 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 sites. 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 for road subproject. The findings of this effort starting from the Madanpur-Madanganj Road are given in ***Table 2.1***.

Table 2.1: Major Environmental Features for Road Subproject

Chainage (m)	Left	Right	Major Environmental Features
0-100	√		Railway pond, residential building
		√	Railway pond, poultry, factory
100-200	√		Residential pucca, semi-pucca buildings
		√	Residential pucca, semi-pucca buildings
200-300	√		Residential pucca, semi-pucca buildings
		√	Residential pucca, semi-pucca buildings with roadside shops
300-400	√		Kazi Nazrul Islam Govt. Primary School
		√	Residential pucca, semi-pucca buildings with roadside shops
400-500	√		Pond
		√	Residential pucca, semi-pucca buildings with roadside shops
500-600	√		Residential pucca, semi-pucca buildings with roadside shops
		√	Residential pucca buildings
600-700	√		Residential pucca, semi-pucca buildings
		√	Residential pucca, semi-pucca buildings with roadside shops

There are 8 electrical poles to be relocated prior to the implementation of the road subproject.

The environmental features four sides of the Pond considered during side visit and data collected accordingly. The findings of this visit are given in ***Table 2.2***.

Table 2.2: Major Environmental Features for Beautification of the Pond

Sides/Direction	Major Environmental Features
North	Under construction hospital
South	Residential area, Shitalkya spinning Mills Ltd
East	Lakkhonkhola-Sombariya Road, Tin-shed and semi-pucca shops
West	Sports ground, Eid-gah

3 BASELINE ANALYSIS OF THE ENVIRONMENTAL CONDITION

3.1 Physical Environment

Geology, Topography, and Soils

NCC is a land of mixed topography. The present urbanized areas and the levees of the Sitalakhya, the Buriganga and the Old Brahmaputra Rivers are of comparatively higher elevation.

Geologically NCC lies on the edge of the Madhupur Tract and the Holocene floodplain deposits from the aquifers. Geologically it is a terrace from one to ten meters above the adjacent floodplains. Two characteristic geological units cover NCC, namely, Madhupur Clay of the Pleistocene age and alluvial deposits of recent age. The Madhupur Clay is the oldest sediment exposed in the area having characteristic topography and drainage. The major geographic units of the city are: the high land or terrace, the low land or floodplain, depressions, and abandoned channels. Low lying swamps and marshes located in and around the area are other major topographic features. Modhupur Clay overlies the aquifer with a thickness of 8 m to 45 m. Map and other details of soil condition are not available for this city corporation.

Climate and Meteorology

The climate of the subprojects area can be described as Tropical Monsoon. It is characterized by the warm, humid summers and cool and dry winters. However, generally the weather is sub-tropical, with a warm climate all year round. The annual average temperature varies maximum 36°C to minimum 12.7°C and the average annual rainfall is 2376 mm. ***Figure 3.1.1*** *shows* the annual distribution of the temperature of NCC.

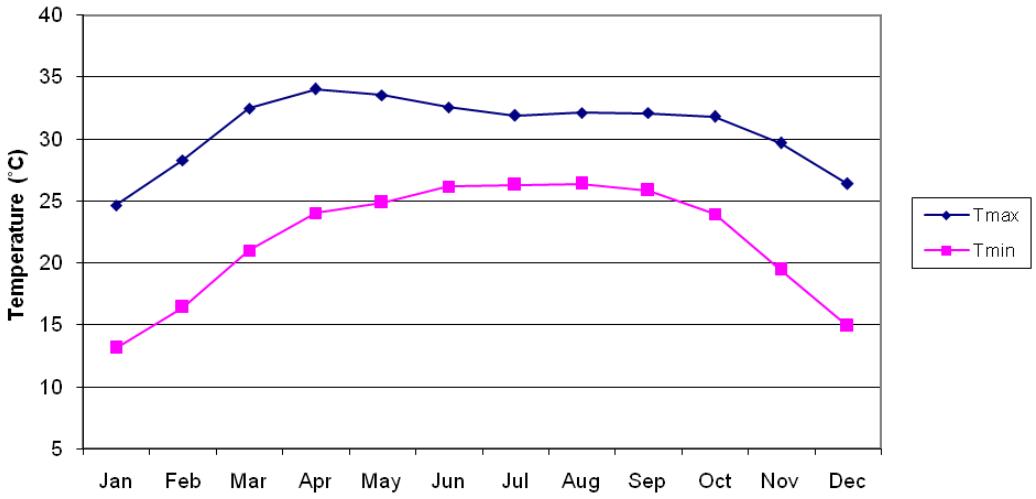

Figure 3.1.1: Annual Distribution of the Temperature in NCC *(Source: BMD)*

Monthly precipitation records clearly show a distinct dry and rainy season in ***Figure 3.1.2***.

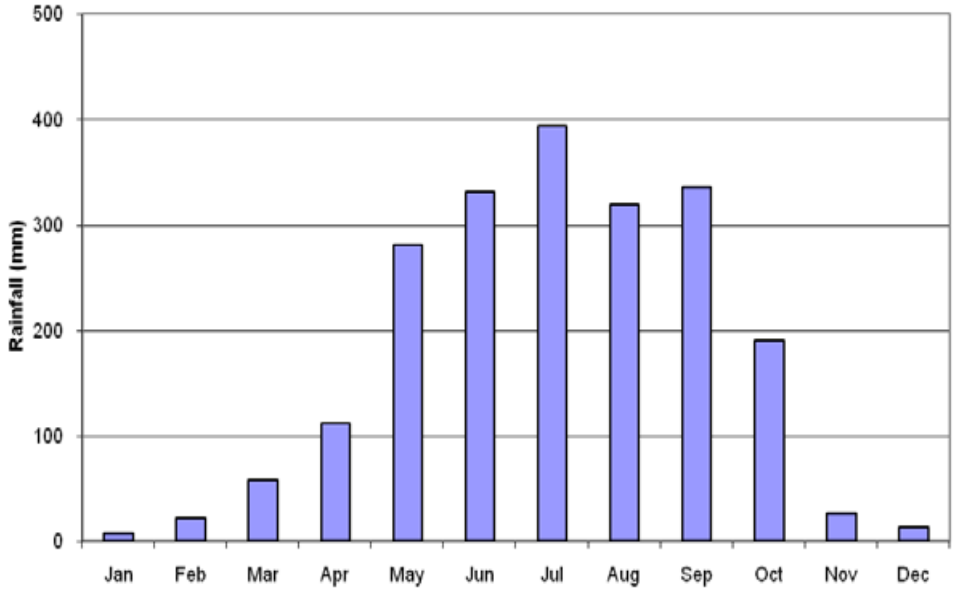

Figure 3.1.2: Monthly Average Rainfall in NCC *(Source: BMD)*

According to the statistics of the wind data from the Bangladesh Meteorological Department Climate Division, wind direction changes by month. Nevertheless, the northwest, south, and northeast winds are predominant.

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 the 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 dehydration problem.

Hydrology (Surface Water, Ground Water, and Rain Water)

The River Shitalkya and the proposed NCC Pond are the main sources of the surface water for the subprojects areas. There are some ponds along the road alignment as well.

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 typically 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 is normally in summer season. During the summer, generally the ground water and surface 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

Structured and functional drainage system in the subprojects area is basically absent. 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. Recently, the authority has very recently undertaken scheme of the tertiary drain construction which are under implementation in the subprojects area. According to the historical data, the subprojects area is not affected in severe flood events after the year 1988.

Air Quality and Dust

Ambient air quality data have not been found. Air seems to be clean. However, due to poor condition of the road dust is generated during the movement of the vehicles and windblown dust cause air pollution. There are no remarkable sources of air pollution such as heavy industries observed in the subprojects area except Shitalkya Spinning Mills Ltd and one road side saw mill.

Noise Level

Noise is not a major impediment for the quality of the environment in the subprojects area. Vehicles such as rickshaws, trolleys, pick-up, trucks, 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. There are no other perceptible sources of noise generation such as heavy factories or industries were found near the subprojects area.

Solid Waste Management

There is no structured solid waste management system in the subprojects area. People dispose their wastes in the darkness of the night and throw their solid wastes in the neighbourhood. 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 50 road side planted trees include Sishu, Mango, Jackfruit, and many others. There are about 25 planted trees around the boundary of the Pond among them coconut trees were dominating others.

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. Presently, the pond is not formally used for fish cultivation. Nevertheless, there are some fish species exist in this pond as per information by the local people.

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 of this area. However, the populations of the floral and faunal species have declined generally due to the regional and national climate change (low rainfall, high temperature, high humidity, short winter period, and long dry season) due to the over exploitation, poor management, demographic pressure, natural calamities, and deterioration of the law and order.

3.3 Socio-economic and Socio-cultural Environment

Land Use

Kazi Nazrul Islam Road passes through the moderate populated areas. Very few agricultural activities along the Kazi Nazrul Islam Road were found. This residential area near the pond is not densely populated and not surrounded by too many built infrastructure. In the detailed area plan (DAP) by RAJUK, recommendations have been made explaining how expansion should proceed in the future to ensure the best possible physical environment, keeping in view the most economic use of land.

Beneficiary Population

This road goes through Wards number 24 and 25. As per information by the municipality, considering the wards' population about 50,000 people will benefit directly and many others indirectly.

Education

In the subprojects area, literacy among the population is about 66.50%. This is higher than

the national average (51.8%). The literacy rate among males (48.40) is still less than females (69.40). (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 the indigenous peoples' safeguard.

Land Acquisition and Resettlement

This Pond is owned by the Narayanganj City Corporation. The road subproject is basically construction of the RCC pavements by replacing the bituminous pavements. For widening of the road, the ULB needs low scale demolition works. However, land acquisition and resettlement activities are not actively involved in the subprojects intervention. The MGSP social experts will evaluate this issue and measures will be given accordingly.

Status of Housing and Built-up infrastructure

The built infrastructure includes mainly semi-pucca and tin-shed residential houses, and few business facilities such as roadside tin shed and semi-pucca shops. In recent years, due to improvement of the economic conditions people are building pucca houses instead of the semi pucca houses. Pucca buildings are manifestation of the better economic status and higher occupational class.

Principal Livelihoods and Economic Activities

The subprojects area is now inhabited by the mixed occupational people where with the few agricultural activities, the major income comes from non-farm activities such as business, enterprises, jobs, transport vehicle ownership, and operation. Presently, a significant number of people work in the 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.

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 religious spots (such as Mosques), school, and play grounds.

Social Conflicts, Development Activities, and Political Condition

There are no visible conflicts between the local communities regarding the subprojects implementation. There are some ongoing subprojects at the City Corporation area under

MGSP, JICA and other agencies. However, there is no visible conflict between these donors and agencies are not found. 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. The field visit for preparing the ES was carried out on 25 Jan 2016, in the subprojects area. Environmental Screening Checklist, as adopted in Appendix C of the Environmental Management Framework of the MGSP, was administered for identifying the impacts and their extents. The screening data and information for the ***Kazi Nazrul Road*** have been formulated and are shown in below.

1) Potential Environmental Impact during Construction Phase:

(a) Ecological Impacts:

➢ Felling of trees	Significant □	Moderate □	Minor □ √	Number of tress 50
➢ 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 Impact during 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 the ***Beautification of the Pond*** have been formulated and are shown in below.

1) Potential Environmental Impact during Construction Phase:

(a) Ecological Impacts:

➢ Felling of trees	Significant □	Moderate □	Minor □ √	Number of tress 25
➢ 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 Impact during 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 are not located within any environmentally sensitive area. Thus, they are not going to create intimidation to the important environmental features. 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.

For site clearing, the subprojects need low scale demolition works which will have socio-economic impacts. This demolition works will generate solid wastes, construction debris, and other wastes materials. This demolition works will raise social issues as well which should be investigated and examined by the social experts and guidelines should be given as per requirements. Safety concern is an important issue for both the construction and operation phases. Nevertheless, these subprojects will have positive impacts in terms of the generation of the employment and business activities.

There are no adverse impacts to be caused by the implementation of these subprojects. Hence, considering the environmental impacts, these subprojects can consider as Orange-B category as per ECR-97. According to the WB classification, these subprojects can classify 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

The road subproject involve the construction work of the 700 m RCC road, which pass through different types of environmental features like residential houses, small shops, Mosques, and ponds. The road side portion of the Pond also includes small semi-pucca and tin shed shops.

From the environmental study, the possible impacts of the works are mainly caused by the key activities of the subprojects- earth work, reinforcement cement work, cement concrete work, dismantle works, clearing and grubbing, construction of the temporary semi-pucca site office, relocation of the telephone and electric post, and electrification 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 the topsoil for the earth work.

5.2 Tree Plantation

There are about 75 planted trees along the roadsides and periphery of the Pond (Sishu, Mango, Jackfruit, Coconut, and others) that will cut down for implementing of these subprojects.

Mitigation

- At least 375 (75*5) (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 the ecological balance of the area after their successful growth

5.3 Pollution from the Construction Materials

Dumping of the construction spoils, including accidental leakage of the oil, grease, and fuel in the 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 the construction materials, and the equipment have to be carried out in order to avoid accidental spillage and loss;
- Fuels, lubricants, and other hazardous materials should store over raised platforms and not directly on the ground;
- The playgrounds of the educational institutions should not use as a stockyard or work campsite.

5.4 Air Quality and Dust

During the construction phase, air pollutants will be emitted from the equipment and construction vehicles are expected to remain low. 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 at the worksite. At the operational phase, there is no real risk of pollution, since the current traffic volume of motor vehicles is not high 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 roadsides houses, mosques, and shops 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 the water pollution have been found. The water quality may deteriorate if the construction materials, including borrow and fill materials, sand, construction wastes, effluent from the work camps, and food wastes are dumped in the River Shitalkya, proposed Pond, roadside ponds, and low land.

Mitigation

- Proper construction management including waste management as well as training of the operators and other workers should provide to avoid pollution of the water bodies;
- Construction waste will dispose in the specified bins (not in the 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 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 infections and diseases;
- Risk of poor air quality due to dust;
- Risk of collision (traffic);
- Risks from the 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 and at the Labor sheds; • Arrangement of the proper ventilation and temperature at the labor sheds;

Issues	Requirements
	• Protection against dust and furnace by using of the nose masks and covering of the head and body; • Proper disposal of the wastes and effluents; • Provision of the adequate latrines and separate toilets for the women; • Sufficient dustbins for the solid waste management system.
Safety and first aid	• Using of the 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 the 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 the 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.

5.8 Impacts on Social Environment and Common Property Resources

Through comprehensive study, it is revealed that impacts are expected not to be severe and to be largely manageable. The following ***Table 5.8.1*** presents impacts on socio-economic environment and common property resources.

Table 5.8.1: Impacts on Social Environment and Common Property Resources

Social Components	Impacts on IECs	Impact Significance

Social Components	Impacts on IECs	Impact Significance
Community Perception	The local community people welcome these subprojects and there is no visible objection from them.	Significant
Employment and business opportunity	Community feels happy because generally the local contractor will be engaged for the construction works which will create work opportunity for skilled and non-skilled labor. The subproject will create business opportunity for the equipments and materials suppliers'.	Moderate
Community order and security	These subprojects activities do not create any severe security problems to the local community and community people.	Moderate
Infrastructure and facilities	Degradation of the existing road infrastructure by transport vehicles used in these subprojects.	Minimal
Agriculture and land use	No direct impact on agriculture however, these may affect the adjacent land to a very limited extent.	Minimal
Landscape and aesthetics	These subprojects activities will degrade landscape and aesthetics values of the subprojects area to a limited extent.	Minimal
Labor habitat	Most of the labors will stay at the Labor sheds which will have impacts on environment relates to the generation of solid wastes, effluent, and water consumption.	Significant
Health care	Workers may suffer from dehydration problems, respiratory problem, and other health hazards.	Moderate
Accident	-Road accidents by the vehicles to be used for the transportation have serious negative impact.	Significant

Specific Measures and Guidelines for the Key Social Issues

The primary objective of these guidelines is to ensure social compliances and requirements required for these subprojects. The social guidelines required for the subprojects as appeared in this report are given in below.

- Conduct dissemination with details about the project to the local community;
- Continue liaison with the community leaders in order to maintain the community support;
- Engage local contractor and local people for the positive perception of the local community;
- Do not exceed number of trucks and trips for the transportation of the equipments and construction materials that exceed capacity of the access road;

- Avoid peak hours for transportation of the equipment and construction materials;
- Avoid throwing of any forms of materials in the River Shitalkya, proposed Pond, road side ponds and low land;
- Avoid storage of the construction materials here and there;
- Ensure no child workers (less than 18 years) and aged worker (more than 65 years) at the site;
- Ensure no discrimination between the male and female in terms of the wages and getting work opportunity;
- Consult with the local people for restriction of the unnecessary entrance to the site by the children and others;
- Ensure regular payment to the workers;
- Consult with the workers for feeling of any health problems and take measures accordingly;
- Monitor the workers movement for avoiding any unexpected social activities (robbery, crime, political attachment and conflicts, taking drugs);
- Control the speed of the vehicles carrying equipments and construction materials;
- Follow traffic rules and regulation during transportation activities;
- Monitor contractor behavior and attitude to the workers.

5.9 Water Requirement, Calculation and Impact on Environment

Water will be consumed by two ways - for construction works and for domestic use by the workers. However, water consumption for the construction works depends on the site condition and moisture contents of the sand and other materials. Therefore, it is very difficult to quantify the actual amount of the water to be needed for the implementation of these subprojects. The major and key activities of these subprojects include RCC work. Generally, for the RCC works, the water-cement ration varies from 0.45 to 0.55. The total quantity of the casting work is about 128,787.54 cubic ft which needs about 14,720 bags cement. Considering the thumb rule, for concrete mixture 1 bag of cement requires 27.5 liter of water. Therefore, the approximate water consumption is about 14,720*27.5 =404,800 liter.

For domestic use, it is extremely difficult to calculate exact figure seeing that water consumption varies person to person. Water consumption also depends on the availability and sources. Obviously, at the Labor sheds and construction site, the water sources are not easily accessible compared to the home and residential areas. Therefore, it reduces water consumption at the Labor sheds and work place. Furthermore, the numbers of workers at the Labor sheds and work places are not same for the whole construction period. An activities wise calculation is performed for the numbers of the workers to be needed for the

construction works which shows that about 10,600 persons of skilled and non-skilled labor to be required. Considering the 12 months duration of the construction works, the average daily labor will be about 10,600/360=30 people.

Considering about 30 liters per capita per day for the working people at the Labor sheds and about 20 liters per capita per day for the outside people, the rough figure of the total water consumption for the domestic purposes is about (30*30+25*20) = 1,400 liters per day. Therefore, for the whole construction period, the total water consumption to be required about 1400*360=504,000 liter for the domestic purposes.

Though, this is approximate calculation of the water consumption. However, it is understandable that huge amount of water to be consumed for both the construction works and domestic purposes by the workers. Water is one of the key components of the natural resources. Hence, it has significant impact on the environment by continuous reducing of this resource. Presently, there is no water shortage during the dry season and no real depletion of the ground water level at Narayanganj. However, this continuous water consumption may lead water shortage and depletion of the ground water in future.

Mitigation

- Effective use of the water for both the construction works and domestic purposes;
- Except drinking ULB should encourage the contractors to use ponds water and Shitalkya River water for the construction works.

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 the 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 negotiations will be conducted by the Project Implementation Unit (PIU), and will involve the APs and Grievance Redress Committee (GRC) lead by the Project Director of Project Management Unit (PMU) of LGED and Chaired by The City Mayor. With the discussion of the Head of the PMU, the City Mayor should nominate the GRC members who will also seek advice from DC Office, local NGO, and Civil Society. The GRC will be formed and established at Narayanganj City Corporation. The grievance response focal point will be available at City Corporation 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 should have the following key members. However, this is tentative structure of the GRC which may change as per the need prior to the project implementation.

i.	Honorable Mayor, Narayanganj City Corporation	Chairman
ii.	Project Director (Head of the PMU), LGED	Director
iii.	Superintending Engineer/ Executive Engineer (Head of the Engineering Department), Narayanganj City Corporation	Member
iv.	Assistant Engineer, Narayanganj City Corporation	Member Secretary
v.	Representative from DC Office, Narayanganj	Member (Optional)
vi.	Representative of Civil Society, Narayanganj	Member (Optional)
vii.	Representative from Local NGO	Member (Optional)
viii.	Female Ward Councilor, Narayanganj City Corporation	Member (Optional)
ix.	Senior Municipal Engineer, DSM-MGSP	Technical Facilitator
xi.	Social Management Specialist, DSM-MGSP	Technical Facilitator
xii.	Environmental Safeguard Specialist, DSM-MGSP	Technical Facilitator (Optional)

6.2.2 Grievance Resolution Process

All complaints and suggestions will be received formally in the City Corporation Office by the GRC Member Secretary. 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. 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 the 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 will be maintained by the Member Secretary 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 also 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 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 PMU. The cost estimates for the 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 the law.

6.3 Institutional Arrangement for the Safeguard Compliances

In the institutional arrangement procedure, Project Director and Team Leader will directly involve. The PD and TL would be supported by an environment safeguard specialist and social management expert. The City Corporation 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 the help of environment and social management specialist, will submit the monthly and quarterly progress reports on environmental and social compliances to the World Bank.

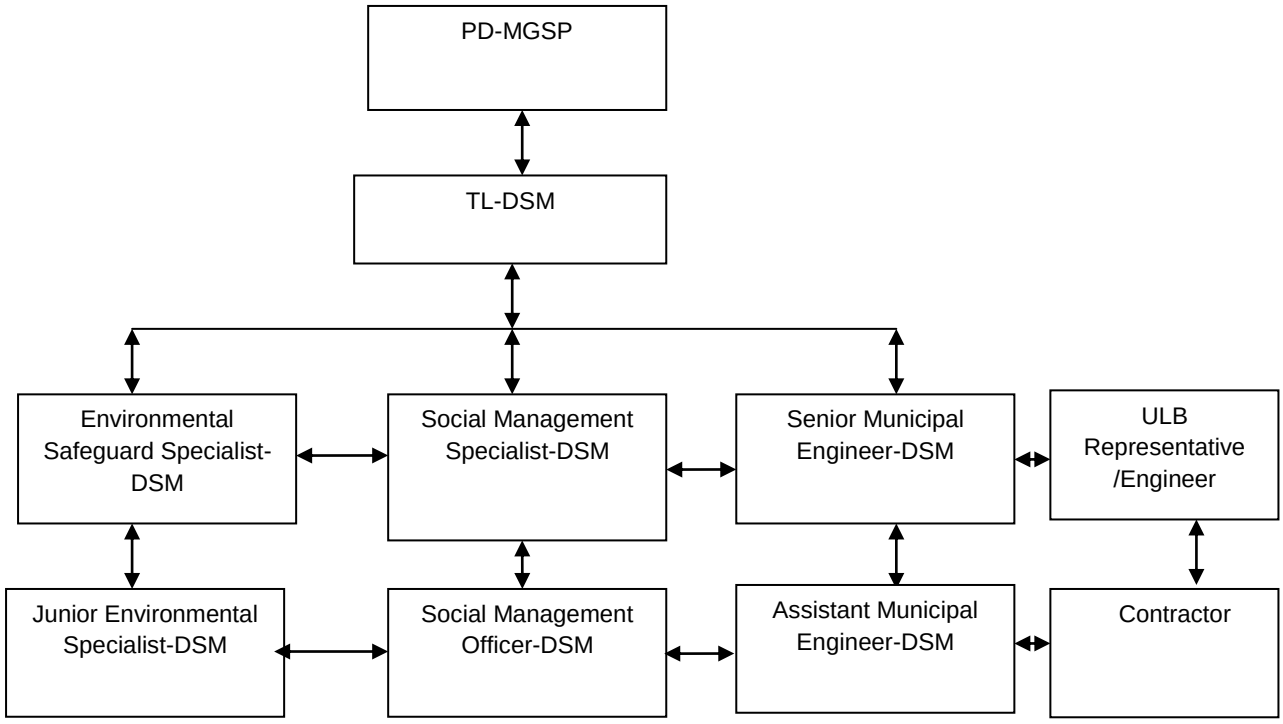

Figure 6.3.1: Environmental and Social Management Team (Tentative)

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 the 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 the resources and responsibilities for dealing with all humanitarian aspects of the 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 the 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 and 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 and 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 and 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 and 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; - Regulate use of horns and avoid use of hydraulic	Contractor	- LGED/ULB - DSM	As work progresses (Daily). - Noise level can be measured once during construction

Table 6.6.1: Environmental Management Action Plan						
Sl. No.	**Activity/ Issues**	**Potential Impacts**	**Proposed Mitigation and Enhancement Measures**	**Responsible for implementation**	**Responsible for monitoring**	**Frequency of monitoring**
			horns for the subproject vehicles.			phase.
		Water and 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 200 nos. of trees (Mango, Coconut, and Jackfruit).	- Re-plantation of trees (200*5=1000 nos, as same species as fallen down) in the school premises and 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 and disposal of spills.	Contractor	- LGED/ULB - DSM	As work progresses (Daily).
		Improper stockpiling/ disposal of construction wastes and 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).
		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.

Table 6.6.1: Environmental Management Action Plan						
Sl. No.	**Activity/ Issues**	**Potential Impacts**	**Proposed Mitigation and Enhancement Measures**	**Responsible for implementation**	**Responsible for monitoring**	**Frequency of monitoring**
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 and maintenance of the road	-Increase 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
7.	Operation 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 inspection.	ULB	-LGED/DSM	Once in a month
8.	Operation of the drain	-Pollution of downstream water body due to disposal of polluted water from the drain.	-Ensure installation of septic tank in all establishments; -Stop direct connecting sanitation facilities to storm drain.	ULB	-LGED/DSM	Once prior to the operation
		-Blockage in the drain due to disposal of solid waste/debris.	-Creation of awareness, introduce SWM system and install cover in open manholes if any; -Regular maintenance/cleaning of the drain	ULB	-LGED/DSM	Twice in a year

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 AND ENHANCEMENT WORKS	
	Overall Environmental Management to the Compliances	
1	a) Dust suppression measures like water spraying in and around the site (lump sum)	50,000.00
	b) Dust suppression measures like water sprinkling on aggregates/unpaved roads at the work site (lump sum)	
	c) Air quality (SPM, PM 10, and PM 2.5) Measurement. It can be measured from the pre-approved public institute/ university twice during construction phase @Tk. 10,000.00 per sample (2*3*10,000.00 Tk)	60,000.00
	d) Noise level measurement. It can be measured from the pre-approved public institute/ university five times during construction phase @Tk.5,000.00 per measurement (5*5,000.00Tk)	25,000.00
	e) Water quality (pH, BOD5, COD, NH3) measurement. It can be measured from the pre-approved public institute/ university twice during construction period @Tk. 10,000.00 per sample (2*4*10,000.00 Tk)	80,000.00
	f) Prevention of spillage, leakage of polluting materials (Lump sum)	30,000.00
	g) Temporary camp site waste disposal facility improvement 2nos (1no of organic waste and 1no of inorganic waste disposal facility) @Tk.20,000.00 (2*20,000.00 Tk)	40,000.00
	Providing and maintaining adequate potable water supply and sanitation facilities at camp site and work site	
2	a) Water supply:2nos of tube well @ Tk 20,000.00 per tube well (2* 20,000.00Tk)	40,000.00
	b) Sanitation facilities: 2nos. of toilets preferably portable toilets (1 no. for women and 1 no. for men) @ 20,000.00 (2* 20,000.00 Tk)	40,000.00
	c) Providing safety gear package like hand gloves, spectacles for eye protection, helmets, rubber shoes, first aid boxes (lump sum)	30,000.00
3	Clearing and grubbing (lump sum)	30,000.00
4	Tree plantation (including protection, fencing and conservation during project period) 375 nos. of tree @Tk 1,000.00 per tree (375* 1,000.00 Tk)	375,000.00
	Total	**800,000.00**

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 City Corporation Mayor, Officials, Engineers, 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 Narayanganj City Corporation with Superintending Engineer, 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 Narayanganj City Corporation which mainly includes roads and drains. They also discussed about the quality of

the construction works that already 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 Narayanganj City;
- Most of the participants expressed that the number of subprojects that have been selected for each financial year is insufficient;
- The participants stated that the public water supply facilities, sanitation facilities, and access road are not adequate;
- Construction works should be scheduled properly and the quality of the 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 applicable 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 subproject will create employment for the workforce who live in the vicinity of the construction site 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 City Corporation staffs 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