Government of the People's Republic of Bangladesh
Ministry of Local Government, Rural Development and Cooperatives

Local Government Division

Dhaka South City Corporation (DSCC)

Dhaka City Neighborhood Upgrading Project (DCNUP)

Environmental Management Framework (EMF) Report

29 May 2018

Executive Summary

Introduction

Bangladesh has been developing rapidly in the past decade. As the country aims to graduate from its LDC status and grow further there will be a significant increase in urbanisation. At present Dhaka, the capital city, is the country's central economic and political hub, generating at least one third of the country's GDP. The core of Dhaka city – home to more than half of the metro area population- is under the jurisdiction of two city corporations: Dhaka South (DSCC) and Dhaka North (DNCC)[1]. Despite the many development efforts being conducted by the Government of Bangladesh, Dhaka city has been ranked 137 out of 140 cities, being denounced as one of least liveable cities in the world[2]. Due to its unplanned expansion the city currently hosts hundreds of urban slums that are crammed with people living in extremely poor conditions. The number keeps increasing as people from the rural areas continue to migrate to Dhaka in search of a better life. However, due to the chronic air pollution, severe traffic congestion, inadequate infrastructure and insufficient employment opportunities the poorest inhabitants of the city end up in a cycle of poverty.

In order to address some of these urban issues the Government of Bangladesh in partnership with the World Bank Group (WBG) is preparing a "Dhaka Metropolitan Transformation Platform" to strengthen the institution's overall approach for a long-term and sustained engagement with Dhaka. The Platform is contributing towards the development of a roadmap to transform Dhaka into a more liveable megacity through a range of interventions that demonstrate high visibility improvements within a short time frame.

In line with this work The World Bank (WB) is assisting the Government of Bangladesh (GoB) through the Dhaka South City Corporation (DSCC) in preparing the Dhaka City Neighborhood Upgrading Project (DCNUP), as a rapid results initiative which will support an initial set of targeted high-visibility interventions to demonstrate the potential for transforming Dhaka city. The project will be designed for rapid response to development needs in selected neighbourhoods to improve liveability within the city.

Project Description

The project is comprised of two components: (i) neighborhood-level public space upgrading and (ii) urban management, capacity building and implementation support.

[1] Dhaka City Corporation was split into two in 2011.
[2] Ranking by Economist Intelligence Unit (2017)

Component 1: Neighborhood-level public space upgrading

The two subcomponents under component 1 include (a) Neighborhood public space upgrading and (b) Pilot traffic junction & traffic management improvements.

This component will finance improvements in public spaces clustered within selected commercial, residential and mixed-use areas of Dhaka South City Corporation. The objective of this is to enhance the accessibility, usability, safety, attractiveness and disaster and climate resilience of public spaces; improve mobility and pedestrian access to key destinations; and improve traffic safety. For the purpose of this project public spaces can broadly be grouped into the following categories:

(a) Open and green spaces, such as parks, playgrounds, plazas, squares and waterfronts.

(b) Streets and pedestrian connections, such as streets, avenues, sidewalks, footpaths and bike paths.

(c) Public buildings and amenities, such as community centers, markets, libraries and passenger transport terminals.

Under the scope of DCNUP an "area-based approach" will be taken, which entails clustering interventions within a locality for generating integrated solutions. Overall community development will be ensured through upgrading various components in the same area such as public facilities, drainage, street lighting, sidewalks, parks etc. A synergistic network approach will present a more meaningful and visible impact than scattered efforts across the city. This approach also offers the opportunity to better engage the existing community in these neighborhoods.

The possible sub-projects under this component will be located in four neighborhoods of Dhaka: *(i)*Kamrangirchar; *(ii)* Lalbagh; *(iii)* Sutrapur-Nayabazar-Gulistan; and *(iv)* Khilgaon-Mugdha-Bashabo). These neighborhoods, falling within the jurisdiction of Dhaka South City Corporation, were selected through a series of structured consultations with counterparts and stakeholders[3] on the basis of the following criteria and considerations:

- *Demonstration potential or deprivation need.* Areas with potential public space assets owned or controlled by DSCC with a high potential to demonstrate the impact of improved public spaces and livability enhancement.

[3] Consultations were conducted as part of a structured citizen engagement framework. First, a public consultation was conducted on September 27, 2017 to validate need for public space investments and priorities for Dhaka. Subsequently, a launch workshop held on January 28, 2018 with government stakeholders and professional groups identified potential neighborhoods to be included as part of DUUP investments. Subsequently, an internal screening was conducted by DSCC and World Bank to ensure feasibility. Four citizen-level consultations were held from February 28 to March 9, 2018 in each shortlisted neighborhood was conducted to validate user needs and refine potential sub-projects.

- *Community-focused.* Areas with the potential for community engagement in low-income and marginalized areas, to support confidence building between citizens and municipal authorities, and having potential benefits to low-income and vulnerable groups, especially women.
- *Complementary.* Areas with potential for complementary engagement with ongoing or future GoB and WBG interventions for public space improvement, public transport and other municipal infrastructure investments.

Component 2: Urban management, capacity building and project implementation support

This component aims to improve the capacity of DSCC in providing urban services in selected neighborhoods and supports the sustainability of Component 1 investments. It will also finance management and coordination costs associated with project implementation, including: operating costs, training, technical advisory, goods and services related procurement for the Project Implementation Unit (PIU); consultancies for contract management and supervision of civil works; and monitoring and evaluation of the results framework. This component will also finance the preparation of feasibility studies, conceptual and detailed designs and other necessary preparation activities for follow- on investment projects.

The project will be implemented by the Dhaka South City Corporation (DSCC). It will administratively report to the Local Government Division (LGD) of the Ministry of Local Government, Rural Development and Co-Operatives (MLGRD&C).

Environmental Considerations in Project Design

In order to minimize some of the possible environmental impacts during the construction and operational phases of a particular sub project under DCNUP certain features maybe incorporated in the engineering design.

Based on the scope of the Dhaka City Neighborhood Upgrading Project and the nature of the possible sub-projects some of the examples of predicted environmental impacts and corresponding design considerations to reduce such impacts is mentioned in the table below. Input from project stakeholders will also be incorporated to strengthen the designs and ensure optimum benefit to the community.

Table a: Examples of sample sub-project impact and corresponding design consideration

Sub- Project Type	Environmental Impact	Design Considerations to Reduce Impact

Road	• Water logging on road surface • Traffic Management	• Proper slope of road surface (adjacent to water drainage facility). • Where appropriate, road rehabilitation to be preceded by drain construction. • Pedestrian lane designed adjacent to vehicle used roads.
Bridge	• Impact on water movement, siltation and erosion • Obstruction to the movement of water vessels underneath bridge	• Adequate opening for required water flow and inclusion of river training works, based on appropriate hydrologic studies. • Keeping required clear height for movement of water vessels.
Community Centre	• Water logging during rainfall • Pollution from inadequate wastewater disposal. • Fire hazard • Electricity Consumption	• Provisions for storm water drainage; roof- top rain water harvesting system • Provision for septic tank system; designing soakage pit considering depth of water table. • Keeping adequate provisions (including fire/emergency exits) for fire safety in accordance with National Building Code • Enough space to ensure proper ventilation within the building. • Incorporate roof top solar panels to provide a certain amount of electricity for the building. • Waste management facilities within the building; recycling facilities
Street light	• Contribution to carbon emission	• Install solar panels over street lights to ensure some of the electricity used is produced through solar energy

Regulatory Review

The proposed Dhaka City Neighborhood Upgrading Project (DCNUP) will be developed and implemented in accordance with all applicable environmental laws and regulations set by the Government of Bangladesh as well as World Bank safeguard policies for environmental protection and natural resource management. The World Bank Safeguard policies are in place to ensure that all proposed projects that are Bank financed take adequate precaution to prevent any adverse impact on the surrounding environment and its habitants.

National Environmental and other Laws and Regulations

The national environmental and other laws and regulations that apply to the Dhaka City Neighborhood Upgrading Project include the:

I. National Environmental Policy 1992
II. Bangladesh Environmental Conservation Act (ECA), 1995 (Amendment Act- 2010)
III. Environment Conservation Rules (ECR) 1997 amended 2003
IV. National Land-use Policy, 2001
V. Environment Court Act, 2000
VI. Bangladesh Labor Act, 2006
VII. Public Procurement Rule (PPR), 2008
VIII. Bangladesh National Building Code

The Ministry of Environment and Forests (MoEF) acts as the guide and custodian for the conservation and development of the environment. In addition to this the MoEF is also responsible for ensuring that during the implementation of any development project natural resources, such as land, air, water and forests, are not exploited or managed in an environmentally unsustainable manner. The Department of Environment (DoE), formed in 1989 with a mandate for environmental management later formalized under the Environment Conservation Act, 1995 (ECA'95), acts as the technical arm of the Ministry and is responsible for environmental planning, management, monitoring and enforcement. The Environment Conservation Rules (1997) provide the Director General a discretionary authority to grant 'Environmental Clearance' to an applicant, exempting the requirement of site/location clearance, provided the DG considers it to be appropriate.

Thus, the GoB has well-defined legal/regulatory systems for safeguarding environmental issues through the Ministry of Environment and Forest in the policy level and the Department of Environment in the implementation level. The Dhaka South City Corporation (DSCC) plays a pivotal role in urban infrastructure development within Dhaka City. DSCC in order to deliver sustainable projects has pursued a strategy of mainstreaming environmental concerns in project development and implementation.

Implications of National Policies and Regulations on DCNUP

The Environmental Conservation Rules (ECR) 1997 (DoE, 1997) classifies projects into four categories according to potential environmental impacts: (1) Green; (2) Orange A; (3) Orange B; and (4) Red. Considering the available information on the nature of the proposed sub-projects most of the sub-projects to be implemented under DCNUP would fall either under Orange A and Orange B categories. It is possible that there will be a few components under the green category; and none are likely to fall under Red category. For projects categorized as Orange B, according to ECR '97, a feasibility report and an IEE, an NOC would be required to obtain site clearance

and environmental clearance certificate. For projects categorized as Orange A, the feasibility and IEE report will not be essential.

The BNBC, PPR 2008, Bangladesh Labor Act 2006 outlines guidelines for ensuring worker's health and safety during construction works which would have direct implications in the DCNUP. It would be the responsibilities of the contractors (with supervision of DSCC officials) to ensure that proper health and safety guidelines are followed in the workplace environment, especially during the construction phase.

World Bank Safeguard Policies

The objective of the World Bank Safeguard policies is to prevent and mitigate undue harm to people and their environment in the development process. Safeguard policies provide a platform for the participation of stakeholders in project design, and act as an important instrument for building ownership among local populations. The relevant policies for environmental safeguard are the following:

- OP/BP 4.01 Environmental Assessment
- OP/BP 4.04 Natural Habitats
- OP/BP 4.09 Pest Management
- OP/BP 4.11 Physical Cultural Resources
- OP/BP 4.36 Forests
- OP/BP 4.37 Safety of Dams

Impact of World Bank Safeguard Policies on DCNUP

According to World Bank Operational Policy (OP 4.01), the nature of environmental assessment to be carried out for a particular sub-project would largely depend on the category of the sub-project. The World Bank Operational Policy (OP) 4.01 classifies projects into three major categories (category A, B and C), depending on the type, location, sensitivity and scale of the project, and nature and magnitude of potential impacts. Category A will have the most significant adverse environmental impact, Category B will have less adverse environmental impacts (in comparison to Category A) and most of the impacts will be site-specific and few reversible, and Category C will have no notable adverse environmental impacts. The sub-projects to be implemented under the Dhaka City Neighborhood Upgrading Project (DCNUP) do not involve large-scale infrastructure development (e.g., construction of sanitary landfill, water or wastewater treatment plant, major highways). The sub-projects do not involve involuntary land acquisition. Therefore, the proposed DCNUP project is classified as Category B and the safeguard polices OP/BP 4.01 (Environmental Assessment) and OP/BP 4.11 (Physical Cultural Resources) are triggered.

An Environmental Management Framework (EMF) has been prepared to meet the requirements of Environment Conservation Rules 1997 of Bangladesh, the Safeguard Policies of the WB and the Environmental, Health and Safety Guidelines of the World Bank Group. It has been anticipated from the proposed scope of the project that significant irreversible environmental impacts would not be generated from proposed project activities. The anticipated impacts will mostly occur during the construction phase and these may include, disturbance of the aquatic habitat, contamination of land and water, loss of small trees, noise from operation of construction machinery, air quality deterioration, worker's health and safety etc. These impacts can be mitigated through enhanced design strategies and implementation of relevant Environmental Management Plans (EMPs) where applicable.

Although the project is not likely to affect natural or cultural heritage, 'Chance Finds' will be encountered and precautions will be taken to ensure that no cultural heritage sites and properties are damaged. Therefore, in this regard the Physical Cultural Resources Policy (OB/BP 4.11) is triggered. The following EMF provides criteria for screening and assessment of physical cultural resources.

The IFC guidelines provide guidance on certain EHS issues which include standards for environmental parameters (ambient air quality, water and wastewater quality, noise level, waste management), hazard and accident prevention, occupational and community health and safety (during commissioning and decommissioning works) etc. These guidelines will be directly applicable to the DCNUP. The World Bank access to information policy would be directly followed.

Overall Environmental Baseline Assessment

In order to develop a comprehensive Environmental Management Framework (EMF) for the Dhaka City Neighborhood Upgrading Project (DCNUP), an environmental baseline study was carried out. The existing environmental conditions of Dhaka city, where all potential sub projects are to be implemented, was outlined for tracing any future impacts during or after project implementation. The assessment of the baseline conditions of Dhaka city include looking at the physiochemical environment, the ecological environment as well as the demography. All the baseline conditions are reflective of the conditions of Dhaka city prior to the implementation of any sub-projects under DCNUP.

In addition, primary data was used to draw the environmental baseline conditions of some of the potential sub-project locations, including Khilgaon, Sutrapur and Kamrangirchar. The criteria selected for this primary site evaluation included assessing the water quality- both surface and ground water, and the noise quality of the three locations. Recent data on air quality was

collected from the ambient air quality measurement stations in Dhaka, in order to gain an understanding of the air quality scenario of south Dhaka prior to project implementation.

Overall Environmental Condition of Tentative Sites

There were no noticeable major environmental concerns in the context of the possible sites and sub projects of the DCNUP. Most of the environmental concerns will be temporary, construction related and limited to the sites for the sub projects. The possible issues that could arise include: dust, noise, waste management, safety measures in stockpiling construction material, traffic congestion during construction, transportation of stockpiles and site wastes. In order to control these possible impacts, it will be important to implement the recommended EMP and ensure proper M&E facilities by the implementing agency. The EA must be reviewed and the implementation of EMF must be supervised.

Some of the observations regarding the environmental baseline of proposed location clusters is given below:

Climate: The climatic status of the proposed location clusters is consistent with the conditions of Dhaka city, which has a tropical climate and is hot and humid for most of the year.

Road Network: Some of the sites visited has networks of narrow roads which could be prone to flooding during monsoon season, when the rainfall is quite heavy. The road networks were extremely narrow in some areas and could not facilitate both vehicles and pedestrian use at the same time.

Air and Noise Pollution: There was a notable amount of dust surrounding some of the location clusters visited, this is due to the nature of the sand based play grounds of the local area and existing construction sites. Noise in the local area was mainly from the traffic congestion in the narrow road networks.

Water Usage: From the consultations it was found that in some areas the drinking water is from tube-wells. Some of the locations selected were beside the rivers, however the river water is only used for washing clothes and in some cases such as the Kamrangirchar river front, the river water is also used for washing recyclable plastics from a plastic recycling facility adjacent to the river front. The banks of the river in Kamrangirchar were covered with waste from the local area. This added to the existing pollution of the river water and contributed to the odour coming from the river water.During the stakeholder consultations held at these potential location clusters it was found that the river was not used for fishing purposes.

Flora and Fauna: The ponds and rivers visited has a lining of rich vegetation common for freshwater ecosystems. However, the other land-locked sites visited were not densely packed with trees other than some scattered large trees within the periphery of the parks and playgrounds.
The proposed locations did not show any notable wildlife habitat. There were some local birds in the areas and animals such as dogs, cats and rodents such as rats. No endangered species were reported in any of the location clusters visited during the field trips.

Land Use: In terms of land use and existing infrastructures within the proposed location clusters, it was observed that most of the land is owned by DSCC and therefore no acquisition of land will be required for the purposes of this project. Currently most of the land being considered for this project is being used as playgrounds for the neighbourhood children, existing community centres, parks, jheels, bazaars, ponds and parks.

Stakeholder Consultation

The Public Stakeholder Consultation Process

The sub projects under DCNUP will be identified by DSCC through a process of consultations with the local community and the targeted beneficiaries of the project. Public consultation is a continuous process through which opinion from the public is sought on matters affecting them, through this process the stakeholders are kept engaged throughout the planning, design, construction, and operation phases of a project. The objectives of consultation and access to information are to generate public awareness by providing information about a sub-project to all stakeholders, particularly the sub-projects affected persons (PAPs) in a timely manner, and to provide opportunity to the stakeholders to voice their opinions and concerns on different aspects of the project. The opinions and suggestions of the stakeholders would assist the implementing body, in this case DSCC, in taking appropriate decisions for effective environmental management of the sub-projects. Therefore, consultation and disclosure would be a useful tool for maintaining communications between the implementing agency and the stakeholders.
At least one consultation will be organized with stakeholders at the location clusters selected for the sub-projects, where the discussion will highlight all relevant issues related to the sub-project to be implemented under their respective wards.

Summary of Preliminary Consultation Sessions

In order to ensure future sustainability of the DCNUP and to develop a robust EMF four preliminary stakeholder consultation sessions were held at location clusters selected for potential sub projects under the project. The location clusters selected include: 1. Lalbagh 2. Sutrapur 3. Kamrangirchar and 4. Khilgaon. All of which are located in South Dhaka and fall under the

jurisdiction of Dhaka South City Corporation. During the consultation meetings, possible social and environmental issues were disclosed. The participants of these sessions representing the community included ward councillors of the respected areas, local residents and entrepreneurs, members of youth club, social organization and political party members, doctors, teachers, imams of local mosque as well as community women. During the sessions the participants were encouraged to share the present condition and the needs of their local area and provide recommendations for sub-project design.

Some of the key recommendations made during the consultations include:

Kamrangirchar: The participants suggested public facilities such as walkways, parks, seating arrangements in open spaces, playground area, street lighting and waterside development. They shared that there is a need for raising public awareness regarding waste disposal in the river water and streets of the local area. They also mentioned their want for DSCC to identify *Khas* land owned by the government and free them from illegal encroachment and develop these areas as open spaces for neighbourhood usage.

Lal Bagh: The participants want development and green spaces along the riverside for public use. They suggested better connection with Kamrangirchar through the river. They insisted on developing separate open spaces for girls. The community centres to be developed should have a variety of facilities for the community people, this includes emergency health services, indoor sports facilities, IT training facilities and swimming pools.

Khilgaon: The participants mentioned the need for public toilets. They demanded more playgrounds in the local area. The community also expressed their want for developing Shahjahanpur Jheel by cleaning the polluted water and solving the existing odour problem so that the area can be visited and enjoyed for leisure purposes.

Sutrapur: The participants shared that they want all the ward councilors and the youth group to be consulted through focus group discussions before any intervention is planned in this area. Considering that there are many heritage sites in this area, any development should consider these heritage sites and plan interventions accordingly. The community members mentioned the need for swimming pools, cinema halls, culture centres, and health care centres. They also discussed their want for better walkways for pedestrian use and the development of playgrounds and sports practice grounds for the youth.

Environmental Assessment Procedure

The major activities to be carried out as part of the Environmental Assessment Procedure include: (i) Environment Screening and description of environmental baselines against which sub-project impacts will be measured (ii) Analysis of alternatives; (iii) Identification of major sub-project activities; (iv) Assessment, prediction and evaluation of impacts of major project

activities on the baseline environment. The EMF presents guidelines for carrying out each of these activities.

Environmental Screening

Once finalised, all the sub-projects to be funded under DCNUP will be subject to an environmental screening. This process will ensure that any project with significant negative impacts on the environment is not executed. The main purpose of "environmental screening" is to get a preliminary idea about the degree and extent of potential environmental impacts of a particular sub-project. The environmental screening would then be used to assess if the sub-project requires further environmental assessment (IEE/EIA). The IEE/EIA (if needed) will be conducted following World Bank guidelines and will be in accordance to the environmental rules and regulations under the Government of Bangladesh. The implementing agency will be responsible for carrying out the environmental screening process.

The major steps making up the environmental screening process includes: (i) reconnaissance survey of the sub-project area and its surroundings by engineers hired by the implementing body; (ii) identification of all major sub-project activities; and (iii) a preliminary assessment of the possible impacts of these activities on ecological, physico-chemical and socio-economic aspects of the sub-project surrounding areas.

The PIU and the consultants would carry out a reconnaissance surveys around the sub-project locations in order to identify all the key environmental features of the area, including human settlements, education, religion, historical establishments, heritage sites and water bodies close to the sub-project site. They will then be responsible for outlining all major sub-project activities and identifying all possible impacts during the construction and operational phases of the sub-project.

Identification of Major Sub-Project Activities

Identifying the details of the sub-project and the main sub-project activities is essential for assessing the environmental impacts of the sub-project during both construction and operational phases. At this stage, it can be noted that acquisition of private land is not required for carrying out any of the sub projects under DCNUP

Assessment and Prediction of Impacts

Once the sub project activities are identified and specific locations are agreed upon the IEE/EIA procedures will assess impacts of these activities on the baseline environment of the proposed locations. The impacts will be different during the construction and the operational phases of the sub-project. The potential environmental impacts during the construction phase of sub-projects

could be categorized into: (a) ecological impacts; (b) physico-chemical impacts; and (c) socio-economic impacts. In addition, it is essential to ensure that Dhaka's archaeological and historical sites are protected during the construction stages of any of the sub project activities under DCNUP. As such, the impact on archaeological sites and safeguarding Physical, Cultural Resources (PCR) will also be assessed in the process.

Once the activities and processes that would take place during operational phase of a sub-project are identified, the potential impacts of these activities on the baseline environment need to be assessed. The potential environmental impacts during operational phase could also be categorized into: (a) ecological impacts; (b) physico-chemical impacts; and (c) socio-economic impacts.

Overall it is without doubt that some of the sub projects under DCNUP is likely to bring significant positive impacts on the overall lives and experiences of the residents of Dhaka city. The key socio-economic parameters that are likely to experience beneficial impacts due to implementation of the sub-projects include: traffic improvement, public health and safety, employment opportunities, enhanced commercial activities, more revenue through existing businesses, entertainment, health and wellness, and better social life.

Environmental Management Procedure

Environmental Management Plan

The main purpose of the environmental management plan (EMP) is to record environmental impacts resulting from the sub-project activities and to ensure that the identified "mitigation measures" to reduce adverse impacts are implemented in a timely fashion. Additionally, it would also contain material to address any unexpected or unforeseen environmental impacts that may arise during construction and operational phases of the sub-projects. The major components of the EMP include:

- Mitigation and enhancement measures: The nature of the sub-projects to be implemented under DCNUP indicates that most of the adverse impacts could be minimized or eliminated by adopting standard mitigation measures; there is also scope to enhance some of the beneficial impacts to be generated from the proposed sub-projects. Considering that sub-projects have not yet been finalised only generic impacts and mitigation measures can be recommended at this stage.

- Monitoring plan: Environmental monitoring will record all environmental impacts resulting from the sub-project activities and will ensure implementation of the "mitigation measures" identified to reduce adverse impacts and enhance positive impacts from project activities. The implementing agency will be responsible for monitoring and

making sure that the environmental mitigation/enhancement measures (including health and safety measures) outlined in the EMP for the particular sub-project are being implemented in accordance to the provisions of the Tender Document.

- Grievance Redress Mechanism (GRM): Grievance Redress Mechanism is a valuable tool which will enable people who are in any way affected by DCNUP sub- project activities to voice their concerns regarding environmental and social impacts. The implementing entities will ensure that grievance redress procedures are in place and would monitor those procedures to ensure that the grievance process is managed effectively.

- Estimation of cost of EMP: Cost of implementing the environmental management plan (EMP) including monitoring activities needs to be estimated as part of the preparation of EMP.

- Institutional arrangement for implementation of EMP: For sub-projects to be implemented by the DSCC, the dedicated Project Implementation Unit (PIU) of the respective city corporation will be responsible for overall environmental management including implementation of mitigation measures and monitoring, and preparation of quarterly progress and monitoring reports.

Environmental Code of Practice (ECoP)

The Environmental Code of Practice (ECoP) is prepared as a guideline for environmental management of the subprojects to be implemented under DCNUP. The main objective of an ECoP is to guarantee that all construction activities under the project are considerate of the environment surrounding it. The well-being of a community and the environment needs to be ensured through:

- Minimizing pollution
- Sustaining eco-systems
- Conserving cultural heritage
- Enhancing amenity

The purpose of the Code of Practice is to ensure that construction activities are conducted in a manner that minimizes impacts on the environment and promotes environmental awareness and use of best practice in overall environmental management. ECoP is applicable to the construction sites and associated activities such as stockpile sites, disposal sites for clean excavated materials, etc. The sub projects under the DCNUP will involve construction work of various types of urban infrastructure, such as bridges, kitchen markets, drains, and road. All of which should be

conducted with regard to the ECoP.

Access to Information

The DCNUP implementing entity will ensure that all the environmental assessment and EMF documents are available to the public by publishing it in their websites. In addition, subproject specific screening/assessment reports will periodically be posted in the DSCC website before the bidding process. Hard copies of these documents in English (including a summary in Bengali) will be made available in the city corporations for the local stakeholders.

After the project is effective a national level workshop will be planned to present the draft EMF report to all relevant parties, including implementing agencies, community representatives, ward councilors, civil society and NGOs etc.

Environmental Management and Information System (EMIS)

An Environmental Management Information System (EMIS) may be implemented for DCNUP after the mid-term review the project. The purpose of establishing the EMIS is to manage the data of the DCNUP and to monitor the progress and impacts accordingly.

Special Environmental Clauses (SECs) for Tender Document

Apart from the provisions under "General Specification" and "Particular Specification" for different sub-project components, the following special environmental clauses (SECs) shall be included in the Tender Document under General/Particular Specification. These clauses are aimed at ensuring that the Contractor carries out his responsibility of implementing the EMP and other environmental and safety measures. The points for the environmental clauses include:

- Environmental Management Plan (EMP)
- Temporary Works
- Health and Safety
- Disposal and Pollution
- Earthworks

Institutional Arrangement and Training Requirement

According to the EMF, the implementing agency will be responsible for the identification of sub-projects and preparation of relevant sub-project documents. The implementing agency will be responsible for providing hired consultants the technical assistance needed for carrying out the

above tasks, and in the preparation of other sub-project documents. The documents for sub-project description, environmental screening, and analysis of alternatives, prepared will then be reviewed by DSCC.

A dedicated Project Implementation Unit (PIU) will be established within the implementing agency, which under the current scope of DCNUP will be DSCC. Therefore, DSCC will be responsible for implementing the project, including technical, operational, environmental and social safeguards, procurement, financial management, public awareness and communication activities. The PIU will consist of a project director (PD), and experts on technical, fiduciary, safeguards, and other relevant fields. The PIU will receive additional support through engineering design, project supervision, contract management, and other consultants.

In terms of Monitoring and Evaluation of DCNUP, the PIU will be the responsible body. The PIU will be supported by an engineering supervision and contract management consulting firm to help monitor and evaluate satisfactory implementation of Environmental and Social Management Plans (ESMPs) and Resettlement Action Plans (RAPs). The PIU will also be responsible for implementing the EMP and ECoP of a subproject. It will have a separate M&E consultant to help monitor the overall project performance and impacts. In order to ensure sustainability over the long run, the project will provide capacity- building support to DSCC to prepare multi-year O&M plans. DSCC will have full management control of the newly-created and improved assets beyond the completion period and will do regular O&M.

Trainings will be provided to help build the capacity of DSCC and help them facilitate the processes much more effectively. The purpose of this is to provide basic knowledge and information on key environmental issues associated with the proposed sub- projects to the relevant parties, including the Local Government Staff, Contractor(s) staff and general project staff. Basic training on regulatory requirements, environmental impacts, and environmental assessment and management would greatly improve the capability of the implementing agency in carrying out their responsibilities under the DCNUP.

Budget Estimation

The financing scope for suggestive activities for ensuring environmental due diligence under DCNUP are given below.

Table b: Budget for activities to ensure environmental due diligence under DCNUP

Activities	Financing scope with provision
Budget for hiring Consultants to carry out Environment Assessment for subprojects (if required) during	DSM Consultancy at DPP

implementation stage	
Hiring of Environment consultants at PIU	Individual Consultant at DPP
Training Requirements	Training (local) component at DPP
EMP implementation (If not included in civil works contract)	To be included in civil works contract
Obtaining and renewing of DoE Clearance	FEE and application head of DPP

The provision of budget has been incorporated at various economic code of DPP.

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Abbreviations

BDT	**Bangladesh Taka**
BNBC	**Bangladesh National Building Code**
BOD	**Biochemical Oxygen Demand**
CAMS	**Continuous Air Monitoring Station**
COD	**Chemical Oxygen Demand**
DG	**Director General**
DNCC	**Dhaka North City Corporation**
DSCC	**Dhaka South City Corporation**
DoE	**Department of Environment**
DCNUP	**Dhaka City Neighborhood Upgrading Project**
EA	**Environmental Assessment**
ECA	**Ecologically Critical Area**
ECoP	**Environmental Code of Practice**
ECR	**Environment Conservation Rules**
EHS	**Environmental, Health and Safety**
EIA	**Environmental Impact Assessment**
EMIS	**Environmental Management Information System**
EMF	**Environmental Management Framework**
EMP	**Environmental Management Plan**
FGD	**Focus Group Discussion**
GoB	**Government of Bangladesh**
GRC	**Grievance Redress Committee**
IDA	**International Development Association**
IEE	**Initial Environmental Examination**
IFC	**International Finance Corporation**
NGO	**Non-Government Organization**
OHS	**Occupational Health and Safety**
OP	**Operational Policy**
PAP	**Project Affected Person**
PCAIP	**Public Consultation and Access to information Plan**
PC	**Public Consultation**
PCR	**Physical Cultural Resources**
PD	**Project Director**
PIU	**Project Implementation Unit**
PPR	**Public Procurement Rule**
PM	**Particulate Matter**
PM2.5	**Particulate Matter with aerodynamic diameter 2.5 micrometers**
PM10	**Particulate Matter with aerodynamic diameter 10 micrometers**

RAP	**Resettlement Action Plans**
RCC	**Reinforced Cement Concrete**
SECs	**Special Environmental Clauses**
SMF	**Social Management Framework**
SMP	**Social Management Plan**
SPM	**Suspended Particulate Matter**
TDS	**Total Dissolved Solids**
ToR	**Terms of Reference**
WBG	**World Bank Group**

Chapter 1: Introduction

1.1 Background

Bangladesh has experienced a relatively fast rate of urbanisation in the past decade. Cities play a major role in contributing to the country's overall economic growth. Dhaka, the capital city, has been the country's central economic and political hub, generating at least one third of the country's GDP.

The core of Dhaka city – home to more than half of the metro area population- is under the jurisdiction of two city corporations: Dhaka South (DSCC) and Dhaka North (DNCC)[1]. The expanded metro area comprises other adjoining local governments including two city corporations (Gazipur and Narayanganj) and other municipalities. Despite the various development efforts undertaken by the Government of Bangladesh (GoB) to improve the conditions of these cities, lack of coordination between separate entities and institutional fragmentation has been the root cause for preventing proper facilitation of such plans at a municipal and local level. This has had negative impacts on the cities' inclusion and liveability, especially for the poorest and most vulnerable segments of the community.

At present Dhaka has been denounced as one of least liveable cities in the world[2]. Some of the key issues contributing to the cities overall liveability include the devastating air pollution, severe traffic congestion, inadequate infrastructure, limited employment opportunities and poor drainage and waste management. Due to its unplanned expansion the city currently hosts hundreds of urban slums that are crammed with people living in extremely poor conditions. The number keeps increasing as people from the rural areas continue to migrate to Dhaka in search of a better life. As the threats of climate change continue to impact Bangladesh more people are expected to migrate to urban cities from coastal areas, adding to the existing environmental stresses and limiting the availability of open spaces for the public to use and appreciate.

In order to address some of these urban issues the Government of Bangladesh in partnership with the World Bank Group (WBG) is preparing a "Dhaka Metropolitan Transformation Platform". The Platform is contributing towards the development of a roadmap to transform Dhaka into a more liveable megacity through a range of interventions that demonstrate high visibility improvements within a short time frame.

In line with this work The World Bank (WB) is assisting the Government of Bangladesh (GoB) through the Dhaka South City Corporation (DSCC)in preparing the Dhaka City Neighborhood

[1] Dhaka City Corporation was split into two in 2011.
[2] Ranking by Economist Intelligence Unit (2017)

Upgrading Project (DCNUP), as a rapid results initiative which will support an initial set of targeted high-visibility interventions to demonstrate the potential for transforming Dhaka city. The project will be designed for rapid response to development needs in selected neighbourhoods to improve liveability. Although as a starting point the project will only focus on Dhaka South City Corporation (DSCC), in the near term the project can be extended to Dhaka North City Corporation (DNCC).

1.2 Brief Project Outlook

The Dhaka City Neighborhood Upgrading Project (DCNUP) plans on enhancing the Bank's long-term engagement with Dhaka city through investing in urban development interventions to improve the lives of the people using them. The scope of the project will focus on interventions that can be implemented relatively rapidly and can have a high visibility impact on the daily lives of the community.

The DCNUP will focus on financing improvement if public spaces around the city, such as sidewalks, parks, and community centres. Through this approach the project aims to demonstrate the importance and validity of an inclusive process for community investments. In order to ensure sustainability of all development efforts the project will also support improvements in selected city-wide administrative services and strengthen the capacity of local institutions in urban management.

Although specific subprojects have not been decided upon at this stage, specific location clusters have been considered for some of the possible interventions. Within these short listed neighbourhoods, the interventions and subprojects will be selected if they contribute to one or more of the following objectives: (a) Accessibility and mobility; (b) Pedestrian safety; (c) Neighbourhood public spaces; (d) Local economic development; (e) Traffic and parking management; (f) Sanitation and clean environment; (g) Local-level public transport; (h) Public & civic amenities; (i) "Green Infrastructure" and drainage to increase disaster resilience, especially flood risk management; and (j) Behaviour change activities for improving city liveability & municipal services.

The final decisions leading to the design of each sub project intervention will incorporate feedback from all relevant stakeholders in the selected areas, this will include beneficiaries of the project and the local community representatives. The activities selected for this project will be within the existing land owned by the Government of Bangladesh and DSCC and there will be no acquisition of private land.

Environmental Safeguard Requirement

While it is certain that the DCNUP will be conducted within the expanded city of Dhaka, the neighbourhoods and exact locations of interventions are not known at this stage, neither are the interventions and designs confirmed. Component and site specific environmental and social risks and impacts will only be known at the implementation stage. Therefore, a framework approach has been taken and an Environmental Management Framework (EMF) has been prepared to guide site specific environmental screening and impact assessment, and preparation and implementation of environmental management plans.

The Dhaka City Neighborhood Upgrading Project (DCNUP) will be implemented by Dhaka South City Corporation. Considering that the IDA and the GoB are responsible for financing the project, the environmental assessment of the proposed project should comply with the policies and legislative requirements of the World Bank and the GoB. Therefore, the proposed project will require an Environmental Assessment in accordance with the Environment Conservation Act 1995 (Amended in 2000, 2002 and 2010), the Environment Conservation Rules 1997, and the World Bank Safeguard Policies.

The following EMF will be based on:

(a) Assessment of potential environmental impacts posed by the different types of sub-projects to be implemented under the DCNUP;
(b) Preparation of standard mitigation measures, enhancement measures and monitoring strategies for specific sub-projects (once identified);
(c) Understanding the barriers and capacity needs of environmental management of all stakeholder organizations involved; and
(d) Structuring institutional arrangement with relevant parties through assigning responsibilities for environmental management and monitoring of sub-projects.

The Environmental Management Framework intends to outline general policies, guidelines and procedures to be incorporated into the design and implementation of all potential sub-projects under the proposed project (DCNUP); it will serve as a guide for preparation of the sub-project specific EAs once these are identified.

1.3 Rationale for EMF

The World Bank takes responsibility for ensuring that all proposed projects that are financed by the Bank[3] are environmentally sound and sustainable and so requires an environmental

[3]"Bank" includes IBRD and IDA; "EA" refers to the entire process set out in OP/BP 4.01; "loans" includes IDA credits and IDA grants; "borrower" includes, for guarantee operations, a private or public project sponsor receiving from another financial institution a loan guaranteed by the Bank; and "project" covers all operations financed by Investment Project. Financing or Bank guarantees ("project" does not cover operations supported by Development Policy lending (for which the environmental provisions are set out in OP/BP 8.60, *Development Policy Lending*), or operations supported by Program-for-Results Financing (for which environmental provisions are set out in OP/BP 9.00, *Program-for-Results* Financing) and also includes projects and components funded under the Global Environment Facility. The

assessment (EA) to be carried out. In accordance with the Bank's OP 4.01, depending on the project a range of instruments can be applied to fulfil the Bank's EA requirements and in some cases more than one instrument may be needed. However, in case of DCNUP since the sub projects have not been finalised yet a framework approach has been taken and an EMF has been prepared to satisfy the Bank's EA requirements. The EMF will contain necessary guidelines for carrying out environmental assessments of sub-projects under DCNUP.

Based on the nature of the possible sub-projects, scale and magnitude and selected locations for work, the DCNUP has been classified under Category B[4] of the Bank's environmental screening categories. In compliance with OP 4.01 the following EMF will set out principles, rules, guidelines and procedures to evaluate the environmental impacts.

1.4 Basis of EMF

1.4.1 Objectives of EMF

The overall objectives for this EMF include the following:

- To ensure that the potential sub-projects will be formulated by DSCC through an active stakeholder participation, incorporating views of those in the community who would directly benefit or be impacted by the proposed sub-projects;

- To make sure potential sub-projects are designed considering the site specific socio-cultural and environmental situation at the selected locations and to investigate the impacts of the major sub-project activities during both construction and operational phases

- To design adequate mitigation and enhancement measures to account for all possible project impacts and to use as a reference document consisting of alternative investment routes

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project is described in the Loan/Credit/Grant Agreement. This policy applies to all components of the project, regardless of the source of financing.

[4]When the screening process determines, or national legislation requires, that any of the environmental issues identified warrant special attention, the findings and results of Category B EA may be set out in a separate report. Depending on the type of project and the nature and magnitude of the impacts, this report may include, for example, a limited environmental impact assessment, an environmental mitigation or management plan, an environmental audit, or a hazard assessment. For Category B projects that are not in environmentally sensitive areas and that present well-defined and well-understood issues of narrow scope, the Bank may accept alternative approaches for meeting EA requirements: for example, environmentally sound design criteria, siting criteria, or pollution standards for small-scale industrial plants or rural works; environmentally sound siting criteria, construction standards, or inspection procedures for housing projects; or environmentally sound operating procedures for road rehabilitation projects.

- To ensure sustainability of the project over the long run through developing monitoring plans as part of the overall environmental management plan (EMP). Incorporate guidelines for following the Environmental Management Plan (EMP), Environmental code of practices (ECoP) and other environmental audits

- To make sure all the possible sub-projects are in compliance with the relevant policies, rules and regulations of the GoB (e.g., Environmental Conservation Rules 1997) as well as the safeguard policies of the World Bank.

1.4.2 Components of EMF

The EMF will have the necessary components to identify the potential generic negative environmental impacts, propose generic mitigation measures, provide basic screening criteria of all proposed sub projects for their potential impacts, list the type of safeguard instruments to be used in various cases, provide mitigating, managing, monitoring and reporting measures for environmental safeguards compliance during operation. The EMF will also outline the need for necessary training and capacity building arrangements for the implementing agencies of the DCNUP.

1.4.3 Methodology applied for EMF

At the initial stages the project documents were reviewed thoroughly to understand the proposed interventions in sub project areas. This information has been gathered and analysed as part of the EMF process. This was supported by a background information review through available literature sources to better understand the proposed project area and its current status. The information collected through this also set the base for the reconnaissance surveys that took place at later stages.

After an initial set of information was collected and reviewed, site visits were conducted by the consultant to evaluate the locations and assess the suitability of the area for possible interventions and understand the baseline conditions first hand. During this stage possible environmental impacts of suggested interventions were also identified. A reconnaissance survey was carried out additionally to collect primary data for some of the sub-project areas. These site surveys were focused on developing a broad baseline picture of various environmental aspects of some sample areas. The primary data for assessment included; noise level measurements, surface water sample (typically from the water body receiving drainage water), and a groundwater sample (typically from a randomly selected tube well).

Parallel to this a desk based review of all relevant legislative material was also carried out. This included reviewing the environmental laws and acts in Bangladesh that is relevant for the proposed project as well as the guidelines and the World Bank Operational Policies applicable

for this project.

In order to ensure that the views of the community representatives are incorporated in the sub project designs, stakeholder consultations were carried out in four location clusters that have been short listed for sub projects. This included: Kamrangirchar, Lalbagh, Sutrapur and Khilgaon. These consultation sessions were attended by ward councillors of the local areas, primary stakeholders such as local residents and entrepreneurs, members of the youth club, social organizations and political parties, imam of the local mosque, teachers and local women representatives of the community. Following the stakeholder consultations, a separate Focus Group Discussion was also held with the female stakeholders in some of the areas, this helped shed light on some of the gender issues of the local area. It also revealed specific needs of the women in the area to help improve the quality of their lives. This crucial information will inform the sub project designs in order to make sure the voices and opinions of women are incorporated in the plans.

Members of the Project Implementation Unit (PIU) of the DSCC facilitated the consultations and the social and environmental safeguard specialists, urban design specialists, and international urban design consultants appointed by the World Bank joined the consultation.

As part of the environmental assessment (EA), discussions have been held with DSCC officials on different aspects of project implementation and management (including experience from recent CASE project), the discussions surrounded lessons learned and focused on the existing capacity and institutional arrangement for environmental management of the proposed sub-projects.

The final stages of the methodology included identification of some of the possible environmental impacts for anticipated natures of subprojects. Using this information some generic mitigation measures were also researched and recommended in order to minimize these impacts.

1.5 Overall Layout of EMF

The first section of the EMF contains a brief description of DCNUP and the possible sub projects under it. This is followed by the legislative and administrative framework, which will in detail describe all relevant environmental policies of the Government of Bangladesh and all World Bank safeguard policies that apply to this particular project, based on its category and the proposed nature of sub projects. In this segment the implication of the national policies and regulations on DCNUP and the implications of the World Bank safeguard policies on DCNUP will also be explained in detail.

The following sections contain a detailed description of possible sub projects, considering their short-listed locations and the nature of proposed interventions, this section also includes possible environmental considerations to be considered in sub-project design. The section for environmental assessment includes the environmental baseline conditions at a district level collected through secondary sources and the primary data reflecting the environmental conditions of some proposed locations. It also covers an overall assessment of some of the tentative project sites.

The EMF contains guidelines for the environmental screening procedures and the assessment of alternatives, to be carried out by the implementing agency for each sub project under DCNUP. All relevant procedures required for the implementation of the sub projects will be outlined by the EMF for being used by DSCC during the implementing stages. Following the environmental screening process if additional IEE/EIA is needed for specific subprojects DSCC will be in charge of carrying out the assessments in accordance to the national policies and the Bank requirements. DSCC will also be responsible for getting necessary environmental clearance from the Department of Environment (DoE) for subprojects under DCNUP.

The EMF also allocates a section for highlighting all the possible environmental impacts of all proposed sub projects and the possible mitigation measures to reduce the adverse effects, both during the construction as well as the operational stages. The EMF contains a section describing the public consultations and stakeholder engagement experience.

The document has a section for describing all the environmental management procedures that need to be followed for sub-projects under DCNUP. This includes the Environmental Management Plan (EMP), Environmental Code of Practice (ECoP), Environment Management and Information Systems (EMIS) and Special Environmental Clauses (SECs) for Tender Document.

Assessment of the technical and institutional capacity of the implementing agency is highly important for successful execution of the DCNUP. As such the EMF contains information regarding institutional requirements, outlines the monitoring and reporting guidelines for the project implementation stages, and contain training and capacity building recommendations for relevant parties involved. The various annexes attached to the EMF document includes formats and guidelines for conducting Environmental Screening, EMP, ECoP, Analysis of Alternatives and ToRs for hiring consultants to conduct the following procedures on behalf of the implementing agency.

Chapter 2: Policy and Administrative Framework

The proposed Dhaka City Neighborhood Upgrading Project (DCNUP) will be developed and implemented in accordance with all applicable environmental laws and regulations; national level as well as World Bank safeguards policies. The Government of Bangladesh has an environmental legal framework covering aspects of environmental protection and natural resource management. The environmental legal framework and the various environments related laws and regulations will apply to the work proposed by the DCNUP. The World Bank safeguard policies are in place to ensure that all proposed projects that are Bank financed take adequate precaution to prevent any adverse impact on the surrounding environment and its habitants.

This section presents an overview of some of the national environmental laws and regulations and World Bank safeguard policies that are relevant to the proposed activities supported by the DCNUP.

2.1 National Environmental and Other Laws and Regulations

National Environmental Policy 1992

The idea of environmental protection through national laws was first declared in Bangladesh through the adoption of the Environment Policy, 1992 and the Environment Action Plan, 1992. The key objectives of Environmental policy include: maintenance of ecological balance and overall development through protection and improvement of the environment, protecting the country against natural disaster, identifying and regulating activities that may pollute and degrade the environment, ensuring development that is environmentally sound, ensuring sustainable, long term and environmentally sound base of natural resources, and remaining in line with all international environmental initiatives.

Bangladesh Environmental Conservation Act (ECA), 1995 (Amendment Act- 2010)

This umbrella act, the Bangladesh Environmental Conservation Act (ECA) includes laws for conservation of the environment, improvement of environmental standards, and control and mitigation of environmental pollution. It is currently the main legislative framework document relating to environmental protection in Bangladesh, which repealed the earlier Environment Pollution Control ordinance of 1977.

The main provisions of the Act can be summarized as:

- Declaration of ecologically critical areas, and restrictions on the operations and processes, which can be carried out or cannot be initiated in the ecologically critical area;

- Regulation in respect of vehicles emitting smoke harmful for the environment;
- Environmental Clearance;
- Regulation of industries and other development activities with regards to discharge
- permits;
- Promulgation of standards for quality of air, water, noises and soils for different areasfor different purposes;
- Promulgation of standard limits for discharging and emitting waste; and formulation and declaration of environmental guidelines;

The first sets of rules to implement the provisions of the Act were declared in 1997 (see below: "Environmental Conservation Rules 1997"). The Department of Environment (DoE) implements the Act. DoE is headed by a Director General (DG). The DG has complete control over the DoE and the main power of DG, as given in the Act, may be outlined as follows:

- Identification of different types and causes of environmental degradation and pollution;
- Instigating investigation and research regarding environmental conservation, development and pollution.
- Power to close down the activities considered harmful to human life or the environment.
- Power to declare an area affected by pollution as an Ecologically Critical Area.

Under the Act, operators of industries/projects must inform the Director General of any pollution incident. In the event of an accidental pollution, the Director General may take control of an operation and the respective operator is bound to help. The operator is responsible for the costs incurred and possible payments for compensation.

Environment Conservation Rules (ECR) 1997 amended 2003

These are the first set of rules, promulgated under the Environment Conservation Act 1995. Among other things, these rules set (i) the National Environmental Quality Standards for ambient air, various types of water, industrial effluent, emission, noise, vehicular exhaust etc., (ii) requirement for and procedures to obtain Environmental Clearance, and (iii) requirements for IEE/EIA according to categories of industrial and other development interventions.

However, the rules provide the Director General a discretionary authority to grant 'Environmental Clearance' to an applicant, exempting the requirement of site/location clearance, provided the DG considers it to be appropriate.

Presently, "EIA Guidelines for Industries" published by the Department of Environment and the "Environment Conservation Rules 1997" are the formal documents providing guidance for conducting Environmental Assessment. Any proponent planning to set up or operate an industrial project is required to obtain an "Environmental Clearance Certificate" from the Department of Environment (DoE), under the Environment Conservation Act 1995 amended in 2002.

The first step of obtaining Environmental Clearance for the project the proponent is to apply for it in prescribed form, together with a covering letter, to the Director/Deputy Director of respective DoE divisional offices. The application should include a project feasibility study report, the EIA report, No Objection Certificate (NOC) of the local authority; Mitigation Plan for minimizing potential environmental impacts; and appropriate amount of fees in 'treasury chalan' (in the present case the amount is BDT 50,000). The DOE authority reserves the right to request additional information, supporting documents, or other additional materials for the proposed project. Under the conditions specified in the Environment Conservation Rules-1997, the DoE divisional authority must issue environmental site clearance certificates within working days from the date of submitting the application, or the refusal letter with appropriate reasons for such refusal. The clearance issued remains valid for a one-year period and is required to be renewed 30 days prior to its expiry date.

Environment Conservation Rules-1997 ensures the right of any aggrieved party to appeal against the notice order or decision to the appellate authority. The appeal should be made to the appellate authority with clear justification and the attested copy of the specific notice, order, or decision of the respective DoE office against, which the appeal is to be made. Prescribed fee is to be paid through 'Treasury Chalan' of BDT 50,000 and the relevant papers for the appeal must be placed.

Rule 7 of Environment Conservation Rules (ECR) has classified the projects into the following four categories based on their site conditions and the impacts on the environment; (a) Green, (b) Orange A, (c) Orange B and (d) Red. Various industries and projects falling under each category have been listed in schedule 1 of ECR 1997. According to the Rules, Environmental Clearance Certificate is issued to all existing and proposed industrial units and projects, falling in the Green Category without undergoing EIA. However, for category Orange A and B and for Red projects, require location clearance certificate and followed by issuing of Environmental Clearance upon the satisfactory submission of the required documents. Green listed industries are considered relatively pollution-free, and therefore do not require site clearance from the DoE. On the other hand, Red listed industries are those that can cause 'significant adverse' environmental impacts and are, therefore, required to submit an EIA report. These industrial projects may obtain an initial Site Clearance on the basis of an IEE based on the DoE's prescribed format, and subsequently submit an EIA report for obtaining Environmental Clearance. Figure 1 shows the process of application leading to environmental clearance for all four categories of projects.

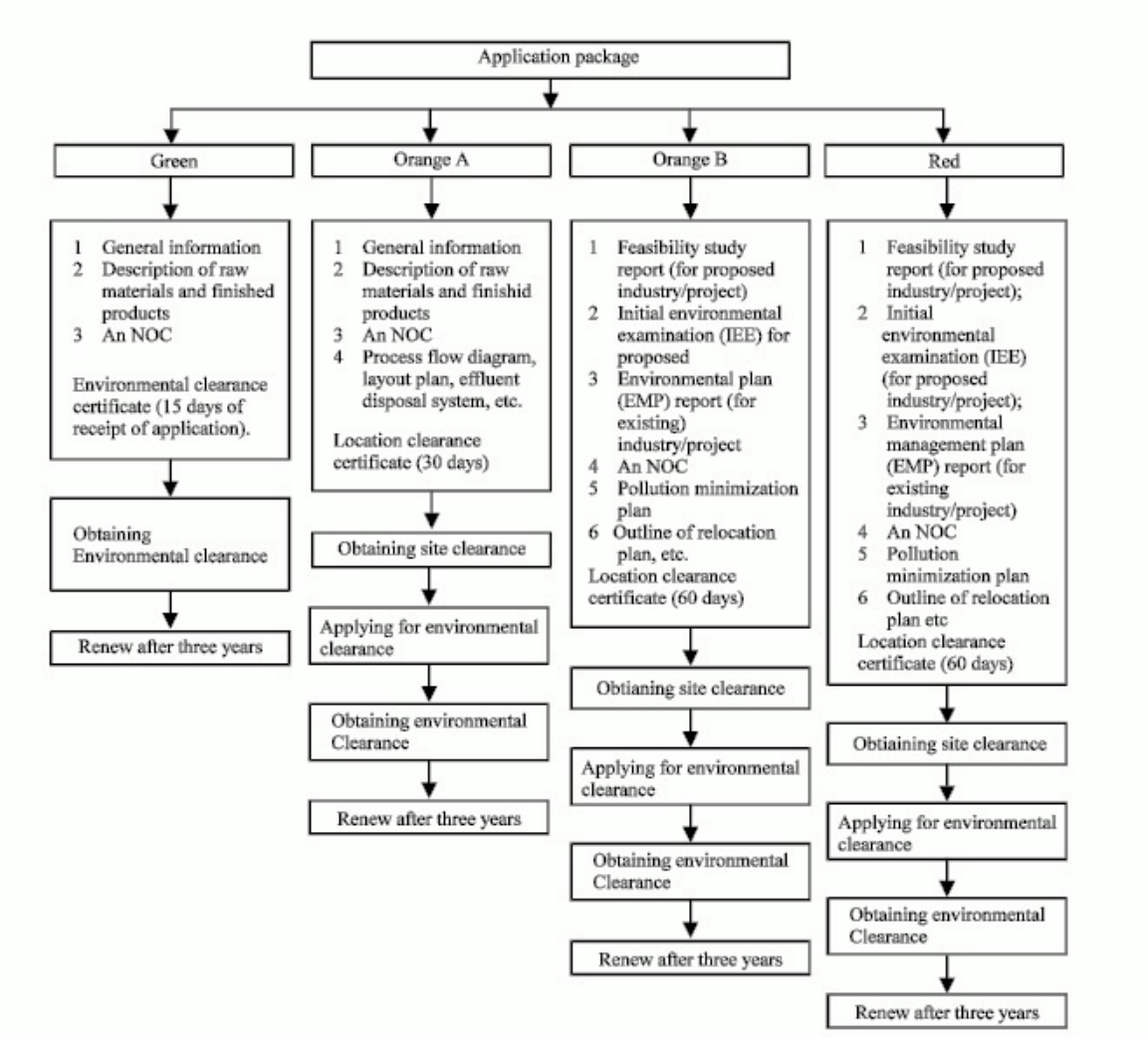

Figure 1 Categories for Project according to Bangladesh Environmental Conservation Act, 1995

National Land-use Policy, 2001

The Government of Bangladesh has adopted national Land-use Policy, 2001. The salient features of the policy objectives relevant to the proposed project are as follows:

- To prevent the current tendency of gradual and consistent decrease of cultivable land for the production of food to meet the demand of expanding population;
- To ensure that land use is in harmony with the natural environment;
- To use land resources in the best possible way and to play a supplementary role in controlling the consistent increase in the number of land less people towards the elimination of poverty and the increase of employment;
- To protect natural forest areas, prevent river erosion and destruction of hills;

- To prevent land pollution; and
- To ensure the minimal use of land for construction of both government and nongovernment buildings.

Environment Court Act, 2000

The aim and objective of the Act is to materialize the Environmental Conservation Act, 1995 through judicial activities. This Act established Environmental Courts (one or more in every division), set the jurisdiction of the courts, and outlined the procedure of activities and power of the courts, right of entry for judicial inspection and for appeal as well as the constitution of Appeal Court.

Bangladesh Labor Act, 2006

This Act pertains to the occupational rights and safety of factory workers and the provision of a comfortable work environment and reasonable working conditions. In the chapter VI of this law safety precaution regarding explosive or inflammable dust/ gas, protection of eyes, protection against fire, works with cranes and other lifting machinery, lifting of excessive weights are described. And in the Chapter VIII provision safety measure like as appliances of first aid, maintenance of safety record book, rooms for children, housing facilities, medical care, group insurance etc. are illustrated.

Public Procurement Rule (PPR), 2008

This document contains the public procurement rules of Bangladesh and this shall apply to the Procurement of Goods, Works or Services by any government, semi-government or any statutory body established under any law. The rule includes adequate measures regarding the "Safety, Security and Protection of the Environment' in the construction works. This clause states that, the contractor shall take all reasonable steps to (i) safeguard the health and safety of all workers working on the Site and other persons entitled to be on it, and to keep the Site in an orderly state and (ii) protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of the Contractors methods of operation.

Bangladesh National Building Code

The basic purpose of this code is to establish minimum standards for design, construction, quality of materials, use and occupancy, location and maintenance of all buildings within Bangladesh in order to safeguard, within achievable limits, life, limb, health, property and public

welfare. The installation and use of certain equipment, services and appurtenances related, connected or attached to such buildings are also regulated herein to achieve the same purpose.

Part-7, Chapter-3 of the Code has clarified the issue of safety of workmen during construction and with relation to this, set out the details about the different safety tools of specified standard. In relation with the health hazards of the workers during construction, this chapter describes the nature of the different health hazards that normally occur in the site during construction and at the same time specifies the specific measures to be taken to prevent such health hazards. According to this chapter, exhaust ventilation, use of protective devices, medical checkups etc. are the measures to be taken by the particular employer to ensure a healthy workplace for the workers.

Section 1.4.1 of chapter-1, part-7 of the BNBC, states the general duties of the employer to the public as well as workers. According to this section, "All equipment and safeguards required for the construction work such as temporary stair, ladder, ramp, scaffold, hoist, run way, barricade, chute, lift etc. shall be substantially constructed and erected so as not to create any unsafe situation for the workmen using them or the workmen and general public passing under, on or near them".

Part-7, Chapter -1 of the Bangladesh National Building Code (BNBC) clearly sets out the constructional responsibilities according to which the relevant authority of a particular construction site shall adopt some precautionary measures to ensure the safety of the workmen. According to section 1.2.1 of chapter 1 of part 7, "in a construction or demolition work, the terms of contract between the owner and the contractor and between a consultant and the owner shall be clearly defined and put in writing. These however will not absolve the owner from any of his responsibilities under the various provisions of this Code and other applicable regulations and by-laws. The terms of contract between the owner and the contractor will determine the responsibilities and liabilities of either party in the concerned matters, within the provisions of the relevant Acts and Codes (e.g.) the Employers' Liability Act, 1938, the Factories Act 1965, the Fatal Accident Act, 1955 and Workmen's Compensation Act 1923". (After the introduction of the Bangladesh Labor Act, 2006, these Acts have been repealed).

To prevent workers falling from heights, the Code in section 3.7.1 to 3.7.6 of chapter 3 of part 7 sets out the detailed requirements on the formation and use of scaffolding. According to section 3.9.2 of the same chapter, "every temporary floor opening shall either have railing of at least 900 mm height or shall be constantly attended. Every floor hole shall be guarded by either a railing with toe board or a hinged cover. Alternatively, the hole may be constantly attended or protected by a removable railing. Every stairway floor opening shall be guarded by railing at least 900 mm high on the exposed sides except at entrance to stairway. Every ladder way floor opening or platform shall be guarded by a guard railing with toe board except at entrance to opening. Every

open sided floor or platform 1.2 meters or more above adjacent ground level shall be guarded by a railing on all open sides except where there is entrance to ramp, stairway or fixed ladder. The precautions shall also be taken near the open edges of the floors and the roofs"

2.2 Institutional Arrangements at National and Sub-National Levels

As outlined in the National Environment Policy (1992) and National Forest Policy (1994), the Ministry of Environment and Forests (MoEF) acts as the guide and custodian for the conservation and development of the environment and, in the pursuit of that goal, to ensure through appropriate laws and regulations that natural resources, including land, air, water and forests, are not exploited and managed in an environmentally sustainable manner. The Department of Environment (DoE), formed in 1989 with a mandate for environmental management later formalized under the Environment Conservation Act, 1995 (ECA'95), acts as the technical arm of the Ministry and is responsible for environmental planning, management, monitoring and enforcement. The DoE is headed by a Director General, with Divisional offices in Dhaka, Chittagong, Bogra, Khulna, Barisal and Sylhet. The Environment Conservation Rules (1997) provide the Director General a discretionary authority to grant 'Environmental Clearance' to an applicant, exempting the requirement of site/location clearance, provided the DG considers it to be appropriate.

The mandate of the Department has expanded over time, evolving from an exclusive focus on pollution control to include natural resources and environmental management, now covering:

- monitoring environmental quality;
- promoting environmental awareness through public information programs;
- controlling and monitoring industrial pollution;
- reviewing environmental impact assessments and managing the environmental clearance process; and,
- establishing regulations and guidelines for activities affecting the environment

Thus, the GoB has well-defined legal/regulatory systems for safeguarding environment issues through the Ministry of Environment and Forest in the policy level and the Department of Environment in the implementation level. Although the environmental legal framework is relatively modern and is in an advanced state in connection with the environmental assessment, the main limitations are in the capabilities of the regulatory agencies to enforce and promulgate these legal tools. The existing resources (manpower, technical tools etc.) of regulatory agencies are deemed largely inadequate to monitor compliance with existing rules.

The environmental management system in Bangladesh constitutes an extremely centralized and partially de-concentrated model of environmental management. At the divisional level, there is a Divisional Environmental Advisory Committee headed by the Divisional Commissioner with

representation from various government agencies. The DoE does not have any representation below this level. An important gap in existing formal rules (the Constitution and other laws) is that the divisions, districts, upazilas, unions do not have a clearly defined role to play in environmental management. Lack of an appropriate mandate and institutional arrangements below the divisional level is a key factor contributing to difficulties in implementing environmental policies and regulations.

The ECA'95 and ECR '97 make no provision for the environmental clearance function of the DoE to be devolved to the municipalities, upazila or union authorities, even for small scale, low impact investments falling under the Green Category. As per ECA '95, the only potentiallyimportant environmental role given at this level is the issuance of the no objection certificate (NOC), which is a requirement while applying for environmental clearance from the DoE. In this case, the applicant is to obtain and submit a No Objection Certificate issued by the Municipal Chairman in Pourashavas, and the City Corporation Executive in metropolitan areas. Although there is no systematic review or assessment process in place, these certificates are normally procured through private negotiation. Nevertheless, if greater public consultation could be introduced into this process, municipalities could perform a valuable role in environmental management, particularly considering their unique positions as locally-based elected representatives.

The Dhaka South City Corporation (DSCC)plays a pivotal role in urban infrastructure development within Dhaka City. The DSCC aspires to improve the quality of lives of those residing in the rapidly urbanized megacity. DSCC in order to be able to deliver sustainable projects has pursued a strategy of mainstreaming environmental concerns in project development and implementation. DSCC have gained experience on environmental diligence through working with a variety of multi-lateral agencies such as ADB, World Bank etc.

2.3 World Bank Safeguard Policies

The objective of the World Bank safe guard policies is to prevent and mitigate undue harm to the people and their environment in the development process. Safeguard policies provide a platform for the participation of stakeholders in project design, and act as an important instrument for building ownership among the local population. The effectiveness and development impact of projects and programs supported by the Bank has substantially increased as a result of attention to these policies. The World Bank has ten environmental, social, and legal safeguard policies. The relevant policies for environmental safeguard are the following:

- OP/BP 4.01 Environmental Assessment
- OP/BP 4.04 Natural Habitats
- OP/BP 4.09 Pest Management
- OP/BP 4.11 Physical Cultural Resources

- OP/BP 4.36 Forests
- OP/BP 4.37 Safety of Dams

Operational Policies (OP) are the statement of policy objectives and operational principles including the roles and obligations of the Borrower and the Bank, whereas Bank Procedures (BP) is the mandatory procedures to be followed by the Borrower and the Bank. Apart from these, the IFC guidelines for Environmental Health and Safety have been adopted by the World Bank Group which is also relevant for environmental protection and monitoring. In addition to that the Policy on Access to Information of the World Bank also relates to environmental safeguard. The environmental safeguard and access to information policy as well as the IFC guidelines are discussed below:

OP/BP 4.01 Environmental Assessment

This policy is considered to be the umbrella safeguard policy to identify, avoid, and mitigate the potential negative environmental and social impacts associated with Bank lending operations. In World Bank operations, the purpose of Environmental Assessment is to improve decision making, to ensure that project options under consideration are sound and sustainable, and that potentially affected people have been properly consulted. The borrower is responsible for carrying out the EA and the Bank advises the borrower on the Bank's EA requirements. The Bank classifies the proposed project into three major categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts:

Category A: The proposed project is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works.

Category B: The proposed project's potential adverse environmental impacts on human population or environmentally important areas-including wetlands, forests, grasslands, or other natural habitats- are less adverse than those of Category A projects. These impacts are site specific; few if any of them are irreversible; and in most cases mitigation measures can be designed more readily than Category A projects.

Category C: The proposed project is likely to have minimal or no adverse environmental impacts.

OP/BP 4.04 Natural Habitats

The conservation of natural habitats is essential for long-term sustainable development. The Bank therefore supports the protection, maintenance, and rehabilitation of natural habitats and

their functions in its economic and sector work, project financing, and policy dialogue. The Bank supports, and expects borrowers to apply, a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development. The Bank does not support projects that involve the significant conversion or degradation of critical natural habitats.

OP/BP 4.09 Pest Management

The aim of the pest management policy is to minimize and manage the environmental and health risks associated with pesticide use and promote and support safe, effective and environmentally sound pest management. The procurement of any pesticide in a Bank-financed project is contingent on an assessment of the nature and degree of associated risks, taking into account the proposed use and the intended user. To manage pests that affect either agriculture or public health, the Bank supports a strategy that promotes the use of biological or environmental control methods and reduces reliance on synthetic chemical pesticides. In Bank- financed projects, the borrower addresses pest management issues in the context of the project's environmental assessment. In appraising a project that will involve pest management, the Bank assesses the capacity of the country's regulatory framework and institutions to promote and support safe, effective, and environmentally sound pest management.

OP/BP 4.11 Physical Cultural Resources

Physical cultural resources are defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Their cultural interest may be at the local, provincial or national level, or within the international community. Physical cultural resources are important as sources of valuable scientific and historical information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices. The Bank assists countries to avoid or mitigate adverse impacts on physical cultural resources from development projects that it finances. The impacts on physical cultural resources resulting from project activities, including mitigating measures, may not contravene either the borrower's national legislation, or its obligations under relevant international environmental treaties and agreements. The borrower addresses impacts on physical cultural resources in projects proposed for Bank financing, as an integral part of the environmental assessment (EA) process.

OP/BP 4.36 Forests

Forest is defined as an area of land of not less than 1.0 hectare with tree crown cover (or equivalent stocking level) of more than 10 percent that have trees with the potential to reach a

minimum height of 2 meters at maturity in situ. A forest may consist of either closed forest formations, where trees of various stories and undergrowth cover a high proportion of the ground, or open forest. The definition includes forests dedicated to forest production, protection, multiple uses, or conservation, whether formally recognized or not. The definition excludes areas where other land uses not dependent on tree cover predominate, such as agriculture, grazing or settlements. In countries with low forest cover, the definition may be expanded to include areas covered by trees that fall below the 10 percent threshold for canopy density, but are considered forest under local conditions. The Bank's forests policy recognizes the importance of forests to reduce poverty in a sustainable manner integrates forests effectively in economic development, aims to reduce deforestation, promote afforestation and enhance the environmental contribution of forested areas. The Bank assists borrowers with the establishment and sustainable management of environmentally appropriate, socially beneficial, and economically viable forest plantations to help meet growing demands for forest goods and services.

OP/BP 4.37 Safety of Dams

When the World Bank finances new dams, the Policy Safety on Dams requires that experienced and competent professionals design and supervise construction, and that the borrower adopts and implements dam safety measures throughout the project cycle. The policy also applies to existing dams where they influence the performance of a project. In this case, a dam safety assessment should be carried out and necessary additional dam safety measures implemented.

IFC Environmental, Health and Safety Guidelines

The Environmental, Health and Safety (EHS) Guidelines of the World Bank Group (WBG)/International Finance Corporation (IFC), 2008 is the safeguard guidelines for environment, health and safety for the development of the industrial and other projects. They contain performance levels and measures that are considered to be achievable in new facilities at reasonable costs using existing technologies. When host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent. If less stringent levels or measures than those provided in these EHS Guidelines are appropriate, in view of specific project circumstances, a full and detailed justification for any proposed alternatives is needed as part of the site-specific environmental assessment. This justification should demonstrate that the choice for any alternate performance levels is protective of human health and the environment.

The section 4 of EHS Guidelines for “Construction and Decommissioning” provides additional, specific guidance on prevention and control of community health and safety impacts that may occur during new project development, at the end of the project life-cycle, or due to expansion or modification of existing project facilities.

World Bank Policy on Access to Information

In addition to the safeguard policies, the Access to Information Policy also relates to safeguards. To promote transparency and facilitate accountability, Bank Access to Information Policy supports decision making by the Borrower and Bank by allowing the public access to information on environmental and social aspects of projects in an accessible place and understandable form and language to key stakeholders. The Bank ensures that relevant project-related environmental and social safeguard documents, including the procedures prepared for projects involving subprojects, are disclosed in a timely manner before project appraisal formally begins. The policy requires disclosure in both English and the local language and must meet the World Bank standards.

2.4 Implications of National Policies and Regulations on DCNUP

The Environmental Conservation Rules (ECR) 1997 (DoE, 1997) classifies projects into four categories according to potential environmental impacts: (1) Green; (2) Orange A; (3) Orange B; and (4) Red. Green category projects are those with mostly positive environmental impacts or negligible negative impacts; Orange A category projects are those with minor and mostly temporary environmental impacts for which there are standard mitigation measures; Orange B category project are those with moderately significant environmental impacts; while Red category projects are those with significant adverse environmental impacts.

Considering the available information on the nature of the proposed sub-projects most of the sub-projects to be implemented under DCNUP would fall either under Orange A and Orange B categories. It is possible that there will be a few components under the green category; and none are likely to fall under the Red category.

For projects categorized as Orange B, according to ECR ’97, a feasibility report and an IEE, an NOC would be required to obtain site clearance and environmental clearance certificate. For projects categorized as Orange A, the feasibility and IEE report will not be essential.

The BNBC, PPR 2008, Bangladesh Labor Act 2006 outlines guidelines for ensuring worker’s health and safety during construction works which would have direct implications in DCNUP. It would be the responsibilities of the contractors (with supervision of DSCC officials) to ensure proper health and safety guidelines are followed in the workplace environment, especially during the construction phase.

2.5 Implications of World Bank Safeguard Policies on DCNUP

According to World Bank Operational Policy (OP 4.01), the nature of environmental assessment to be carried out for a particular sub-project would largely depend on the category of the sub-project. As mentioned earlier, The World Bank Operational Policy (OP) 4.01 classifies projects into three major categories (category A, B and C), depending on the type, location, sensitivity and scale of the project, and nature and magnitude of potential impacts.

The sub-projects to be implemented under the Dhaka City Neighborhood Upgrading Project (DCNUP) do not involve large-scale infrastructure development (e.g., construction of sanitary landfill, water or wastewater treatment plant, major highways). The sub-projects will not involve involuntary land acquisition. Therefore, the proposed DCNUP project is classified as Category B and the safeguard polices OP/BP 4.01 (Environmental Assessment); OP/BP 4.11 (Physical Cultural Resources) are triggered.

An Environmental Management Framework (EMF) has been prepared to meet the requirements of Environment Conservation Rules 1997 of Bangladesh, the Safeguard Policies of the WB and the Environmental, Health and Safety Guidelines of the World Bank Group. It has been anticipated from the proposed scope of the project that significant irreversible environmental impacts would not be generated from proposed project activities. The anticipated impacts will mostly occur during the construction phase and these may include, disturbance of the aquatic habitat, contamination of land and water, loss of small trees, noise from operation of construction machinery, air quality deterioration, worker's health and safety etc. These impacts can be mitigated through enhanced design strategies and implementation of relevant Environmental Management Plans (EMPs) where applicable.

Although the project is not likely to affect natural or cultural heritage, 'Chance Finds' will be encountered and precautions will be taken to ensure that no cultural heritage sites and properties are damaged. Therefore, in this regard the Physical Cultural Resources Policy (OB/BP 4.11) is triggered. The following EMF provides criteria for screening and assessment of Physical Cultural Resources.

Considering the potential sub projects there will be no such use of synthetic chemical pesticides, use of any such substance will be strictly prohibited during the implementation of the project, therefore OP 4.09 will be not triggered.

It is highly unlikely that any natural habitant formed by native plant and animal species will be affected or modified by the subprojects activities to be implemented under DCNUP as such Natural Habitats OP/BP 4.04 will not been triggered.

The activities of the project will not include activities in forest areas and will not affect the management, protection or utilization of natural forests. The scope of work under the project will

not finance dams or conduct any work on any existing dams. Hence OP/BO 4.36 and OP/BP 4.37 will not be triggered by DCNUP.

The IFC guidelines provides guidance on certain EHS issues which include standards for environmental parameters (ambient air quality, water and wastewater quality, noise level, waste management), hazard and accident prevention, occupational and community health and safety (during commissioning and decommissioning works) etc. These guidelines will be directly applicable to the DCNUP project. As a general rule, the IFC guidelines should complement the existing Bangladesh guidelines or standards. In case the Bangladesh guidelines or standards differ from the IFC guidelines, project is expected to follow the more stringent ones.

The World Bank access to information policy would be directly followed. The implementing entity of the DCNUP will make the environmental assessment and EMF documents available to the public by publishing it in their websites. In addition, subproject specific screening/assessment report will periodically be posted in the DSCC website before the bidding process. Hard copies of these documents in English (including a summary in Bengali) will be made available in the City Corporations for the local stakeholders.

Chapter 3: Project Description and Design Considerations

Introduction

The Dhaka City Neighborhood Upgrading Project (DCNUP) will be based in Dhaka city. Considering that Dhaka accounts for at least one-fifth of Bangladesh's GDP and accounts for almost half of formal employment nationally the city's population growth is on the rise. The population of the Dhaka Metropolitan Area increased ten-fold in just over 40 years, from 1.7 million in 1974 to an estimated 18 million in 2015, now accounting for over one-third of the country's total urban population. People from all around the country migrate to Dhaka in search of a better life, making Dhaka one of the most densely populated cities in the world.

Considering issues such as the city's chronic air pollution crisis, traffic congestion and inadequate infrastructure, Dhaka is now known to be one of the least livable cities in the world. A major segment of the city is left without piped water and the city does nothaveproper waste management strategies in place. The living standards of those living in urban slums is in distress as the city continues its rapid unplanned urbanization.

Figure 2 District Map of Dhaka

In an attempt to improve the living conditions of Dhaka city the World Bank Group (WBG) in partnership with the Government of Bangladesh is preparing a "Dhaka Metropolitan Transformation Platform" to support the institution's overall approach for a long-term and sustained engagement with Dhaka.The Platform will conduct a series of rapid assessments on priority themes, such as city competitiveness, infrastructure and basic services, urban resilience, social development and local institutions. At the same time, the platform is supporting the development of a road map to prioritize interventions including identifying a set of targeted "rapid-results" interventions that can deliver highly visible improvements in the daily life of Dhaka citizens in a relatively short period of time.

In this context, the proposed Dhaka City Neighborhood Upgrading Project (DCNUP) seeks to have a preparation timeline which will support an initial set of targeted high-visibility rapid-results interventions to demonstrate potential for city transformation and build consensus amongst stakeholders. DCNUPaims to lay the groundwork for institutional reform for larger investments over a longer period of time to make Dhaka a more liveable city overall. The project development objective is to enhance public spaces and improve urban services in selected neighborhoods in Dhaka

3.1 Project Overview

Under the current scope of work the proposed project (DCNUP) will focus on Dhaka South City Corporation. The same project approach can be extended and scaled up to DNCC in the near term

The Bank and DSCC have identified certain priority areas for "rapid results" investments through consultations with civil society, think tanks and urban experts. The priority areas being considered include; improving pedestrian safety and mobility, enhancing green spaces and open areas, particularly in low-income neighborhoods, and revitalization of waterfront areas.

The project focuses on interventions for public spaces and neighborhood-level upgrading as well improving pedestrian safety and traffic management, in order to generate substantial benefits and improve livability within Dhaka city. Well-designed and managed public spaces offer benefits such as environmental sustainability, transport efficiency, and public health improvements, all of which create significant improvements in the lives of the community members. In addition, more efficient use of the existing road space can reduce congestion in most parts of Dhaka and provide visible improvements to the urban landscape.

The possible sub-projects under this component will be located in four neighbourhoods of Dhaka: (i) Kamrangirchar; (ii) Lalbagh; (iii) Sutrapur-Nayabazar-Gulistan; and (iv) Khilgaon-Mugdha-Bashabo). These neighbourhoods, falling within the jurisdiction of Dhaka South City

Corporation, were selected through a series of structured consultations with counterparts and stakeholders on the basis of the following criteria and considerations:

- Demonstration potential or deprivation need. Areas with potential public space assets owned or controlled by DSCC with a high potential to demonstrate the impact of improved public spaces and liveability enhancement.
- Community-focused. Areas with the potential for community engagement in low-income and marginalized areas, to support confidence building between citizens and municipal authorities, and having the potential to benefit low-income and vulnerable groups, especially women.
- Complementary. Areas with potential for complementarily with ongoing or future GoB and WBG interventions for public space improvement, public transport and other municipal infrastructure investments.

Some of the location clusters identified in South Dhaka through DSCC are demonstrated in the figures below. The location clusters for possible interventions under DCNUP (as identified in the figures) include:

Figure 3a: Lalbagh Fort (Old Dhaka), New Market (Palashi), University of Dhaka (Palashi). Gulistan Park (Kamlapur), Shahajahanpur Jheel (Khilgaon), Bashabo (Mughda), Old Stadium (Kamlapur), Sutrapur (Jurain), Naya Bazaar (Old Dhaka),

Figure 3b: Zone 3: Kamrangir Char, Zone 4: West Jurain Riverside, Zone 5: Old Dhaka River Side.

It is important to note that at this stage the specific sites for sub-project activities and confirmed interventions under DCNUP have not been decided upon.

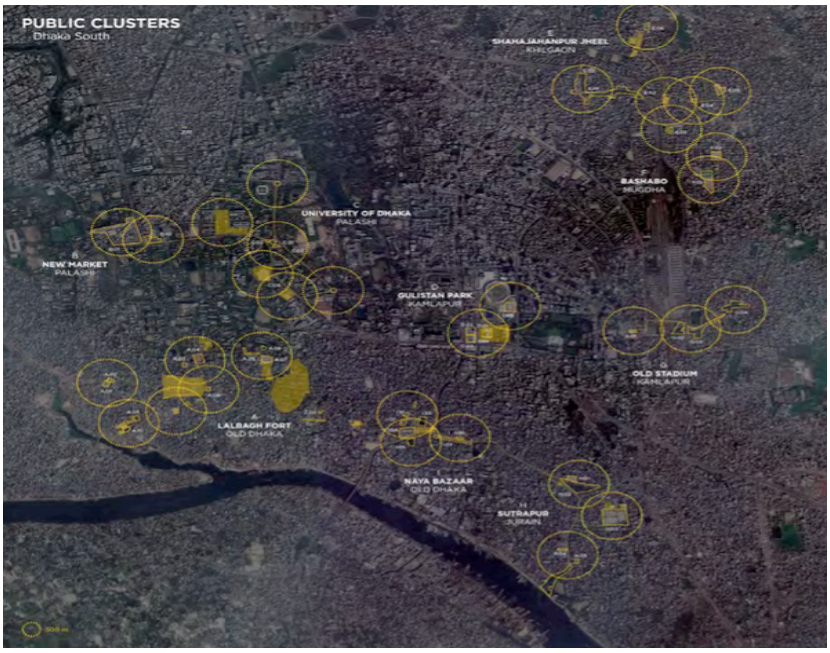

Figure 2a Map of location clusters for possible sub projects under DUUP

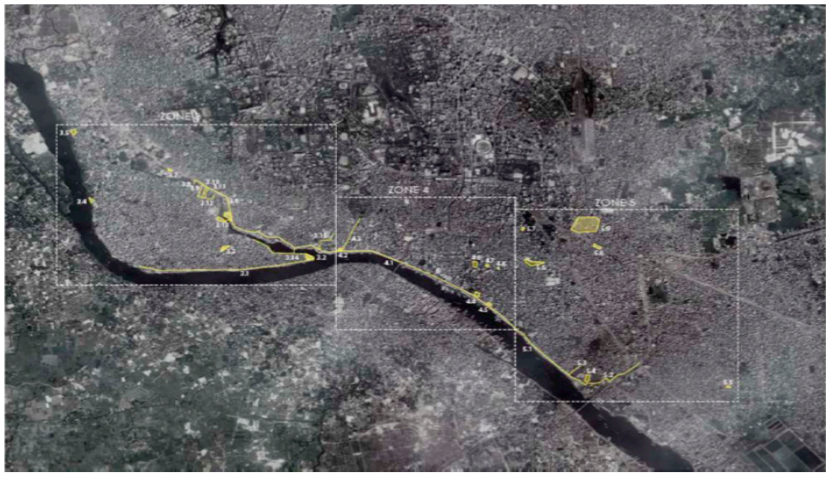

Figure 3b Map of location clusters for potential sites for sub projects under DUUP

3.2 Project Activities

The project (DCNUP) is comprised of two components: (i) neighbourhood-level public space upgrading and (ii) urban management, capacity building and implementation support.

Component 1: Neighbourhood-level public space upgrading

The specific sub-components under this include:

Subcomponent 1.1: Neighborhood Public Space Upgrading

Subcomponent 1.2: Pilot traffic junction & traffic management improvements

This component will finance improvements in public spaces clustered within selected commercial, residential and mixed-use areas of Dhaka South City Corporation (DSCC), to enhance the accessibility, usability, safety, attractiveness and disaster and climate resilience of public spaces; improve mobility and pedestrian access to key destinations; and improve traffic safety.

"*Public spaces"* is defined, for the purpose of this project as open areas or structures that are publicly owned or accessible and available to all for free and without a profit motive. These can be broadly grouped into three categories:

a) Open and green spaces, such as parks, playgrounds, plazas, squares and waterfronts.
b) Streets and pedestrian connections, such as streets, avenues, sidewalks, footpaths and bike paths.
c) Public buildings and amenities, such as community centers, markets, libraries and passenger transport terminals.

Under the scope of DCNUP an "area-based approach" will be taken, which entails clustering interventions within a locality for generating integrated solutions. Overall community development will be ensured through upgrading various components in the same area such as public facilities, drainage, street lighting, sidewalks, parks etc. A synergistic network approach will present a more meaningful and visible impact than scattered efforts across the city. This approach also offers opportunities to better engage the existing community in these neighborhoods.

Table 1 Example of possible investments for sub projects under component 1 of DCNUP

Roads and streets	Open and green spaces	Public buildings and amenities	Residence and inclusion
-Roads & Sidewalks -Junctions and crossings -Bus bays and stops -Street lighting -Parking and Traffic Management -Reorganizing vehicular travel lanes	-Rehabilitating existing open spaces -Cleaning drainage system -Solid waste collection and sanitation -Street furniture and Landscaping -Wayfinding signs -Riverfront and promenade -Boat landing areas	-Market areas and management of vendors -Bus and ferry terminals -Municipal car parks -Public toilets	- "Green Infrastructure" and drainage for disaster resilience -Behaviour change activities for improving city liveability

Component 2: Urban management, capacity building and implementation support

The specific sub-components under this include:

Subcomponent 2.1: Asset management, operations and maintenance and place management

Subcomponent 2.2: Urban planning and feasibility study for upgrading unplanned areas

Subcomponent 2.3: Traffic study and traffic awareness / behavior change program

Subcomponent 2.4: Architecture, urban design, engineering and supervision support

This component will finance services that will enhance the use of public spaces and improve the maintenance of selected neighbourhoods by the City Corporations. Activities under this component will include support for developing, operationalizing and using detailed Operations & Maintenance plans for the newly-improved areas in the selected neighbourhoods; development of public information systems at the City Corporations for improved access to information for citizens; support for sustainability of Component 1 investments; and institutional strengthening support for capacity building and coordination. It will also finance technical assistance and advisory services to the project implementation unit (PIU), including project management and coordination costs associated with project implementation; consultancy services for feasibility, conceptual, and detailed designs, safeguards instruments for sub-projects, and the preparation of follow-on operations; and consultancy services for the preparation of required studies.

The proposed project will coordinate closely with, and build on approaches and lessons learned from ongoing WBG engagements in Dhaka by various Global Practices. These engagements include the Clean Air and Sustainable Environment (CASE) Project, various pilot projects and studies under Municipal Governance Support Project (MGSP), riverfront restoration efforts and resilience building. Given the proposed investment theme of the proposed project on public spaces, there could be other strong linkages with riverfront development and infrastructure resilience.

3.3 Environmental Considerations in Design

Development projects cannot always be full proof, there will be certain adverse environmental impacts resulting from the implementation of a sub-project. Any change brought to a locality will have some negative impacts on existing conditions. In order to minimize some of these environmental impacts during the construction and operational phases of a particular sub project certain features maybe incorporated in the engineering design. Identifying and incorporating

these improved design elements within the sub-project could greatly reduce the adverse impacts and ensure proper environmental management of a sub-project.

The table below identifies possible adverse environmental impacts and environmental considerations to be included in the design for reducing possible environmental impacts for some of the potential major sub-projects to be implemented under DCNUP. It is essential to make sure these issues are addressed adequately during the design phase of the sub-projects, as part of the environmental management. Input from project stakeholders will also be incorporated to strengthen the designs and ensure optimum benefit to the community.

The table below demonstrates some of the possible environmental impacts and the corresponding design consideration to reduce those impacts for some of the potential sub-project types under DCNUP.

Table 1 In design Environmental Considerations for Sub-Projects under DUUP

Sub- Project Type	**Environmental Impact**	**Design Considerations to Reduce Impact**
Road	• Waterlogging on road surface • Traffic Management	• Proper slope of road surface (adjacent to water drainage facility in place). • Where appropriate, road rehabilitation to be preceded by drain construction. • Pedestrian lane designed beside roads for vehicle use.
Bridge	• Impact on water movement, siltation and erosion • Obstruction to the movement of water vessels underneath bridge	• Adequate opening for required water flow and inclusion of river training works, based on appropriate hydrologic studies. • Keeping required clear height for movement of water vessels. • Ensuring protection of aquatic life.

Office building, Community Centre	• Water logging during rainfall • Pollution from inadequate wastewater disposal. • Fire hazard • Electricity Consumption	• Consider provisions for storm water drainage; roof- top rain water harvesting system. • Keeping adequate provisions (including fire/emergency exits) for fire safety in accordance with National Building Code. • Enough space to ensure proper ventilation within the building. • Consider incorporating roof top solar panels to provide a certain amount of electricity for the building. • Waste management facilities within building; recycling facilities.
Street light	• Contribution to carbon emission	• Consider installing solar panels over street lights to ensure some of the electricity is provided through solar energy.
Bus/ truck terminal, Cattle/ kitchen market	• Traffic congestion resulting from increased public congregation and vehicular movement • Adverse impact from inadequate rain/ storm water management • Contribution to carbon emission through electricity consumption	• Adequate provisions for optimum traffic circulation and rerouting traffic for convenience. • Considering roof-top rain water harvesting system. • Consider solar panels to energy for a part of the electricity supply. • Waste collection

		facilities; trash cans.
Market, Slaughter house	• Pollution from wastewater and solid waste disposal	• Proper waste disposal system in design of market/ slaughter house. • Proper waste collection facilities.
Public Toilet	• Pollution during construction • Occupying free land/open space • Odour from establishment	• Adequate height with proper ventilation in place. • Proper maintenance and sanitation facilities. • Compost facilities to be considered. • Water supply and hand wash facility. • Consider solar energy to supply part of the electricity for the establishment.
Drain	• Clogging/ stagnation of flow in the storm drain • Backflow of water through drain (e.g., due to high water level at downstream discharge point, such as khal/ river) • Pollution of downstream water body due to disposal of polluted water from drain	• Designing drain considering the downstream discharge point; adequate slope; RCC cover for drain, where appropriate. • Considering installation of regulator to control inflow/ outflow through the drains. • Not allowing direct connection of sanitation facilities to the drains connected to waterbodies.

Park	• Water logging • Dust pollution and noise pollution during construction	• Maintain consistent slope with storm water storage facility. • Ensure solar powered lights within the park for light during the night. • Sprinkle water to reduce dust pollution. • Add large trees to provide shade for comfort of people.

Chapter 4 Overall Environmental Assessment

4.1 Basis of Environmental Assessment

In order to develop a comprehensive Environmental Management Framework (EMF) for the Dhaka City Neighborhood Upgrading Project (DCNUP), an environmental baseline study was carried out. The existing environmental conditions of Dhaka city, where all potential sub projects are to be implemented, was outlined for tracing any future impacts during or after project implementation. This chapter includes the data and information gathered for this purpose and reflects the existing physico-chemical and ecological conditions of Dhaka city. Any possible impact of the sub projects under DCNUP will be evaluated against these baseline environmental conditions.

Data and information for the overall baseline assessment of Dhaka city was collected from secondary sources such as monitoring reports and other available literature. Information on a variety of environmental dimensions such as air, noise, water was collected for this purpose. In order to better understand Dhaka city from a macro-environmental point of view an assessment of the climate, temperature and ecology of Dhaka was also made. Following this assessment, a number of consultation sessions were held at key location clusters in order to understand the environmental contexts from the point of view of those experiencing it first-hand (A detailed account of the stakeholder consultation is available in chapter 5).

4.2 Baseline Conditions of Dhaka City

The baseline conditions of Dhaka city consist of an assessment of the physico-chemical environment and ecological environment of Dhaka city; in addition, the demography of the city is also mentioned. All the baseline conditions included in this section is reflective of the conditions of Dhaka city prior to the implementation of any sub-projects under DCNUP.

4.2.1 Climate of Dhaka City:

Dhaka city has a tropical climate. For most of the year the climate experienced is hot, wet and humid. The city however has a distinct monsoon season. The average temperature experienced annually is between 25- 25.9 degrees Celsius; it varies between 18 degrees Celsius in January to approximately 29.1 Degrees Celsius in May [5].

According to the past rainfall pattern of Dhaka city most of the rainfall (approximately 50%) occurs during the months of June, July and August. These months make up the monsoon season.

[5] CLIMATE DATA.ORG (2018). CLIMATE: DHAKA. Retrieved from: https://en.climate-data.org/location/1062098/

The average rainfall during December, January and February make up less than 2% of the annual rainfall. Alam and Rabbani (2007) denotes that although there is no significant change in the long-term trend in annual rainfall, the seasonal rainfall pattern can often be erratic[6].

4.2.2 Geology of Dhaka City

Dhaka is located in the central-eastern part of Bangladesh. The city is in the extreme south of the Madhupur Tract. The main area is covered by the Pleistocene Madhupur clay, a yellowish brown to oxidised reddish brown silty clay. The Madhupur Clay makes up most of the surface across the elevated Madhupur Tract. This particular unit is about 45 m in thickness (an average of 10 m thickness in Dhaka) and has a fine sandy layer at its base. The southern part of Dhaka is made of Holocene sediments. And the drainage channels and shallow depressions on the Madhupur Tract are partially comprised of grey and yellow organic-rich sands and clays of the Holocene Bashabo Formation.

An assessment of the moisture content and the liquid limit results obtained for the Madhupur clay it could be seen that its state is normally consolidated to slightly over-consolidated. This could be as a result of groundwater pumping. The clay has intermediate to high plasticity, and is overlain by the Dupi Tila. The formation of Dupa Tila is made up of fine to coarse grained micaceous quartzo- feldspathic sands[7]. The incised channels and depressions within the city are floored by recent alluvial flood plain deposits.

4.2.3Hydrology of Dhaka City

Dhaka city has a number of rivers flowing through it. At its west Dhaka has the Turag river which connects to the north of the city through a small khal, the Tongi khal. The Eastern part of the city is bound by the Balu river, which hydrologically connects to the Tongi Khal. The South of Dhaka city is surrounded by the Buriganga river. The major lakes in Dhaka city include: Dhanmondi lake, Ramna lake, Gulshan lake and Crescent lake, other than that there are numerous smaller lakes throughout the city.

Some of the major canals which are still in use are Begunbari Khal, Abdullahpur Khal, Diabari Khal, Manda Khal, Digun Khal, Meradia-Gazaria khal and Kallyanpur Khal (DoE, BCAS and UNEP, 2006)[8].

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[6] Alam, M., & Rabbani, M. G. (2007). Vulnerabilities and responses to climate change for Dhaka. Environment and urbanization, 19(1), 81-97.

[7] Burgess WG, Hasan MH, Rihani E, Ahmed KM, Hoque MA,
Darling WG (2011) Groundwater quality trends in the Dupi Tila aquifer of Dhaka: Bangladesh—sources of contamination evaluated using modelling and environmental isotopes. Int J Urban Sustain Dev 3(1):56–76

[8]DoE, BCAS and UNEP. (2006). In Dhaka City State of Environment 2005. United nations Environment Programme.

4.2.4 Drainage Situation in Dhaka City

Dhaka's natural drainage system is made up of a number of retention and detention areas including khals (canal), which are also linked to the surrounding rivers. The rain water is usually collected in these retention and detention areas and then discharged to the surrounding rivers through the khals.

Among the many canals in the city, the Dholai Khal which once used to be the primary route for travelling through water within the metropolis, has almost disappeared due to four decades of wrong policies of the city administration to construct roads by closing the canal (Huq and Alam 2003). This has caused major impacts on the city's natural ecosystem.

The sewerage system of Dhaka city covers only one third of the total urban area. Dhaka WASA is responsible for this and uses the existing canals and sewerage pipes to collect the waste water from different areas of the city. After collection the effluent is usually disposed into surrounding river systems, without being treated. Many of the city's canals are being cut off and turned into lakes e.g. Dhanmondi, Gulshan, Banani or Baridhara lake.

4.2.5 Groundwater Quality of Dhaka City

It has been recorded that Dhaka city's ground water has been depleting in the past decade. The groundwater from the Dupa Tila Aquifer, located in the Madhupur Tract has a chemistry of calcium-bicarbonate to sodium-bicarbonate. It has less than 350 mg/l of total dissolved solids and is oxygenated, making its PH slightly acidic. These baseline conditions of groundwater in the Dupi Tila aquifer have since then been altered by the influence of recharge modification that increased the concentration of chloride, nitrate and sulphate, which are the principal inorganic indicators of urban contamination[9].

In Dhaka city the ground water extraction started from a depth of 100m and in some extreme conditions the well goes up to 300 meters to reach the main aquifer. The rate of depletion varies from area to area. The city's groundwater level has dropped about 20m over the last seven years at a rate of 2.81m per year. From the year 2000 the rate has been increasingly high.Long term hydrographs from different parts of the Dhaka city indicate the drop in water level is increasing rapidly throughout the city.

This trend of continuous decline of the water table with little or no fluctuation is usually a sign that the aquifers have been over exploited (Bangladesh Water Development Board, 2007).

[9] Burgess WG, Hasan MH, Rihani E, Ahmed KM, Hoque MA,
Darling WG (2011) Groundwater quality trends in the Dupi Tila aquifer of Dhaka: Bangladesh—sources of contamination evaluated using modelling and environmental isotopes. Int J Urban Sustain Dev 3(1):56–76

The groundwater level is comparatively high in the city's periphery and low in the central part of the city. Among the periphery, the northern part of the city has a comparatively higher water level than the southern part. This is because the south of the city has comparatively less open spaces and small surface water bodies that are dispersed and therefore the rate of withdrawal of groundwater is higher.

4.2.6 Surface Water Quality of Dhaka City

The interior of Dhaka city is contoured with flowing rivers and inter-connected canals. In the past decade or so migration from rural areas to the city, unplanned industrialisation, rapid urbanization and river encroachment has made a remarkable impact on the surface water quality of these water bodies. There is a shortage of sewage treatment facilities within Dhaka city and it covers less than 20% of the overall capacity. The existing facilities suffer from sewage system failures and only a few large scale industries have in-built effluent treatment systems.

This results in chaotic waste disposal within the city. A large portion of waste from community members, households, industries, farm animals, pesticides and fertilisers end up polluting the surface water bodies of Dhaka city, often untreated. One of the consequences of such waste disposal is that many sections of the river and canals get clogged with waste. This situation has caused parts of the Buriganga and Sitalakhya to be biologically dead during the dry season.

4.2.7 Air Quality of Dhaka City

In recent years, air pollution is a major concern for Dhaka city. A study conducted by scientists of Bangladesh Atomic Energy Commission (BAEC) revealed that approximately 50 tons of leads are emitted into Dhaka city's air annually and the highest level of emission is reached in the dry season (November-January). The density of lead in the air of Dhaka city in the dry season reaches 463 monograms, which is one of the highest in the world. The air quality standards are different for residential, industrial, commercial, and sensitive areas. The worst affected areas in Dhaka city include: Hatkhola, Manik Mia Avenue, Tejgaon, Farmgate, Motijheel, Lalmatia, and Mohakhali. These areas are mostly located within the periphery of south Dhaka.

The Summary of Air Quality and Meteorological data measured during October 2014 is presented below:

Table 2 Summary of air quality and meteorological data measured by DoE (2014)

Location	$PM_{2.5}$ (µg /m^3)	PM_{10} (µg /m^3)	SO_x (ppb)	NO_x (ppb)
Sangshad Bhaban, Sher-e-e Bangla Nagar	49.2	72.7	DNA	DNA
BARC, Farmgate	43	DNA	3.07	DNA
Darussalam	67.2	98.5	DNA	41.8
Bangladesh Ambient Air Quality Standard*	65	150	140	53
Sampling Duration (hours)	24 hrs	24 hrs	24 hrs	24 hrs

4.2.8 Noise Level in Dhaka city

Dhaka city is crammed with traffic congestion and with increase in urbanisation the issue of noise pollution is becoming more troublesome. Studies have been conducted to assess the noise pollution in Dhaka city. The table below shows the acceptable sound levels decided by the Department of Environment[10].

Table 4 Acceptable noise levels for Dhaka city according to the DoE, Bangladesh (2015)

Description of area	Noise level dB(A)	
	Day Time	Night Time
i) A sensitive area where quietness is of primary importance such as schools, hospitals, mosques etc.	45	35
ii) Residential areas	50	40
iii) Mixed areas, which are, used as residential areas as well as commercial and industrial purposes.	60	50
iv) Commercial areas	70	60
v) Industrial areas	75	70

A study conducted by Husain et al (2015) on a few key locations in Dhaka city, categorised within the different types of spaces (figure 2) assessed the noise levels both in working days and in non-working days.

Table 3 Areas studied by Husain et al. (2015) Categorised by types of areas

Type of Places	Place
Commercial Areas (C/A)	Agargaon, Asad Gate, BijoyShoroni, Farmgate, Gabtoli, Gulistan(Zero-Point), Mirpur 1, Mirpur 10, Notun Bazar, Nilkhet, Paltan, Technical, Shodorghat, Motijhil
Residential Areas (R/A)	Bashundhara, Gulshan, Malibag, Narda, Shantinagar, Shahajadpur, Uttara
Mixed Areas	Banani, Badda, Shameli, Kollanpur

[10] I laces in Dhaka and Proposing a Device to K

Table 4 Sound levels measured (in dB) of all types of areas on working days (Hussain et al. 2015)

Place	Mean	Max	Place	Mean	Max
Agargaon	73.2019	89.20	Mirpur 1	75.0256	90.30
Asad Gate	75.398	88.90	Mirpur 10	73.72743	89.70
Badda	75.3387	92.00	Motijhil	75.14473	90.13
Banani	73.9273	86.40	Nilkhet	75.34733	89.45
Bashundhara	74.5826	88.30	Notun Bazar	73.94967	87.20
BijoyShoroni	74.3182	89.50	Paltan	75.273	89.46
Farmgate	76.9444	90.30	Shahajadpur	72.20287	89.00
Gabtoli	75.3728	91.40	Shamoli	75.65413	91.50
Gulistan	73.0727	88.50	Shantinagar	68.42783	85.60
Gulshan	71.2751	85.70	Technical	74.86997	89.40
Kollanpur	75.1241	89.60	Uttara	73.416	85.92

Area Type	Mean	Max
C/A	74.72	91.40
Mixed	74.97	92.00
R/A	73.10	90.30

Table 5 Sound levels measured (in dB) of all types of areas on non-working days (Hussain et al. 2015)

Place	Mean	Max	Place	Mean	Max
Agargaon	64.8321	84.5	Mirpur 1	60.45573	82.8
Asad Gate	68.8838	86.8	Mirpur 10	64.64893	82
Badda	69.271	89.7	Narda	70.32497	85.8
Banani	73.2097	88.2	Nilkhet	70.5278	85.2
Bashundhara	70.0901	84.4	Notun Bazar	69.22993	84.9
BijoyShoroni	58.164	77.4	Paltan	70.90263	82.4
Farmgate	63.3925	86.9	Shahajadpur	61.3759	79.6
Gabtoli	64.9703	86.6	Shamoli	62.9167	88.1
Gulistan	70.2441	86.367	Shantinagar	55.07223	77.5
Gulshan	69.1035	83.3	Shodorghat	72.38103	82.9
Kollanpur	61.421	87.2	Technical	57.37767	86.8

Area type	Mean	Max
C/A	65.85	86.90
Mixed	68.47	89.70
R/A	64.45	87.20

For most spaces it can be seen that the measured noise level is much higher than the accepted level. The sound level is much higher on working days, due to the increase in car mobility. The World Health Organisation states that 60dB sound can make a person deaf temporarily and 100 dB can cause complete deafness. With measures that go up to 92 dB in some areas of Dhaka city the situation is quite alarming.

4.2.9 Biological Environment of Dhaka City

- **Flora in Dhaka City:**

Dhaka city's flora has been reduced as a result of rapid urbanisation. Some of the major types of trees found in Dhaka city include mahogany, rain tree, Kul, Jarul, Sheaora, Khaer, Siris and Sishu. As per reports Dhaka city does not host any endangered floral species. The primary fruit-bearing trees include mango, jackfruit, bananas and coconut.

- **Fauna in Dhaka City**

There is an increase in the number of crows in Dhaka city. It is reported that Dhaka currently has a large population of the lokkhi pecha (barn owl). Some of the more common birds found in Dhaka city include chorui, doel, shalik, kak, tuntuni, bulbuli, kokil (all named in Bengali).

Another creature found in Dhaka city is the Mongoose, they can mainly be located in wetlands or marshes, since these areas are covered with small bushes. Mongooses are also found in some suburban areas such as in Uttara, Mohammadpur, Keraniganj, Demra and Jatrabari.

Around a decade or more ago Dhaka had more rhesus monkeys, but the quantity has decreased and they can only be seen in certain areas. These are tree-bound creatures that still found in abundance in Old Dhaka. Dhaka also has jackals, but the numbers are decreasing in comparison to 30 years ago. There are jungle cats that can be spotted in Ashulia, Savar and the Uttara belt, although hunting and loss of habitat is also endangering these species. Holdegal titi is also a species that was more abundant in central Dhaka in the past, due to the city's fast paced growth it can only be seen in the city's peripheral areas now.Apart from these, Dhaka city is also host to bats, monitor lizards (gui shap), squirrels, snakes, garden lizards and the pangolin (bonrui)[11].

4.2.10 Demography of Dhaka city

The population count of greater Dhaka area is at 18 million as of 2016, however the city itself has an estimated population of about 8.5 million. With a density of 23,234 people per square kilometre within a total area of 300 square kilometres, Dhaka is one of the most densely populated cities in the world. The city has shown a population growth of about 4.2% annually. One of the key reasons for Dhaka's population growth is migration from rural areas of the country. Rural migration accounted for at least 60% population growth throughout the 1960s and 1970s. Although it has slowed over time Dhaka continues to show steady growth, with estimates placing the 2020 population at almost 21 million, while 2030 may see as many as 27.3 million residents. The fast-growing population is already adding stress to the city, some of the key concerns include high rates of poverty, increasing congestion, inadequate infrastructure and a

[11] http://www.thedailystar.net/news/wildlife-in-dhaka

high rate of unemployment.[12]

4.3 Assessment of Tentative Sites

The Dhaka City Neighborhood Upgrading Project (DCNUP) will mainly invest in enhancing public urban spaces in south Dhaka.

The specific sites and interventions have not been confirmed yet and will be decided upon consultation with DSCC, the local level councillors and the community representatives. The selection criteria for public space enhancements will focus on the following priorities such as: improving the daily lives of the residents, quick to implement and low risk, no land acquisition. The possible investments could include integrated neighbourhood development, rehabilitation of public assets and pedestrian facilities such as street lighting, neighbourhood level solid waste collection, better traffic management, rehabilitation of critical roads, new improvement of public spaces, parks and so on.

Each of the activities under DCNUP will be environmentally assessed before implementation in accordance with the environmental management framework (EMF). Once sites are finalised baseline surveys will be done for each subproject and the site specific management plan will be prepared. Field visits were conducted by the World Bank safeguard consultants, who were accompanied by the urban design team and the DSCC officials. These field visits were made to potential location clusters, to observe the general area and assess the feasibility for potential sub-projects. Since exact locations and specific sub projects have not been decided upon as of yet only location clusters were visited. The clusters visited include: Lalbagh Fort (Old Dhaka), Kamrangirchar, West Jurain, Khilgaon, Sutrapur, Bashabo (Mughda), Naya Bazaar (Old Dhaka).

4.3.1OverallEnvironmental Assessment ofTentative Sites

There were no noticeable major environmental concerns in the context of the possible sites and sub-projects of the DCNUP. Most of the environmental concerns will be temporary, construction related and limited to the sites for the sub projects. The possible issues that could arise include: dust, noise, waste management, safety measures in stockpiling construction material, traffic congestion during construction, transportation of stockpiles and site wastes. In order to control these possible impacts, it will be important to implement the recommended EMP and ensure proper M&E facilities by the implementing agency. The EA must be reviewed and the implementation of EMF must be supervised.

A base line of the project area will be formulated mainly from the IEE/EIA reports of the subprojects under DCNUP, field observations, and Focus Group Discussions (FGD). Some of

[12] http://worldpopulationreview.com/world-cities/dhaka-population/

the observations regarding the environmental baseline of the proposed location clusters is given below:

Climate:

The climatic status of the proposed location clusters is consistent with the conditions of Dhaka city, which has a tropical climate and is hot and humid for most of the year. An overall account of the meteorological conditions is discussed in detail in the environmental baseline section. The geology of the area is also consistent with that of Dhaka city in general, expressed in details in the environmental baseline section.

Road Network

Some of the sites visited has networks of narrow roads which could be prone to flooding during monsoon season, when the rainfall is quite heavy. Since the area of work is urban most of the road network systems consist of pucca roads and no katcha road was observed. The road networks were extremely narrow in some areas and could not accommodate for both vehicle and pedestrian movement at the same time.

Air and Noise Pollution

There was a notable amount of dust surrounding some of the location clusters visited, this is due to the nature of the sand based play grounds of the local area and existing construction sites. Some of the unpaved roads also cause dust pollution when used by large vehicles. Noise in the local area was mainly from the traffic congestion in the narrow road networks. When local markets were visited, there was noise generated by the people gathered in the markets.

Water Usage

From the consultations it was found that in some areas the drinking water is from tube-wells. Some of the locations were beside the rivers, however the river water is only used for washing clothes and in some cases such as Kamrangirchar river front, the river water is also used for washing recyclable plastics from a plastic recycling facility adjacent to the river front. The banks of the river in Kamrangirchar were covered with waste from the local area. This added to the existing pollution of the river water and contributed to the odour coming from the river water.

The primary water body surrounding some of the proposed locations of the DCNUP is the Buriganga river. From reviewing literature, the following information could be obtained about the water quality of Buriganga river: the PH of the river water varies from 7.3-6.8. The Buriganga is one of the most polluted rivers in Bangladesh. The river Turag meets the river

Buriganga at Kamrangirchar, which is one of the proposed locations for sub projects. During the field visit there were no noticeable fishing activities conducted in the river (Buriganga) and through the stakeholder consultation it was found that the river was not used for fishing purposes.

Flora and Fauna

In terms of trees and vegetation, the general flora and fauna of the area will not be much different from that of the rest of Dhaka city, which is elaborated in the environmental baseline section of the report. The ponds and rivers visited has a lining of rich vegetation common for freshwater ecosystems. However, the other land-locked sites visited were not densely packed with trees other than some scattered large trees within the periphery of the parks and playgrounds.

The proposed locations did not show any notable wildlife habitat. There were some local birds in the areas and animals such as dogs, cats and rodents such as rats. The fauna of the location clusters will be similar to that of Dhaka city in general. No endangered species were reported in any of the location clusters visited during field trips.

Land Use

In terms of land use and existing infrastructures within the proposed location clusters, it was observed that most of the land is owned by DSCC and therefore no acquisition of land will be required for the purposes of this project. Currently most of the land being considered for this project is being used as playgrounds for the neighbourhood children, existing community centres, parks, jheels, bazaars, ponds and parks. All existing spaces could be improved to enhance the experience of the community people utilising this space. Some of the existing building structures are worn out and could use refurbishment. Designing sub projects to enhance the facilities within the proposed areas could significantly improve the neighbourhood and the quality of life of those living within these communities.

4.4 Baseline Environmental Conditions of Tentative Sites

The following section is based on primary data collected for the purpose of assessing some of the environmental parameters, such as air quality, noise level, groundwater/drinking water quality, and surface water quality of the tentative sites for sub projects under DCNUP prior to the implementation of the project. All of the data used for this section has been collected within February- March 2018 and aims to reflect the baseline environmental parameters of south Dhaka before the implementation of DCNUP. These baseline conditions can later be used to assess possible impacts any of the sub-projects under DCNUP could have on its surrounding environment during its construction or operational phase.

4.4.1 Air Quality:

In order to assess the air quality of Dhaka city data has been collected from the different Continuous Air Monitoring Station (CAMS) in operation at different points of Dhaka city under the Department of Environment (DoE) air quality monitoring network. The data obtained has been quality controlled and the air pollution levels have been compared to the Bangladesh Ambient Air Quality Standard as adopted in 2005. The table below demonstrates the national ambient air quality standards for Bangladesh.

Table 8 National ambient air quality standard for Bangladesh (adopted in 2005)

Pollutant	Objective	Average
CO	10 mg/m^3 (9 ppm)	8 hours (a)
	40 mg/m^3 (35 ppm)	1 hour (a)
Pb	0.5 µg /m^3	Annual
NO_x	100 µg /m^3 (0.053 ppm)	Annual
PM10	50 µg /m^3	Annual (b)
	150 µg /m^3	24 hours (c)
PM2.5	15 µg /m^3	Annual
	65 µg /m^3	24 hours
O_3	235 µg /m^3 (0.12 ppm)	1 hour (d)
	157 µg /m^3(0.08 ppm)	8 hours
SO_2	80 µg /m^3 (0.03 ppm)	Annual
	365 µg /m^3 (0.14 ppm)	24 hours (a)

The ambient air quality monitoring network consists of eleven (11) fixed Continuous Air Monitoring Stations (CAMS) throughout Bangladesh. However, for the purpose of this analysis data from the two CAMs in Dhaka, CAM 2(Farmgate, Dhaka) and CAM 3 (Darussalam Mirpur, Dhaka) have been used. The data used has been collected in February, 2018, it is reflective of the current air quality scenario.

Table 9 Air Quality Measurements in specific locations in Dhaka (measured by ambient air quality monitoring network)

Parameter	Unit	NAAQS	Summary	Location 1 BARC Farmgate, Dhaka	Location 2 Darussalam Mirpur, Dhaka
SO2 (24 hr)	ppb	140	Average	40.4	20.7
			Maximum	116	35.1
			Minimum	2.72	8.03
NO2 (24 hr)	ppb	53 (Annual)	Average	-	53.7
			Maximum	-	120
			Minimum	-	23.5

CO (1 Hr)	ppm	35	Average	1.57	2.02
			Maximum	13.0	4.51
			Minimum	0.05	0.84
CO (8 Hr)	ppm	9	Average	1.68	2.03
			Maximum	7.90	3.02
			Minimum	0.26	1.04
O3 (1 Hr)	ppb	120	Average	7.33	4.02
			Maximum	33.2	29.0
			Minimum	0.07	0.37
O3 (8Hr)	ppb	80	Average	7.34	4.04
			Maximum	21.2	22.0
			Minimum	0.82	0.49
PM 2.5 (24 Hr)	µg /m^3	65	Average	176	209
			Maximum	304	282
			Minimum	121	132
Pm 10 (24 Hr)	µg /m^3	150	Average	269	327
			Maximum	489	556
			Minimum	146	218

It can be seen from the data presented in the table above that the average amount of Sulphur-dioxide (SO_2) in the two locations assessed within Dhaka city are well below the National Ambient Air Quality Standard (NAAQS). It is not possible to assess the Nitrogen dioxide (NO_2) since the NAAQS is based on the annual concentration and the data is only representative of the daily conditions. The Carbon Monoxide concentration for both 1 Hr and 8 Hr measures are well below NAAQS. The Ozone (O3) for both 1 Hr and 8 Hr are well below the NAAQS mentioned in the table for both locations. The average concentration for Particulate Matter 2.5 (PM 2.5) observed in BARC Farmgate is 176 µg /m^3 and is significantly higher than the NAAQS, which is at 65 µg /m^3, the maximum concentration at BARC is 304 µg /m^3 which is extremely unhealthy. It is a similar situation at the Darussalam Mirpur, where the average concentration of PM 2.5 is 209 µg /m^3 and the maximum concentration goes up to 556 µg /m^3 , which is very alarming. The average concentration of Particulate Matter 10 (PM 10) is 269 µg /m^3 in BARC Farmgate (maximum being 489 µg /m^3) and the average concentration of PM 10 in Darussalam Mirpur is 327 µg /m^3 (maximum being 218 µg /m^3). This in comparison to NAAQS, which is at 150 µg /m^3, is also significantly high and adds to the chronic air pollution problem faced by the residents of Dhaka city.

4.4.2 Noise Level

The noise level measurements for the purposes of DCNUP was conducted in the following location clusters: Kamrangirchar, Sutrapur and Khilgaon, all of which are potential locations for sub-projects and is reflective of the baseline conditions of South Dhaka. The table below demonstrates the IDs for the sampling locations. The data for this analysis was collected in March 2018.

Table 10 Sample ID of different locations for measuring noise quality

Sampling ID	Sampling Location
Noise Level: NL	
NL1	Nearby CMP Belel Jame Mosque, Sutrapur, Dhaka. GPS Coordinates: 23°42'34.1"N 90°25'07.6"E
NL2	Jamia Nuria Islamia Madrasha, Kamarangirchar, Dhaka. GPS Coordinates**:** 23°42'34.1"N 90°22'12.1"E
NL3	DCC Market Khilgaon, Dhaka. GPS Coordinate**:** 23°45'04.5"N 90°25'28.9"E.

Analysis of Noise Level

The location wise detailed analyses of noise level results are summarized in the table below, the value measured has been compared with the Bangladesh (BD) National Standards, set by the Department of Environment (DOE), (ECR,1997). It was observed that in all three locations, Sutrapur, Kamrangirchar and Khilgaon, the average noise level (measured in dB) exceeded the Bangladesh standard set. The table below explains some of the observations made in the various locations.

Table 11 Noise level measurements and remarks in different locations within Dhaka city

Noise Level ID	**Noise Level Measurement Location**	**Main Sources**	**Approx. Distance from Source (m)**	**Noise Level (dB)**			**Bangladesh Standards***	**Remarks**
				Max	**Min**	**Avg.**		
NL1	Nearby CMP Belel Jame Mosque, **Sutrapur**	Road Traffics (Buses, trucks, cars, rickshaws) and people's voices	5	80	65.3	75.5	60(for Mixed Area)	Noise level exceeded mainly due to the frequent movement of heavy vehicles (buses & trucks), light vehicles (cars, rickshaws, vans) and the voices of people in the local area

Noise Level ID	Noise Level Measurement Location	Main Sources	Approx. Distance from Source (m)	Noise Level (dB)			Bangladesh Standards*	Remarks
				Max	Min	Avg.		
NL2	Jamia Nuria Islamia Madrasa, **Kamrangirchar**	Road Traffics (cars, rickshaws) and people's voices)	15	70.2	56.1	60.3	50 (for Silent Area)	Noise level exceeded mainly due to the movement of light vehicles (such as cars, rickshaws, cycles, vans) and the voices of students from the madrasa
NL3	DCC Market **Khilgaon,**	Road Traffics (Buses, trucks, cars, rickshaws) and people's voices)	20	93.5	69.7	71.4	70 (for Commercial Area)	Noise level exceeded mainly due to frequent movement of heavy vehicles (buses & trucks), light vehicles (cars, rickshaws, vans) & voices of people in the local market.

4.4.3 Ground Water Quality

The following section describes the assessment of the drinking water quality/groundwater quality (DWQ/GWQ) of the tentative sites under DCNUP. The water samples for the drinking water/groundwater (DW/GW) quality measurements were taken from deep tube wells (DTW) installed in the specific sites: Sutrapur, Khilgaon and Kamrangirchar, as mentioned above these sites are location clusters being considered for sub-projects under DCNUP, and will be reflective of the conditions of South Dhaka.

All possible precautions were taken to reduce any error when obtaining representative samples. Firstly, the DW/GW sample for Sutrapur has been collected from the Narinda DWASA Mods Zone where Dhaka WASA installed Deep Tube Wells (DTW). The depth of DTW is about 330m. Secondly, the DW/GW sample for Khilgaon has been collected from a private house which is connected to the Khilgaon Graveyard Mods Zone of Dhaka WASA where Dhaka WASA installed Deep Tube Well (DTW). The depth of DTW is about 350m. Thirdly, the DW/GW sample for Kamrangirchar has been collected from the Deep Tube Well (DTW) of the Jamia Nuria Islamia Madrasa. The depth of DTW is about 300m. The detailed analyses of DW/GWtest results of each sampling location is summarized in the following table, which has been compared with the Bangladesh National Standard, as set by the DOE (ECR,1997):

Table 12 Results of Drinking Water/Ground Water quality for specific locations

SL. No	Sampling ID	Unit	Concentration Present	Bangladesh Standard*	Remarks
Sampling ID: GW/DW1, Location: Sutrapur					
1	pH	-	6.92	6.5-8.5	Not Exceeded
2	TDS	mg/l	310	1000	Not Exceeded
3	Electric Conductivity (EC)	µS/cm	610	-	
4	Temperature	0C	28.7	20-30	Not Exceeded
5	Iron (Fe)	mg/l	0.15	0.3-1.0	Not Exceeded
6	Arsenic (As)	mg/l	>0.005	0.05	Not Exceeded
7	Fecal Coliform(Fc)	n/ 100ml	Nil	Nil	Not Exceeded
8	Chloride	mg/l	18	150-600	Not Exceeded
Sampling ID: GW/DW2, Location: Kamrangirchar					
1	pH	-	7.3	6.5-8.5	Not Exceeded
2	TDS	mg/l	260	1000	Not Exceeded
3	Electric Conductivity (EC)	µS/cm	495	-	-
4	Temperature	0C	34.2	20-30	Exceeded due to water supply by GI pipe in sunshine.
5	Iron (Fe)	mg/l	0.02	0.3-1.0	Not Exceeded
6	Arsenic (As)	mg/l	>0.005	0.05	Not Exceeded
7	Fecal Coliform(Fc)	n/ 100ml	Nil	Nil	Not Exceeded
8	Chloride	mg/l	187	150-600	Not Exceeded
Sampling ID: GW/DW3, Location: Khilgaon					
1	pH	-	7.3	6.5-8.5	Not Exceeded
2	TDS	mg/l	260	1000	Not Exceeded
3	Electric Conductivity (EC)	µS/cm	500	NA	
4	Temperature	0C	34.2	20-30	Exceeded due to water supply by

SL. No	Sampling ID	Unit	Concentration Present	Bangladesh Standard*	Remarks
					GI pipe in sunshine.
5	Iron (Fe)	mg/l	0.23	0.3-1.0	Not within standard
6	Arsenic (As)	mg/l	>0.005	0.05	Not Exceeded
7	Fecal Coliform(Fc)	n/ 100ml	Nil	Nil	Not Exceeded
8	Chloride	mg/l	14	150-600	Not Exceeded

Noted: * ECR 1997, DOE, NA- Not Available

pH: pH is a measure of the hydrogen ion concentration in water and indicates whether the water is acidic or alkaline. The measurement of alkalinity and acidity of pH is required to determine the corrosiveness of the water. From the above table it is observed that all the samples are within the permissible limit of Bangladesh National Standards and ranges from 6.92 to 7.3.

Total Dissolved Solids (TDS): TDS value indicates the general nature of water quality and is usually related to conductivity. However, the values of TDS of all the samples, collected from the three locations are within the standard limit and ranges between 260 mg/l and 310mg/l.

Electrical Conductivity (EC): The EC indicates the concentration of dissolved electrolytes present in the water sample, but do not give any idea about the types of ions present. The electrical conductivity is the measure of capacity of a substance or a solution to carry an electrical current. The concentration of EC ranges from 495 μS/cm to 610 μS/cm due to severe pollution. The water sample SW1 collected from Sutrapur CMP jheel recorded the highest value of EC. As no standard was set by ECR 1997, DOE, the EC value is not compared with any standards.

Temperature: The values of temperature for the sample, collected from Sutrapur is found to be within the limit but the value of temperature for the samples, collected from Kamrangirchar and Khilgaon exceed the Bangladesh Standard. This could be because of the exposure of the supply pipes to sunlight and the measurements being taken during the day.

Iron (Fe): Aeration of iron-containing layers in the soil can affect the quality of both drinking/ground water and surface water. If the GW/DW table is lowered or nitrate leaching takes place, dissolution of iron can occur as a result of oxidation and lower pH. The concentration of Fe in three drinking water samples ranges between 0.02 and 0.23mg/L. The concentration of iron in all tested DW/GW samples are below the lower limit of 0.3mg/l set by the Bangladesh standard for DWQ/GWQ.

Arsenic (As):The values of As for the samples collected from the three areas are found to be less than the minimum detection limit.

Fecal Coliform (FC): FC has originated from human and animal waste. Untreated organic matter that contains FC can be harmful to health. The presence of FC in all the three tested DW/GW samples are within the Bangladesh Standard for DWQ/GWQ.

Chloride (Cl-): Chloride indicates the general nature of water salinity and it breaks up positively or negatively charged ions. A certain amount of chloride is always present in water. However, excessive amount of chloride has health and other secondary impacts. The concentration of chloride in Kamarangirchar (DW2) is within the Bangladesh standard but in Sutrapur (DW1) and Khilgaon (DW3) the tested drinking water samples are below the lower limit of 150mg/l set by the Bangladesh DWQ/GWQ Standards. The concentration ranges between 14 mg/l and 187 mg/l.

4.4.4Surface Water Quality

The Surface Water (SW) water samples have been collected from the major water bodies present in the three locations, Sutrapur, Kamrangirchar and Khilgaon areas. Every possible precaution has been taken to obtain representative samples with minimal error.

Firstly, the SW sample for Sutrapur area has been collected from the CMP jheel in Sutrapur area, Dhaka. During sample collection, the average water depth of the jheel was about 2.5m on March 2018, as reported by the local population. The jheel was found to be polluted with a variety of waste material being disposed in it. The colour of the jheel water was observed to be murky and dark and the water had bad odour. Secondly, the SW sample for Kamrangirchar has been collected from the Buriganga river, as Kamrangirchar is located on the bank of the Buriganga river. The average depth of the river was about 6m on March 2018, as reported by the local people. The Buriganga river was found to be contaminated with various waste material, industrial effluent, wastewater etc. The colour of the river water was observed as murky and dark and the water had bad odour. Thirdly, the SW sample for Khilgaon area has been collected from the Khilgaon jheel in Khilgaon area, Dhaka. During sample collection the average water depth of the jheel was about 2m on March 2018, as reported by the local people. The jheel was found to be polluted by various waste material, wastewater etc. The colour of the water was observed to be dark and murky.

The detailed analyses of surface water (SW)test results of each sampling location are summarized in the following table, which has been compared with the Bangladesh National Standards, as set by the DOE (ECR,1997):

Table 13 Test results of surface water quality of selected locations

SL. No	Sampling ID	Unit	Concentration Present	Bangladesh Standard*	Remarks
Sampling ID: SW1, Location: Sutrapur					
1	pH	-	7.84	6.5-8.5	Not Exceeded
2	TDS	mg/l	620	1000	Not

SL. No	Sampling ID	Unit	Concentration Present	Bangladesh Standard*	Remarks
					Exceeded
3	Electric Conductivity (EC)	µS/cm	1250	NA	
4	Temperature	0C	30	20-30	Not Exceeded
5	Dissolve Oxygen (DO)	mg/l	3.08	6	Less
6	Biological Oxygen Demand (BOD)	mg/l	9	3 or less	Exceeded
7	Chemical Oxygen Demand	mg/l	23	NA	
Sampling ID: SW2, Location: Kamrangirchar					
1	pH	-	7.90	6.5-8.5	Not Exceeded
2	TDS	mg/l	520	1000	Not Exceeded
3	Electric Conductivity (EC)	µS/cm	1030	NA	
4	Temperature	0C	30.8	20-30	Exceeded
5	Dissolve Oxygen (DO)	mg/l	1.2	6	Less
6	Biological Oxygen Demand (BOD)	mg/l	11.8	3 or less	Exceeded
7	Chemical Oxygen Demand	mg/l	39.5	NA	
Sampling ID: SW3, Location: Khilgaon					
1	pH	-	7.68	6.5-8.5	Not Exceeded
2	TDS	mg/l	400	1000	Not Exceeded
3	Electric Conductivity (EC)	µS/cm	800	NA	
4	Temperature	0C	28.6	20-30	Not Exceeded
5	Dissolve Oxygen (DO)	mg/l	3.4	6	Less
6	Biological Oxygen Demand (BOD)	mg/l	7.6	3 or less	Exceeded
7	Chemical Oxygen Demand	mg/l	19	NA	

Noted: * ECR 1997, DOE, NA- Not Available.

*Notes: * BD National Standard for Inland Surface Water (Water useable for fisheries), (ECR 1997, DOE).*

pH: The "desirable" range of pH prescribed by the National Standard is between 6.5 and 8.5. This is the range, which provides adequate protection to the life of fresh water fish and bottom dwelling invertebrates. In all of the three water bodies, the pH range is found well within the

Bangladesh standards. The pH of water samples lies within the range of 7.68 to 7.90. However, pH value is governed largely by the carbon dioxide/carbonate/bicarbonate equilibrium.

Total Dissolved Solids (TDS): The concentration of TDS of all three water bodies ranges from 400 mg/L to 620 mg/L which is within Bangladesh standard.

Electrical Conductivity (EC): The EC indicates the concentration of dissolved electrolytes present in water sample, but do not give any idea about the types of ions being present. The electrical conductivity is the measure of capacity of a substance or a solution to carry an electrical current. The concentration of EC ranges from 800 μS/cm to 1250 μS/cm due to severe pollution. The water sample SW1 collected from Sutrapur CMP jheel has shown the highest recorded value of EC.

Dissolved Oxygen (DO): Decrease in DO values below the critical level of 3 mg/l causes death of most fishes and other aerobic aquatic organisms. The dissolved oxygen values ranged from 1.2 to 3.4 mg/L in three locations and the range is found less than the National Standards and therefore no fishes were observed in these three water bodies.

Chemical Oxygen Demand(COD): The COD value indicates the amount of oxygen which is needed for the oxidation of all organic substances in water in mg/l. The COD is an important water quality parameter because, similar to BOD, it provides an index to assess the effect discharged wastewater will have on the receiving environment. The COD test is often used as an alternate to BOD due to shorter length of testing time. The COD values ranged from 19 to 39.5 mg/L in three locations and Kamrangirchar (SW2) showed the highest concentration.

Biological Oxygen Demand (BOD): The BOD is the amount of dissolved oxygen needed (i.e., demanded) by aerobic biological organisms to break down organic material present in a given water sample at a certain temperature over a specific time period. The BOD value is most commonly expressed in milligrams of oxygen consumed per liter of sample during 5 days of incubation at 20°C. The BOD values for all samples range from 7.6-11.8 and exceed the Bangladesh Standard of 3 or less.

Chapter 5 Stakeholder Consultation

Having a proper consultation session is essential for a development project. Through a process of consultation and participation the beneficiaries of a project and all stakeholders impacted by the project are given an opportunity to understand the components of the proposed project. Project ideas and design options for possible sub-projects are shared with relevant stakeholders through the consultation process.

Therefore, in order to ensure future sustainability of the DCNUP and to develop a robust EMF four preliminary stakeholder consultation sessions were held on location clusters selected for potential sub projects under the project. All recommendations made by the stakeholders will be investigated before finalising any of the sub projects.

During the consultation meetings, possible social and environmental issues and aspects were disclosed. The participants were encouraged to discuss whatever concerns they anticipated about the construction phase. They were also facilitated to provide their suggestions for consideration within the project design. This section provides a reflection of the consultation sessions held in: 1. Lalbagh 2.Sutrapur 3. Kamrangirchar and 4. Khilgaon. All of which are located in South Dhaka and fall under the jurisdiction of Dhaka South City Corporation (DSCC).

5.1 Feedback from Beneficiaries during Consultation Session

The participants that attended each of the consultations include ward councillors of the respected areas, local residents and entrepreneurs, members of youth club, social organization and political party members, doctors, teachers and imams of the local mosques. The sessions were also attended by local women representing the community. The overall feedback provided by the stakeholders are provided below:

A. *Waterfront development:*

Most of the participants at the Kamrangirchar stakeholder consultancy identified water front development along the canal connecting the Buriganga river as an opportunity to develop public space and amenities for local residents. They also insisted on improving the connection between Kamrangirchar and the rest of Dhaka city.

In the Lalbagh consultancy the site near the crematorium was identified as a suitable location for development ventures. The crematorium has a pond bordering the embankment, a playground at the back and a newly constructed hospital on one of the sides. At present the pond is lined with vegetation and the pond water is used for a bathing ritual after the funeral ceremony. The pond and the surrounding area needs to be improved for public use.

The participants shared that the water used for drinking in Khilgaon area is impure and has odour problems.

There is a jheel in the Shahjahanpur (Khilgaon) area and the participants shared that the local residents living near the jheel face many difficulties, such as outbreak of mosquitoes and odour from the polluted water. They want the area to be improved further.

Even in the Sutrapur consultations the participants mentioned the need for developing the river banks and river fronts for beautification of Dhaka city.

B. Public Space Development:

At the Kamrangirchar stakeholder consultancy session the female members emphasized the need for adequate street lights so that they feel safer when walking the streets after sunset. Another suggestion made by the participants was to ensure shading facilities on the street sides so that they are able to walk or sit by the roads more comfortably.

The participants at Kamrangirchar, Lalbagh and Khilgaon, identified the lack of public toilet facilities within the areas as a major inconvenience. In most cases they said there was a shortage of landfor developing public toilets. They believe this a major requirement for improving the quality of their lives.

At the Lalbagh consultancy session the participants discussed Bakshi bazar as one of the possible areas for a subproject. The area is surrounded by Bangladesh University of Engineering and Technology (BUET), Dhaka Medical College, Badrunnesa College, Alia Madrasa, Dhaka Education Board and Madrasa Education Board; and it is frequently used by students. But there are limited facilities to support their needs. The participants suggested a comprehensive neighbourhood planning, focusing on the needs of the students.

Although there are playgrounds being used in Lalbagh the participants shared that there is no designated space for girls or women to play or walk; however, there is a need for a segregated open space for women. Women also need indoor spaces for recreational activities. The local residents of Lalbagh suggested that the publicly owned land could be developed into playgrounds to keep children active and prevent drug usage in the area.

The participants at the Khilgaon consultation shared that the playgrounds need walking spaces on the periphery so that people who want to walk or jog for exercise can do so. They mentioned Bashabo Balur math and possible interventions in that location. There is also a need for segregated public toilets in these parks and playing fields.

The Sutrapur consultation also mentioned the need for increasing playgrounds for the local children to practice sports and so that they get the opportunity to actually train for national sporting activities. They shared that Dhaka traffic does not allow them to travel to other areas easily and they miss out on a lot of opportunities.

C. Connectivity and Road Networks

The participants at Kamrangirchar, especially the councillors suggested interventions to be planned for improving Kamrangirchar's connectivity to the rest of Dhaka city, this mainly included bridges and better road networks. They shared their concern about past initiatives, including bridge constructions, which were halted before materializing into reality. The discussion about planning bridges for only pedestrianuse was not accepted by most participants. They mentioned that improving vehicular bridges can bring more business to their area.

At Kamrangirchar although the roads are narrow they are usable by pedestrians and rickshaws. They are not considering to widen the streets as the houses along them are small and there is no available free land adjacent to the streets. Recent development initiatives have improved drainage and lighting of some of these streets but there is demand for more. At Kamrangirchar there is a need for ensuring proper waste management to make the streets more usable and hygienic for the residents. Disposal of trash in open spaces will be the cause fordiseases within the local community.

During the Lalbagh consultancy the participants mentioned traffic congestion to be a problem in the area; there are no pavement spaces for pedestrians in many of the streets. The roads are quite narrow. When a suggestion regarding time segregated usage of streets, between pedestrian and vehicles, was put forward most participants agreed to consider this proposal.

During the Khilgaon consultation one of the ward councilors mentioned that walking through the Baganbari area road is extremely difficult. In case of emergency it is not possible to use these roads since it is narrow and crammed with people. Wider roads are needed in some of the areas.

The participants at the Sutrapur consultations mentioned the need for separate walkways partitioning the vehicle used roads and the canal, so people can walk through this pedestrian walkway for leisure.

D. Public Building Facilities

At Kamrangirchar the participants of the consultancy session shared that there are no set locations for conducting trainings and skill development activities for the local residents. At present, schools are used to accommodate such initiatives, including hosting health care

programs.The local residents usually travel outside their neighbourhood to access health care facilities.

Most of the community centres at Kamrangirchar are privately owned and have to be rented for use. There is a demand for more community centres in the area. All of the stakeholders agreed on the demand for publicly owned community centres that may include facilities such as: gymnasium, swimming pool, training centre etc.

At Lalbagh area the participants suggested that community centres should be designed for multiple usage; at present, they are only used for weddings. The demand for community centre came from the youth and female representatives of the community, making suggestions to make multi-purpose community centres to keep the youth active and healthy.

At the Khilgaon consultation sessions the participants discussed the need for developing multi story public buildings for various uses.

The participants at the Sutrapur consultancy session acknowledged the need for cultural centres and health care facilities in their community. The recreation of the community members needs to be ensured and at present there is scope for improvement in this area. They mentioned that in Shyambazar there is a large space with one story markets that are in poor quality, an intervention could be planned there to improve the conditions of these existing infrastructures.

Environment and Social Safeguard Issues

World Bank social and environmental safeguard specialists were present during all four consultation sessions. The participants in all the stakeholder consultancy sessions were made aware of some of the potential environmental and social impacts from the project. This includes some of the inconveniences that could be caused during the construction phases.
Some potential impacts were named as examples, since no sub project has been finalized yet these were generic examples. Possible relocation of some vendors during street side development and possible dust and noise pollution from the construction phase was mentioned.

The audience in all sessions expressed their willingness to make the temporary sacrifices needed. The participants shared that there is no disagreement regarding these issues and full cooperation will be ensured from the community. The participants agreed on the need for making public spaces more accessible to all community members.

It was made clear that once sub projects have been finalized proper mitigation measures will be ensured in both social and environmental fronts. An on-going process of consultations will be conducted once the designs have been finalized and during the implementation stages to ensure

all the feedback, recommendations and issues of the local residents, beneficiaries and affected parties are taken into consideration and incorporated where possible.

5.2 Recommendationsfrom Stakeholder Consultation

Kamrangirchar

- The suggested examples of public facilities included walkways, parks, seating arrangements in open spaces, playground area, street lighting and waterside development.
- Participants expressed a need for raising public awareness regarding waste disposal in the river and streets of the local area.
- The participants shared that they would like DSCC to identify *Khas* land owned by the government, free them from illegal encroachment and develop these areas as open spaces for neighbourhood usage.

Lal Bagh

- To develop the riverside along the Beribadh (embankment) for public use. Participants also suggested waterfront development to better connect Kamrangirchar and Lalbagh.
- These lands to be identified and developed in a similar manner as Hatirjheel waterfront development.
- Planting more trees along the riverbank to improve the environment of the densely-populated area.
- To develop separate open space for girls or time-segregated usage of common open spaces. Participants suggested indoor sports facilities for women of the area.
- Residents emphasized on making the streets safer with CCTV coverage and street lights.
- To incorporate emergency health services in the community centresthat are being planned.
- To include both indoor and outdoor sports facilities in community centres.
- To accommodate IT training facilities within the community centres.
- To include plans for swimming pools in every ward for children to learn swimming.
- The elderly participants suggested separate smoking areas to prevent people from smoking in the streets.

Khilgaon

- There is a need for public toilets in the area.
- The participants expressed a demand for playgrounds in the area.
- Need for more water pumps in the local area.

- The area councillor expressed the communities want for a Hatirjheel like development in the Shahjahanpur jheel area.
- The participants want less polluted water in the Shahjahanpur jheel area so that people can walk by the jheel for leisure without facing odour issues.

Sutrapur

- The participants shared that they want all local ward councillors to be consulted before finalising any sub projects in the Sutrapur cluster
- The youth group needs to be consulted through focus group discussions before any intervention is planned in this area.
- Considering that there are many heritage sites in this area, any development in this area should consider these heritage sites and plan interventions with care.
- Include swimming pool and cinema halls in the development plans.
- Walkway for pedestrian use and to accommodate leisure walks.
- Development of playgrounds and sports practice grounds for youth.
- There is a need for culture centres for the community people.
- There is a need for proper health care centres in the community.

Chapter 6 Environmental Assessment Procedure

Introduction

The major activities to be carried as part of the Environmental Assessment Procedure include:

(i) Environment Screening and description of environmental baselines against which sub-project impacts will be measured
(ii) Analysis of alternatives
(iii) Identification of major sub-project activities
(iv) Assessment, prediction and evaluation of impacts of major project activities on the baseline environment. The EMF presents guidelines for carrying out each of these activities.

6.1 Environmental Screening

Once finalised all the sub-projects to be funded under DCNUP will be subject to an environmental screening. This process will ensure that any project with significant negative impacts on the environment is not executed.

The main purpose of "environmental screening" is to get a preliminary idea about the degree and extent of potential environmental impacts of a particular sub-project. The environmental screening would then be used to assess if the sub-project requires further environmental assessment (IEE/EIA). The IEE/EIA (if needed) will be conducted following World Bank guidelines and will be in accordance to the environmental rules and regulations under the Government of Bangladesh.

All the sub-projects under DCNUP will be identified with the guidance of Dhaka South City Corporation and the targeted beneficiaries. Once the sub project is selected it will go through a rigorous process of environmental screening before the implementation stages. The implementing body, in this case DSCC, will be responsible for carrying out the environmental screening processes.

The major steps making up the environmental screening process includes: (i) reconnaissance survey of the sub-project area and its surroundings by engineers hired by the implementing body; (ii) identification of all major sub-project activities; and (iii) a preliminary assessment of the possible impacts of these activities on ecological, physico-chemical and socio-economic aspects of the sub-project surrounding areas.

The PIU and other hired consultants would carry out a reconnaissance survey around the sub-project locations in order to identify all the key environmental features of the area, including

human settlements, education, religion, historical establishments, heritage sites and water bodies close to the sub-project site.

The major sub-activities could be identified from the description of the sub-project prepared by the implementing agency (by completing Form 1). This is attached in Appendix 1 of the EMF document.

The sub-project description form will be prepared by the implementing body and will cover all the essential details and major sub-activities under each of the sub projects (Form 1). Following this the implementing body will be responsible for conducting the environmental screening of all projects using the "Environmental Screening Form 2", presented in Appendix 2 of the EMF.

The potential impacts resulting from the execution of sub-projects have been divided into two phases; the impacts during construction phase and the impacts during operational phase of the sub-project.

The impacts are divided by: ecological impacts, physicochemical impacts and socio-economic impacts. In order to ensure that all aspects are covered a number of parameters have been identified for each of these categories. As a part of the environmental screening process, the potential impact with respect to each parameter has to be classified as "High", "Medium" and "Low" The following section provides guidelines for carrying out environmental screening of sub-projects using the screening form 2.

Ecological Impacts:

The major parameters to be considered during the ecological screening process during the construction phase includes: tree felling, the impact on vegetation, impact on the aquatic environment. If the sub-project involves cutting or felling of a large number of trees, the impact would be classified as "High"; if the sub-project involves cutting or felling only a few trees, the impact could be classified as "Medium", and if there is no tree felling within the scope of the project, the impact would be classified as "Low".

If there is a water body close to the location of the sub-project, then depending on the sub project activities, the potential risk of polluting the water body (e.g., through discharge of waste/ wastewater from sub-project activities, spills and leaks of oil/ chemical) and the potential impact on aquatic environment, a classification of "High", "Medium" or "Low" will have to be decided upon.

During the operational phase of the sub project one parameter has been selected for screening the ecological impacts, this includes the impact on the aquatic environment. Sub-projects that could

generate such impact include drain work and boat landing jetty; for other sub-projects, ecological impacts during operational phase are likely to be classified as “Low”.

If the drainage water carried by the constructed storm drain is polluted it will adversely affect the aquatic environment of the receiving water body; smaller water bodies with lower levels of flow would be more susceptible to more pollution than larger water bodies (e.g., a river) with higher flows. Depending on the condition of the drainage water and the nature of the receiving water body, the DSCC engineer would classify the scale of impacts as “High”, “Medium” or “Low”, according to Form 2 (Appendix 2).

In addition, the discharge of oil (from engine driven boats) and other wastes at the boat landing jetty could also pollute the river/khal, and end up affecting the aquatic environment. Depending on the potential use of the boat landing jetty (in terms of number of boats and people), the impacts will be classified as “High”, “Medium” or “Low”.

Physicochemical Impacts:

The set parameters considered for screening the physicochemical impacts during the construction phase include drainage congestion, noise and air pollution, and water/ environmental pollution. If the sub-project involves the usage of equipment/machines producing significant noise (e.g., generators, pile driver, heavy truck/vehicle) and if the sub-project site is located close to human settlements/ schools/ hospitals, noise pollution would be significant. Similarly, use of stone crushers, burning of asphalt, excavation works and movement of vehicle would generate air pollution. Depending on the extent of these activities for the proposed sub- project, the scale of impact of air pollution could be subjectively classified as “High”, “Medium” or “Low”. The process for classifying impacts related to drainage congestion, and water/ environmental pollution should follow the same understanding.

The criteria for environmental screening of physicochemical impacts during the operational phase would depend on the type of sub-project in hand. For example for a road sub-project, noise level and air pollution (from vehicular movement) are important parameters; for a drain sub-project, drainage congestion (e.g., improvement of drainage congestion due to the sub- project) and water pollution (of receiving water body, as discussed above) are important parameters; for a number of sub-projects (e.g., solid waste management, kitchen/ cattle market, slaughter house), environmental pollution (e.g., from solid wastes generated from these facilities) is an important physicochemical parameter. Depending on the nature and scale of the sub-project, the DSCC engineer would classify the scale of the potential impacts as “High”, “Medium” or “Low”. Form 2 (Appendix 2) includes various questions that would help screen the sub-project activities and better understand its impact on the surrounding physicochemical environment.

Socio-economic Impacts:

The parameters considered for screening the socio-economic impacts during the construction phase includes traffic congestion, health and safety, impact on archaeological/ historical sites, and employment. A number of projects that are located near/on roads are likely to generate traffic congestion during its construction phase. Sub-projects that involve transportation and storage of significant construction materials could also aggravate traffic congestion. Sub-projects that are likely to generate significant noise and air pollution are also likely to cause short-term health concerns. Sub-projects involving operation of significant vehicles and equipment in busy localities are likely to generate safety concerns. Labor-intensive sub-projects are likely to generate employment opportunities for some people. Archaeological and historical sites located at close proximity of a sub-project site would raise concern of adverse impacts on these sites/establishments.

The parameters considered for screening of socio-economic impacts during the operational phase include traffic, safety, and employment. A number of sub-projects would modify the traffic situation in the sub-project surrounding areas once implemented. Some of these sub-projects (e.g., road, bridge/box culvert, bus/truck terminal, pedestrian bridge) are likely to improve the traffic situation, while others (e.g., office, market, community centre, park) may generate more traffic in the area.

Depending on the type and extent of a sub-project, the DSCC engineer will classify the traffic impacts during the operational phase. Some sub-projects like pedestrian bridge, traffic control and street light are likely to improve "safety", while increased vehicular movement due to construction of road, bridge/box culvert, market/office may create safety concerns (e.g., accidents). Depending on the nature and extent of the sub-project, the DSCC engineers would have to classify the impact on safety. A number of sub-projects are likely to have significant positive impacts in terms of generation of employment and business opportunities; these include road/bridge/box culvert, markets, bus/truck terminals. Depending on the nature of the sub-project, the DSCC engineer would classify the impact on employment generation as "High", "Medium" or "Low".

The EMF includes guidelines for the implementing agency (DSCC) to successfully carry out the "environmental screening" of sub-projects by filling the form for the description of subproject (Appendix 1), the Environmental Screening Form (Appendix 2) and the analysis of alternatives (Appendix 3).

6.2 Analysis of Alternatives

The primary objective of the "analysis of alternatives" is to identify the location/design/technology for a particular sub-project that would generate the least adverse impact, and produce the maximum level of positive impacts. The analysis of alternatives should be carried out at two different stages, firstly by the implementing agency during the formation of the sub project and secondly when carrying out the IEE/EIA of a sub-project (if needed for specific project).
In general, for any sub-project, the analysis of alternative should focus on:

a) Alternative location or route;
b) Alternative design and technology;
c) Costs of alternatives;
d) No Action alternatives.

While the EMF guidelines should assist the implementing agency engineers to conduct "analysis of alternatives" of different sub projects under DCNUP, an assessment of the capacity of the engineer hired by the implementing agency to perform the task should be assessed and if needed training on environmental assessment and management should be facilitated.

6.3 Identification of Major Sub-Project Activities

Identifying the details of the sub-project and the main sub-project activities is essential for assessing the environmental impacts of the sub-project during both construction and operational phases. At this stage, it can be noted that acquisition of private land is not required for carrying out any of the sub projects under DCNUP.

A common sub-project activity is mobilization of material and equipment and establishment of labor shed for carrying out the construction process. The actual construction activities would be different for different types of sub-projects. As such the major activities during the construction and operational phases of all sub-projects should be identified to assess their impacts on the baseline environment.

6.4 Assessment and Prediction of Impacts

Once the sub project activities are identified and specific locations are agreed upon the IEE/EIA procedures will assess impacts of these activities on the baseline environment of the proposed locations. The impacts will be different during the construction and the operational phases and so have been discussed separately. This section will discuss the potential ecological and the potential physico-chemical impacts of proposed project activities on the possible location clusters.

6.4.1 Potential Significant Environmental Impacts during Construction Phase

The potential environmental impacts during the construction phase of sub-projects could be categorized into: (a) ecological impacts; (b) physicochemical impacts; and (c) socio- economic impacts

Ecological impacts:

On the basis of baseline environment conditions at different sub-project locations (observed during field visits) and the nature and scale of the proposed sub-projects, it appears that ecological impacts are not likely to be significant for most of the proposed sub-projects under DCNUP. However, for a few sub-projects such as the river front development the significance of ecological impacts needs to be assessed. In all these cases, the assessment should have a focus on the water quality. For some sub-projects, such as the remodelling of road networks and developing the existing parks and playgrounds special needs to be taken to ensure that the trees in the premises are protected. If by chance some trees need to be removed in the process its ecological impact needs to be assessed and accounted for. In general, the ecological impact should focus on:

- Impact on flora (aquatic and terrestrial);
- Impact on fauna (aquatic and terrestrial) including fish;

Usually the significance of an ecological impact is determined by: (i) Ecological "consequence" of the activity, (ii) "Likelihood of occurrence" of the activity, and (iii) Calculating the product of these two parameters.

Consequence and likelihood of ecological impacts resulting from project activities are discussed below.

Table E-1 of Appendix 4 (Criteria for assessment of ecological impacts) contains the criteria for estimating "consequence" of any particular "sub-project" activity. As can be seen in Table E-1, for adverse ecological impacts, the "consequence" has been divided into six categories (critical, major, moderate, minor, low, and none), with corresponding numerical ranking ranging from 5 (for "critical") to 0 (for "none"). If a sub-project activity falls into multiple categories, it is assigned the highest ranking category for assessment of ecological impact.

Table E-2 of Appendix 4 presents criteria for "likelihood of occurrence" of an activity/ impact. The likelihood of each identified impact is determined by estimating the probability of the activity occurring. The likelihood is divided into five categories (almost certain, very likely,

likely, unlikely, and very unlikely), with corresponding ranking ranging from 5 (for "almost certain") to 1 (for "very unlikely").

The "significance" of ecological impact for a particular sub-project activity is determined by multiplying the "consequence ranking" and the "likelihood ranking" of the sub-project activity, as follows:

Significance = Consequence × Likelihood

The table below shows "significance" ranking of ecological impacts that can be used to classify the ecological impacts for a particular sub-project activity. A detailed account of this can be found in Table E-3 of Appendix 4,which presents examples of estimating ecological impacts of some typical sub-project activities.

Table 14 Significance of ranking ecological impact of a sub project

Significance (calculated by multiplying 'Consequence' and 'Likelihood)	Significance Level
>16	Critical
9-16	High
6-8	Medium
2-5	Low
<2	Negligible

Physicochemical impacts:

The possible physicochemical impacts from the sub-project activities to be carried out under DCNUP may include the following:

- Drainage congestion,
- Noise pollution,
- Air pollution,
- Water pollution,
- Soil Erosion/contamination
- Environmental pollution from solid/construction waste

Drainage congestion:

When conducting infrastructure development and civil engineering activities, there could be instances of temporary drainage congestion resulting from obstruction of the natural flow of drainage water due to the storage of materials, piled up excavated material/ soil, and temporary

embankments constructed to keep the work area dry. Proper care needs to be taken to ensure that drainage congestion does not cause discomfort for the community members.

Noise pollution:

Construction activities will create some unavoidable noise pollution. This could result from the operation of large machinery and movement of vehicles (carrying equipment/ material to and from site). Significant noise is generated from operation of pile drivers, bulldozers, dump trucks, compactors, mixing machines, and generators, etc. Demolition activities, if required, also generate noise. Noise may create annoyance for the community members since most of the location clusters visited during field visits are densely packed and the residential buildings, schools, madrasas, hospitals are in close proximity to the proposed sites. The timings decided for construction needs to consider school operating times as well as the convenience of other establishments in the local area. For full-scale EIA (if needed), noise level predictions may be made for pile drivers and other major equipment used in the sub-project works, and used to assess noise pollution impacts in areas surrounding the sub-project site. Noise modelling should be considered only for sub-projects that require full scale EIA and involve the use of heavy equipment like pile drivers, bulldozers etc.

Air pollution:

Air pollution during the construction phase could result from emissions from machines and equipment (e.g., drilling rig, mixing machines, generators, asphalt plants) used for different sub-project activities, and movement of vehicles (carrying material and equipment) to and from the site. For the sub-projects to be implemented under the DCNUP the adverse impacts of air pollution are likely to be limited to the areas surrounding the sub-project sites.

Water Pollution:

Surface Water pollution:

Water pollution may result from discharge of wastewater (e.g., liquid waste from labour sheds), spills and leaks of oils/ chemical into nearby water bodies (e.g., drain, pond, khal, river). If adequate sanitation arrangement of the labourers is not made, it can create odour, public nuisance and water pollution problems.Construction activities would be carried out near water bodies for some of the sub-projects such as the riverfront development and proposed sub projects surrounding ponds, proper measures need to be taken to ensure that pollution from construction does not reach and pollute the water body.

Groundwater pollution

If there is any sub project that involves drilling boreholes in the ground or setting new tube wells proper measures need to be taken to ensure that the groundwater is not polluted. If there is Arsenic contamination in the upper aquifer and adequate precaution is not taken during deep drilling, there will be a possibility of short-circuiting between the deeper and shallow aquifers which will cause the supply water to become contaminated by arsenic.

Soil Erosion/Contamination:

Most of the sites are located in generally flat areas that are not prone to floods and consequent soil erosion. Certain construction activities can potentially erode soil at the proposed sites particularly during the rainy season. Soil erosion can affect the integrity of the existing and proposed buildings at the sites, can cause water ponding particularly during rainy season, and can also affect the trees and natural vegetation of the area.

Conservation of top soil is an important issue. Utmost care should be taken to protect the topsoil (and thus maintain soil fertility). If there are proposed sub projects that requires protection of the top soil, the first 12 to 18 inches of topsoil should be excavated and stored on one side and the rest of the excavated soil on the other side. During back filling of trench, the top soil should be placed on the top again.

Environmental pollution from solid/ construction waste:

In many sub-projects, considerable construction debris could be generated from different sub-project activities. Some of waste that could be generated from construction includes oily water, waste oils, oily rags, and other similar wastes. The stores and warehouses will generate solid waste such as empty cement bags, cardboards, and wooden crates. If proper disposal of these waste streams is not ensured it can potentially contaminate the soil of the area. Some of the sub projects are near the river front, inappropriate waste disposal could pollute the river water.

Soil contamination can potentially have negative impacts on the local community, natural vegetation, agriculture, and biological resources of the area including aquatic flora and fauna. Improper management of construction debris and solid waste could cause blockage of drainage line/ path and environmental pollution.

<u>Socio-economic impacts</u>

The social assessment of the DCNUP has been carried out separately, and a more detailed account of all social affairs will be incorporated in the individual social assessment and social management framework document. This section provides an overview of the possible major socio-economic impacts of the DCNUP during the construction phase, and presents guidelines for identification and protection of physical cultural resources (PCR).

Possible socio-economic impacts from the sub-project activities to be carried out under DCNUP may include the following:

- loss of land,
- loss of income and displacement,
- traffic congestion,
- health and safety,
- Impact on archaeological and historical sites, and safeguarding physical cultural resources (PCR)

Loss of Land:

Based on the feasibility study for DCNUP and field visits carried out, it appears that no land acquisition will be required for any of the sub-projects to be implemented. Many of the sub-projects involve rehabilitation/ improvement/ expansion of existing infrastructure/ facilities, and sub-projects involving new construction will be carried out in DSCC owned land. Therefore, loss of land is not likely to be an issue of concern for this project.

Loss of income and displacement:

During the construction phase there could be temporary relocation of people/businesses using a particular piece of land/establishment. For example, during construction/ rehabilitation of a section of the road or river front, road-side vendors or small temporary shops on footpaths may not be able to operate in that area for a period of time. However, considering the extent and scale of the proposed sub-projects, it appears that such impacts would not be significant; for example, in most cases, the affected road-side vendors or footpath shops would be able to operate by just moving a short distance away from the sub-project site. This will be discussed in detail in the separate social assessment carried out for DCNUP.

Traffic congestion:

During the construction phase of a proposed sub-project, traffic congestion may result from stock piling of material by the sides of roads, increased movement of people and vehicles carrying material and equipment or blocking certain roads. It can be assessed from the field visits that the proposed locations have a narrow road network and during the construction phase there could be potential traffic congestion in the area. This should be addressed with proper traffic management, and avoiding stockpiling of materials in a way that could obstruct traffic movement.

Health and safety:

It is important to ensure health and safety during the construction phase. General construction activities pose safety risks, which should be addressed as part of the occupational health and safety plan. For all activities under the DCNUP the World Bank Group/IFC Environmental, Health and Safety guidelines should be followed at all times.

Construction activities often involve operation of heavy construction machinery, vehicular traffic, excavation, filling operations and demolition of structures. These activities may pose some safety hazards to the local population. Stockpiling of construction material and debris from the demolished structure may cause serious accidents to the construction workers and people in the vicinity.Slips and falls associated with poor housekeeping, such as excessive debris, fall of bolts during assembling of steel frames, loose construction materials, and uncontrolled use ofelectrical cords and ropes on the ground, are also among the most frequent accidents on site. Vehicle traffic and use of lifting equipment in the movement of machinery and materials at the construction site may pose temporary hazards, such as physical contact, dust, emissions, and noise.

Inappropriate waste disposal at the camps and construction sites, and air quality deterioration caused by the project's vehicular traffic and construction activities potentially pose health hazards for the construction staff and nearby population. Unhygienic condition and unavailability of safe drinking water for the construction staff will expose them to health risks.

Impact on Archaeological Sites and Safeguarding Physical, Cultural Resources (PCR)

Dhaka's archaeological and historical sites are protected resources and care must be executed to ensure that such sites are not damaged during the construction stages of any of the sub project activities under DCNUP. For the convenience of the implementing agency and to keep such resources secured a guideline for archaeological impact assessment is provided in Appendix 5 of the EMF.

Given that the exact locations of the sub-projects to be implemented under DCNUP are not known at this stage any damage to the historical sites of Dhaka city is not expected, however a guideline for identification of physical cultural resources (PCR) and determination of the suitability of the sub-projects from the perspective of PCR is provided in Appendix 6. Following the World Bank Operational Policy OP 4.11 (Physical cultural resources) the "Chance Find" procedure for protection of cultural property is presented in Appendix 7.

6.4.2 Potential Significant Environmental Impacts during Operational Phase

Once the activities and processes that would take place during the operational phase of a sub-project are identified, the potential impacts of these activities on the baseline environment need to be assessed. The potential environmental impacts during operational phase could also be categorized into: (a) ecological impacts; (b) physico-chemical impacts; and (c) socio-economic

impacts.

Ecological Impacts

Poor quality of drainage water (e.g., due to direct discharge of toilet wastewater into storm drain) could cause pollution of the receiving water body (e.g., river, khal) and this could adversely affect aquatic flora, fauna and associated terrestrial fauna. Similarly, discharge of other wastes at certain sub project sites, such as the boat landing jetty could also cause pollution of the water body and affect the aquatic ecology. Constant monitoring of water quality (for river/khal) is therefore necessary to detect possible adverse ecological impacts at an early stage of the sub project.

Physicochemical impacts:

Depending on the type of sub-projects a number of Physicochemical parameters could experience both positive and negative impacts during operation phase of the sub-projects.

Important issues and parameters include:

- Drainage,
- Water quality,
- Air quality and noise level, and
- Environmental pollution from solid waste

Drainage:

The proposed sub-projects involving construction and rehabilitation of storm drains are likely to bring about improvement in the drainage condition of the sub-project locality. Better management of solid waste could reduce chances of drainage blockage and could help maintain the storm drains.

Water Quality:

The poor quality of drainage water (e.g., due to direct discharge of toilet wastewater into storm drain) and discharge of oil from engine driven boats could pollute the final receiving water body. Sub-projects are likely to contribute to the betterment of water quality (and environment in general) through proper management of waste and wastewater. Better waste management interventions within the scope of DCNUP include public toilet, slaughter house, and properly operated kitchen market and cattle market.

Air quality and noise level:

During the operational phase, vehicular movement would be the principal sources of air pollution

and noise pollution. In many cases it is possible to reduce the risk of air pollution (i.e., particulate pollution) through paving existing unpaved roads. The movement of people and vehicles surrounding public places to be developed could contribute to the existing noise pollution, but this is an understandable trade-off for having better planned infrastructures that can improve the quality of lives of the community members. However, public consultations will be held where environmental consequences will be discussed prior to implementation.

Environmental pollution from solid waste:

At present during the consultation sessions and field visits it was seen that most of the location clusters struggle with solid waste management, polluting the environment surrounding them. In regard to this implementing sub projects that focus on solid waste management (for example trash cans, waste collection facility etc.) would cause significant improvement on the overall environmental condition of the surrounding area.

Socio-economic impacts:

While the separate Social Management Framework (SMF) will include all social aspects in details, an overview of the possible major socio-economic impacts of the DCNUP during operational phase is noted in this section.

The Dhaka City Neighborhood Upgrading Project (DCNUP) aims to bring improvement in the socio-economic conditions of the community members living in the urban corners of south Dhaka. The implementation of possible sub projects will bring significant improvement in the quality of lives of those benefitting from these projects. Interventions such as better road infrastructure will enhance work opportunities and get more business in the area. Having interventions such as street lights will allow local girls and women to commute safely. Proposed community centres would host activities that could provide entertainment and bring the community together; leading to cultural growth and better bonding amongst community members. Better parks and open spaces will facilitate more activities in the community and improve the social life of both the youth and the elderly population. Walking and jogging in open spaces will keep the elderly population healthy and active and playing grounds will allow children to be engage in sports.

Overall it is without doubt that some of the sub projects under DCNUP is likely to bring significant positive impacts on the overall lives and experiences of the residents of Dhaka city.

Some of the key socio-economic parameters that are likely to experience beneficial impacts due to implementation of the sub-projects include: traffic improvement, public health and safety, employment opportunities, enhanced commercial activities, more revenue through existing businesses, entertainment, health and wellness, and better social life.

Chapter 7: Environmental Management Procedure

7.1 The Environmental Management Plan

The main purpose of the environmental management plan (EMP) is to record environmental impacts resulting from the sub-project activities and to ensure that the identified "mitigation measures" to reduce adverse impacts are implemented in a timely fashion. Additionally, it would also contain material to address any unexpected or unforeseen environmental impacts that may arise during construction and operational phases of the sub-projects.

The EMP should comprise of these following elements:

(a) Mitigation measures to be taken during both construction and operation phases of a sub-project to tackle adverse environmental impacts;
(b) The actions needed to implement these measures;
(c) A monitoring plan to assess the effectiveness of the mitigation measures in place.

The environmental management procedure should be carried out as an integral part of the project planning and execution process. The processes should be tailored to complement the sub-project implementation, dealing flexibly with environmental impacts, both expected and unexpected. For all sub-projects to be implemented under DCNUP, the EMP should be a part of the Contract Document.

The major components of the EMP include:

- Mitigation and enhancement measures
- Monitoring plan
- Grievance redress mechanism
- Estimation of cost of EMP
- Arrangement for implementation of EMP

7.1.1 Mitigation and Enhancement Measures

Construction Phase

The nature of the sub-projects to be implemented under DCNUP and the overall impact assessment of some of the proposed sub-projects to be implemented at the sub project location clusters reveals that most of the adverse impacts could be minimized or eliminated by adopting standard mitigation measures; there is also scope to enhance some of the beneficial impacts to be generated from the proposed sub-projects.

This section describes the generic mitigation and enhancement measures that could be applied to the sub-projects under DCNUP.

Considering that the sub-projects have not been finalised yet, this will be on the basis of the nature of proposed sub projects and the scope of DCNUP. The table below has been prepared to identify mitigation/enhancement measures corresponding to anticipated impacts from the potential sub-project activities, since the sub projects have not been selected yet these will be generic mitigation measures for possible impacts based on the nature of some of the proposed sub projects.

Operational Phase:

During the operational phase, the city corporations will be responsible for the operation and maintenance of the infrastructures to be developed under the DCNUP. Apart from regular operation and maintenance, a number of issues would require special attention for reducing/ avoiding possible adverse environmental impacts. Based on the nature of the sub projects proposed under DCNUP some of the areas that would require attention are: regular maintenance and management of storm drains, proper operation and management of municipal/kitchen/cattle market/slaughter house because of their potential implications on health and environment.

With respect to possible interventions focussing on storm drains, utmost efforts must be made to keep it operational (i.e., flowing) by restricting discharge of solid wastes into it and by periodically cleaning the drain. Adequate monitoring is also needed to make sure the storm drain does not receive direct discharge of toilet wastewater from households, markets and commercial establishments. Such discharges would contaminate the drainage water and eventually the receiving water body (river or khal), and would bring about a wide range of adverse environmental and health outcomes. Disposal of wastes from kitchen market, cattle market and slaughter house could also cause environmental pollution. Wastewater from slaughter house, if not properly disposed, could bring about adverse health and environmental impacts

Table 15 Potential impacts due to Sub project activities and generic mitigation measures

Potential Impacts due to Sub-Project Activity	Generic Mitigation Measure

Possible Impact on PCRs Since the exact location of the sub projects are not identified yet. Possible impacts of construction of road networks near Physical Cultural Resources (PCR) will be anticipated. However, it is not expected that any of the PCRs will be touched or intruded under the scope DCNUP.	• Since the exact locations of subprojects are not known at this moment, a guideline for identification of physical cultural resources and determination of the suitability of the subprojects from the perspective of PCR should be used for safety purposes. • The following EMF also includes "Chance Find" procedures for protection of cultural property. • Any possible intervention near PCRs will consult the Department of Archaeology under the Government of Bangladesh. Their expert opinion will be taken into consideration when deciding if potential intervention can be conducted in the location.
Impact on Air Quality During Construction Excavation on public roads and removal of old - pavement of roads increase dust emissions; Any construction related work activities for urban infrastructure, including demolishing work will generate dust particles and contribute to air pollution.	• Construction of various infrastructural elements may lead to dust generation and nuisance to the general - public, commuters, pedestrians and nearby households. However, these impacts are likely to be localized and not significant. Measures such as wearing masks when passing these areas could be recommended to pedestrians as well as workers engaged in the work for the during of the construction. • Use of water suppression for control of loose materials from construction site. • Ensure that all project vehicles are in good operating condition. • Spray water on dry surfaces regularly to reduce dust generation. • Maintain adequate moisture content of soil

	during transportation, compaction and handling. • Avoid use of equipment such as stone crushers at site, which produce significant amounts of particulate matter. • Excessive engine idling should be discouraged and machinery causing excessive pollution should be banned from sites.
Contribution to Noise Pollution During the construction works, noise will be generated from the operation of machinery and vehicles used to transport material to the site. These activities may cause discomfort to local residents, shops, and pedestrians	• Use of noise suppressors and mufflers in heavy construction equipment. • Avoid using construction equipment that produces excessive noise at night. • Avoid prolonged exposure to noise (produced by equipment). • Regulate use of horns and avoid use of hydraulic horns in project vehicles. • In case of constructions near schools, hospitals or religious centres, consultation regarding suitable timings should be done prior to construction activities to avoid disturbance.
Storm Water Drainage Possibility of flooding from raising of pavements or working on drainage structures	• Ensure drainage of storm water, especially during monsoon. • Provision of adequate diversion channel, if required. • Ensure adequate monitoring of drainage conditions throughout construction and operation period.
Water Issues There could be water pollution from material on-site, excessive water usage during construction activities and inadequate waste disposal on site.	• Prevent release of fuel, lubricants, chemicals, and wastes from construction site into adjacent water body. • Install sediment basins to trap sediments in storm water prior to discharge to surface

	water. • Collection of toxic waste from the construction site must be ensured so waste does not travel to nearby water body. • Water conservation practices should be adopted by workers on site to prevent waste of water. • Water lines should be checked frequently for leaks.
Waste Management Solid waste is usually generated during construction, this includes waste concrete, empty cement bags, excavated material, chemical waste generated by general site practices, municipal waste by the site workers etc. Inadequate waste management could cause nuisance on site	• Construction of sanitary latrine/ septic tank system. • Behavioural change should be encouraged with signs that discourage littering on public spaces. • There should be a provision of waste bins/cans, where appropriate. • Solid waste should be disposed at waste disposal facilities. • There should be a provision for regularly collecting waste from the designated area. • Waste recycling should be an option for all types of recyclable waste produced during construction.
Contamination of Top soil There is a risk for soil at the construction site to be contaminated from either oil spills or through degradation from activities in the microenvironment of the site.	• Good housekeeping. • Proper handling of lubricating oil and fuel and monitoring of leaks. • Collection, proper treatment, and disposal of spills. • There should be designated spaces for washing vehicles and equipment.
Possible Impact on Flora There is a possibility that the natural vegetation of an area can be affected when developing infrastructures in the area.	• Replant vegetation when soils have been exposed. • Trees located along roadside will be protected during the construction period. • An inventory of large trees in the project site should be made and the trees should

Example: Tree felling and removal of vegetation	be fenced for protection prior to construction activities.
Traffic Management It is possible that there would be substantial traffic congestion and diversion during construction activities.	• Selection of alternative routes, where possible for sub-project vehicles. • Warning signs and diversion signs allotted to help the general public choose alternative routes. • Ensure that all adjacent offices, houses, schools and hospitals can be accessed continuously during construction hours. • Schedule deliveries of material/ equipment during off-peak hours. Arrange for material transfer at night to reduce the impact on traffic during the day time.
Health and Safety The construction of civil works poses an inherent risk of injury to labour force from accidents. Hazards from mishandling equipment, ergonometric stress, lifting heavy materials may cause injury to the labour.	• Raising awareness about hygiene practices among workers is encouraged. • Availability of first-aid equipment and medical supplies at all times during construction activities. • WB Group's Environment, Health and Safety (EHS) Guidelines will be implemented during construction period. • There should be set procedures for documenting and reporting accidents and incidents on site. • Precautions should be given, such as safety/warning signage, safety barrier around the construction site. Lighting facilities for labour working during night time to prevent accidents.

7.1.2 Environmental Monitoring Plan

Monitoring during Construction Phase:

The purpose of the environmental monitoring is to record environmental impacts resulting from the sub-project activities and to ensure proper implementation of the "mitigation measures" identified earlier in order to reduce adverse impacts and enhance positive impacts from project activities.

During the implementation of all sub-projects, the implementing agency will be responsible for monitoring and to make sure that the environmental mitigation/enhancement measures (including health and safety measures) outlined in the EMP for the particular sub-projects are being implemented in accordance to the provisions of the Tender Document.

Apart from general monitoring of mitigation/enhancement measures, important environmental parameters to be monitored during the construction phase of the sub-projects include air quality, noise level, water quality, drainage congestion, and traffic problems. However, the requirement and frequency of monitoring would depend on the type of sub- project and field situation. For certain sub-projects (e.g., street light, traffic control), monitoring of these parameters is not critical; while monitoring of some of these parameters (e.g., air quality) would be needed only if significant pollution is suspected.

The table below presents guidelines for monitoring of specific environmental parameters during the construction phase of different sub-projects.

Table 16a Generic environmental monitoring guidelines for different types of sub-projects during construction phase

Sub Project	Monitoring Parameter	Monitoring Frequency
Road, Drain, Bridge, Culvert, Bus/ truck terminal, Community Center, and Sweeper colony	If significant air pollution is suspected: Particulate Matter (SPM/ PM10/ PM2.5)	As required
Road, Pedestrian bridge, Drain, Bridge, Box Culvert, Boat landing jetty, Bus/ truck terminal, Markets, Community centre, Sweeper colony, Water supply	Regular monitoring: Noise level	Once a week when/if heavy machinery is used
Bridge, Culvert, Boat landing jetty	Water quality (pH, BOD5/ COD)	At least once during construction period at a location near the construction site

Road, Pedestrian bridge, Drain, Bus/ truck terminal, Markets, Community center, Sweeper colony, Water supply	If pollution of an adjacent water body is suspected: Water quality (pH, BOD5/COD, Oil and Grease)	As required
All sub-projects	Visual observation of drainage congestion, traffic within around sub-project location	Once a week and when drainage congestion is suspected

Monitoring during Operational Phase

During the operational phase, monitoring of environmental parameters would be required for certain sub-projects. Table below presents guidelines for monitoring of specific environmental parameters during operational phase of selected sub-projects.

Table 16b Generic environmental monitoring guidelines for different types of sub-projects during operational phase

Sub project	Monitoring Scenario	Frequency
Strom drain, Boat landing jetty	Water quality (for storm drain, of the water body receiving drainage water) (pH, BOD5/ COD, Ammonia, Phosphate)	Twice a year at a suitable location downstream from the construction site
Road, Pedestrian bridge, Bus/ truck terminal, Markets, Community centre	Qualitative assessment of traffic congestion, accidents	As required

Note that in all cases the actual monitoring times and locations will be decided by the engineers and environmental experts according to the specific needs of each sub project.

7.1.3 Grievance Redress Mechanism

Grievance Redress Mechanism (GRM) is a valuable tool which will enable people who are in any way affected by DCNUP sub- project activities to voice their concerns regarding environmental and social impacts. Relevant organizations such as the implementing entities will

ensure that grievance redress procedures are in place and would monitor those procedures to ensure that grievance process is managed effectively. The implementing agency will establish a procedure to answer sub-project- related queries and address complaints, disputes, and grievances about any aspect of the sub- project, including disagreements regarding the assessment and mitigation of environmental and social impacts. Generally, the grievance redress committees (GRC) are of two types (i) formal courts of appeal and (ii) a locally constitutes GRC for dispute resolution. As suggested in the Social Management Framework (SMF), a locally constitutes Grievance Redress Committee (GRC) will be formed.

7.1.4 Method for Estimation of Cost of EMP

Cost of implementing an environmental management plan (EMP) including monitoring activities needs to be estimated as a part of the preparation of EMP. Many of the activities to be carried out as a part of EMP would not involve any additional direct cost e.g., employing local work force, where appropriate; keeping sub-project vehicles in good operating condition; scheduling deliveries of materials/ goods in off-peak hours; good housekeeping, avoiding spills; prohibiting use of fuel wood for heating bitumen; etc.

On the other hand, a number of activities would require additional cost. Environmental monitoring during both construction and operational phases would involve direct cost. At the same time, a number mitigation measures (including health and safety measures) would also require additional cost.

7.1.5 Arrangement for Implementation of EMP

Environmental management and monitoring activities for the proposed sub-project could be divided into management and monitoring: (a) during construction phase, and (b) during operation phase. The environmental management during the construction phase should primarily focus on addressing the possible negative impacts identified for the sub-projects. While environmental management during operational phase should focus on enhancing the positive impacts and reduction of risk of possible adverse environmental impacts from the completed sub-projects.

For sub-projects to be implemented by the DSCC, the dedicated Project ImplementationUnit(PIU) of the respective city corporation will be responsible for overall environmental management including implementation of mitigation measures and monitoring, and preparation of quarterly progress and monitoring reports. The PIU will be supported by the DSM (Design Supervision and Management) consultant (to be hired by City Corporation) and any hired Maintenance and Supervision (M&S) consultant.

7.2 Environmental Code of Practice (ECoP)

The Environmental Code of Practice (ECoP) is prepared as a guideline for environmental management of the subprojects to be implemented under DCNUP. The main objective of an ECoP is to guarantee that all construction activities under the project are considerate of the environment surrounding it. The well-being of a community and the environment needs to be ensured through:

- Minimizing pollution
- Sustaining eco-systems
- Conserving cultural heritage
- Enhancing amenity

The purpose of the Code of Practice is to ensure that construction activities are conducted in a manner that minimizes impacts on the environment and promotes environmental awareness and use of best practice in overall environmental management.

ECoP is applicable to the construction sites and associated activities such as stockpile sites, disposal sites for clean excavated materials, etc. The sub projects under the DCNUP will involve construction work of various types of urban infrastructure, such as bridges, kitchen markets, drains, and road. All of which should be conducted with regard to the ECoP.

All those involved in any given project are responsible for adopting environmentally responsible work practices. The best environmental management practice requires environmental awareness, and understanding of one's environmental responsibilities. Measures taken to prevent environmental impacts are preferred to those designed to control the impact.

The Environmental Code of Practice (ECoP) includes a list of activities associated with different types of infrastructure development considered under the DCNUP. The ECoP outlines activities on different issues related to project implementation. The ECoP developed will address the following issues related to sub-project operation:

1. Planning and Design Phases of a Project
2. Site Preparation
3. Construction Camps
4. Borrow Areas
5. Topsoil Salvage, Storage, and Replacement
6. Slope Stability and Erosion Control
7. Waste Management
8. Water Bodies
9. Water Quality
10. Drainage

11. Public Health and Safety
12. Material Storage, Transport, and Handling
13. Vegetation Management
14. Natural Habitats

A particular sub-project within the DCNUP may involve all or some of these issues. Appendix 8 of the EMF contains a detailed account of the Environmental Code of Practice (ECoP) that can be applied to all possible sub- projects under DCNUP.

7.3 Public Consultations and Access to Information

7.3.1 Public Consultation

The sub projects under DCNUP will be identified by the DSCC through a process of consultations with the local community and the targeted beneficiaries of the project. After selection of a subproject, the community level environmental screening will be an integral part of the sub-project planning. Community meetings will be held to discuss the subproject, identify the community priority and identify the scope of work.

Public consultation is a continuous process through which opinion from the public is sought on matters affecting them, through this process the stakeholders are kept engaged throughout the planning, design, construction, and operation phases of a project. The objectives of consultation and access to information are to generate public awareness by providing information about a sub-project to all stakeholders, particularly the sub-projects affected persons (PAPs) in a timely manner, and to provide opportunity to the stakeholders to voice their opinions and concerns on different aspects of the project. The opinions and suggestions of the stakeholders would assist the implementing body, in this case DSCC, in taking appropriate decisions for effective environmental management of the sub-projects. Therefore, consultation and disclosure would be a useful tool for maintaining communications between the implementing agency and the stakeholders.

It would help facilitate and streamline decision making whilst strengthening understanding among individuals, groups and organizations, who could affect or be affected by the sub-projects. As part of the IEE/EIA process, an effective public consultation and access to information plan (PCAIP) needs to be developed. The specific objectives of PC are:

- To inform stakeholders about the sub-projects at different stages of implementation,
- To address all environmental and social concerns/ impacts of a sub-project, and to outline mitigation measures taking into account the opinion/ suggestions of the stakeholders,
- To generate and document broad community support for the sub-projects,

- To better understand community priorities in order to incorporate them into the planning of the sub project,
- To acknowledge any dispute or disagreements, the community has regarding the sub-project activities,
- To improve communications among interested parties, and
- To establish formal complaint submittal / resolution mechanisms

Consultation Process

At least one consultation will be organized with stakeholders at the location cluster selected for the sub-project, all wards under location clusters will be included in this. This consultation session will specifically discuss the issues related to the sub-project to be implemented under their respective wards.

The mode of consultation will be either public consultation (PC) or focus group discussion (FGD). The consultative meeting or discussion will provide opportunity to the participants to raise their concerns freely about the sub-projects and their impacts on their life, livelihood and their community as a whole. Discussion will also be focused on sub-project(s) specific environmental issues, so that stakeholders can contribute their knowledge on better environmental management.The composition of participants will differ depending on the nature and location of the sub-projects. For example, for a community center sub-project the important stakeholders include people living in the sub-project surrounding areas; representatives from businesses related to community center, e.g., decorators, kitchen market shop owners; and representatives of educational/religious institutions, CBOs, and NGOs. In general, a well-rounded representation of the community must be made in these consultations, which should include the local women, youth and elderly members of the community as well. A stakeholder analysis needs to be carried out to identify the key stakeholders and Project Affected Persons (PAPs).

Information on the PC/FGD needs to be published in national/local newspapers 7 to 10 days prior to the consultations or by whichever means necessary it must be ensured that the PAPs and other stakeholders are informed and consulted about the sub-project, its impact, their entitlements and options, and allowed to participate actively in the development of the sub-project. This should be done particularly in the case of vulnerable PAPs. This exercise should be conducted throughout the sub-project preparation, implementation, and monitoring stages. An open-door policy should be maintained for community people, so that stakeholders feel comfortable approaching the implementing entities directly to ask questions and raise concerns regarding environmental and social issues. A responsive management system should be created for recording and responding to comments and concerns on environmental and social issues. It

should be ensured that the implementing agency takes full responsibility for responding to all questions/comments properly.

7.3.2 Access to Information

Summary of the EMF report should be translated into Bengali language and disseminated locally. Copies of the full report (in English) and the summary (in Bengali) will be sent to all the offices of the concerned City Corporations and will be made available to the public. The draft EMF will also be uploaded in the website of implementing agency (DSCC) and in the Bank InfoShop before appraisal completion.

After the project is effective there will be a national level workshop to present the draft EMF report to all relevant parties, including implementing agencies, community representatives, ward councilors, civil society and NGOs etc.
During the implementation stage of the project, the subproject specific screening/assessment reports will periodically be posted in the implementing agency (DSCC) website before the bidding process.

7.4 Environmental Management and Information System (EMIS)

An Environmental Management Information System (EMIS) may be implemented in case of DCNUP after the mid-term review of the project is conducted. The purpose of establishing the EMIS is to manage the data of the DCNUP and monitor the progress and impacts accordingly. The EMIS will be a central repository for data on a variety of environmental indicators relevant to EMF, IEE and EIA and related to all the sub projects under DCNUP. It will also serve as a knowledge hub and knowledge management tool for the sector and facilitate more analytical evaluation on available data.

Key activities for establishing the EMIS are:

- Assessment of information needs of the project, donor and the stakeholders;
- Designing of necessary databases and user-end software customized for different category of users;
- Installation and administration of databases, network system and users;
- Compilation of primary and secondary data relevant to the project
- Ensure that all primary and secondary data relevant to the project are updated regularly
- Design and implementation of data processing modules to generate reports and outputs as desired;
- Establishment of facilities for data storage, regular data backup and maintenance.

- Establish a mechanism for regular data flow, necessary for the project, from the sector stakeholders and information centers;
- Development and maintenance of website and other web applications for information collection and sharing;
- Procurement of necessary hardware and software for the EMIS.

7.5 Special Environmental Clauses (SECs) for Tender Document

Apart from the provisions under "General Specification" and "Particular Specification" for different sub-project components, the following special environmental clauses (SECs) shall be included in the Tender Document under General/Particular Specification.

These clauses are aimed at ensuring that the Contractor carries out his responsibility of implementing the EMP and other environmental and safety measures.

Environmental Management Plan (EMP)

The Contractor shall carry out all mitigation and enhancement measures (including those related to mitigation of air/noise/water pollution; drainage/traffic congestion) as specified in the Environmental Management Plan (EMP), annexed to this Contract.

Temporary Works:

The Contractor shall make sure that all equipment and safeguards required for the construction work such as temporary stair, ladder, ramp, scaffold, hoist, run away, barricade, chute, lift, etc. are substantially constructed and erected, so as not to create any unsafe situation for the workmen using them or the workmen and general public passing under, or near them.

Health and Safety

The Contractor shall observe and maintain standards of Health and Safety towards all of his employees, not less than those laid down by the national standards or statutory regulations.

Where appropriate, to prevent workers falling from heights, the Contractor shall make sure that every temporary floor openings shall either have a railing of at least 900 mm height or shall be constantly attended; every floor hole shall be guarded by either a railing or a hinged cover, or constantly attended; every stairway floor opening shall be guarded by railing at least 900 mm high on the exposed sides; every ladder way floor opening or platform shall be guarded by a guard railing; every open sided floor or platform 1.2 m or more above adjacent ground level shall be guarded by a railing on all open sides.

The Contractor shall provide all appropriate protective clothing and equipment for the work to be done and ensure its proper use. Where required, safety nets, belts, harnesses and lines shall be provided by the contractor. The "safety directives for work equipment" and "safety directives for protective gears", as specified in the Occupational Health and Safety Guidelines shall be followed.

The Contractor shall provide and maintain in prominent and well-marked positions all necessary first-aid equipment, medical supplies and other related facilities. A sufficient number of trained personnel will be required to be available at all times to render first aid.

The Contractor must provide or ensure that appropriate safety and/or health signs are in place at their work sites where hazards cannot be avoided or reduced.

The Contractor shall report to the Engineer promptly and in writing particulars of any accident or unusual or unforeseen occurrences on the site, whether these are likely to affect progress of the work or not.

Disposal and Pollution:

The Contractor shall not dispose any waste, rubbish or offensive matter in any place not approved by the Engineer or Statutory Authority having jurisdiction. The Contractor shall not discharge into any watercourse oil, solids, noxious or floating materials.

The Contractor shall take all reasonable precautions to keep public or private roads clean of any spillage or droppings from his vehicles or equipment. Any spillage or droppings which accrue shall be cleaned without delay to the satisfaction of the Engineer.

The Contractor shall construct sanitary latrines or septic tank system or install portable cabin toilet for disposal of human waste in the site office and temporary labor sheds for workers/ employees; the Contractor shall provide waste bins/ cans for collection of solid waste at appropriate locations (as directed by the Engineer), and ensure proper transfer/ disposal of solid waste with support from the local government authority (City Corporation).

Earthworks:

During excavation of trenches in natural soils, the Contractor shall make sure that the first 300 mm to 450 mm of topsoil be excavated and stored on one side of the trench and the rest of the excavated soil is stored separately/ on the other side; during back filling of trench, the topsoil should be placed on the top again.

7.6 Institutional Arrangement

A dedicated Project Implementation Unit (PIU) will be established within the implementing agency, which under the current scope of DCNUP will be DSCC. Therefore, DSCC will be responsible for implementing the project, including technical, operational, environmental and social safeguards, procurement, financial management, public awareness and communication activities. The PIU will consist of a project director (PD), and experts on technical, fiduciary, safeguards, and other relevant fields. The PIU will receive additional support through engineering design, project supervision, contract management, and other consultants.

According to the EMF, the implementing agency (DSCC) will be responsible for the identification of sub-projects and preparation of relevant sub-project documents.

The implementing agency will be responsible for providing hired consultants and technical assistance for carrying out the above tasks, and in the preparation of other sub-project documents.
The sub-project description, "environmental screening", and "analysis of alternatives" prepared will then be reviewed by the City Corporation. The PIU will be responsible for overall management of the sub-projects and reviewing the overall environmental management. Through the review process, DSCC will determine the need for further environmental assessment (i.e., IEE/ EIA) of sub-projects. If further environmental assessment (EA) is necessary, the Environmental Unit of DSCC (or a hired consultant) will carry out the EA (following the guidelines presented in the EMF). After completion of the EA, the DSCC will be responsible for getting necessary clearance from the DoE and the World Bank.

In terms of Monitoring and Evaluation of DCNUP, the PIU will be the responsible body. The PIU will be supported by an engineering supervision and contract management consulting firm to help monitor and evaluate satisfactory implementation of Environmental and Social Management Plans (ESMPs) and Resettlement Action Plans (RAPs). The PIU will also be responsible for implementing the EMP and ECoP of a subproject. It will have a separate M&E consultant to help monitor the overall project performance and impacts.

7.7 Training Requirements

In order to ensure that all planned environmental and social precautions as well as mitigation measures are implemented successfully, it is essential to strengthen the relevant and fundamental competencies of the implementing bodies. These trainings will help build the capacity of the implementing agency and help them facilitate the processes much more effectively.

The objectives of the environmental trainings include, providing basic knowledge and information on the key environmental issues associated with the proposed sub- projects to the relevant parties, including the Local Government Staff, Contractor(s) staff and general project staff.

For the DCNUP, at each location cluster, the senior engineer representing the city corporations will act as the environmental and social focal point. As discussed above, they will be responsible for carrying out "environmental screening" and "analysis of alternatives", and guidelines have been provided in the EMF for carrying out these activities. However, basic training on regulatory requirements, environmental impacts, and environmental assessment and management would greatly improve the capability of the implementing agency in carrying out their responsibilities under the DCNUP.

The City Corporation in-house environmental safeguard specialist and the relevant engineers will be provided necessary training on environmental management and monitoring. In this way, when external consultants are hired to conduct the work, the implementing agency will be able to oversee that the consultants are carrying out their responsibilities properly. The overall responsibility of environmental management lies with the implementing agency and having their capacity built will ensure that whoever is carrying out the activities is doing so in compliance with all the requirements mentioned in the EMF.

It is also advised to provide basic training for key personnel on regulatory requirements, environmental impacts, and environmental assessment and management to ensure overall success of the project.

7.8 Budget Estimation

The financing scope for suggestive activities for ensuring environmental due diligence under DCNUP are given below.

Table b: Budget for activities to ensure environmental due diligence under DCNUP

Activities	Financing scope with provision
Budget for hiring Consultants to carry out Environment Assessment for subprojects (if required) during implementation stage	DSM Consultancy at DPP
Hiring of Environment consultants at PIU	Individual Consultant at DPP
Training Requirements	Training (local) component at DPP
EMP implementation (If not included in civil works contract)	To be included in civil works contract

Obtaining and renewing of DoE Clearance	FEE and application head of DPP

The provision of budget has been incorporated at various economic code of DPP.

Appendix 1

Form 1: Sub-project Description

1) **Name of sub-project:**
2) **Brief description of sub-project:**
3) **Location of sub-project:**
    a. (attach location map)
4) **Layout of the sub-project:**
    a. (attach a layout map)
5) **Ownership of sub-project land:**
    a. Government
    b. Private land (need acquisition):
6) **Brief description of sub-project site:** (indicate the information on present land use, HFL for last 30 years and Important Environmental Features[13](IEFs) adjacent to the site)
7) **Brief information of environment within sub-project influence area[14]:** (description of water, flora, fauna, historical or culturally important sites)
8) **Key activities of sub-project:**
9) **Estimated cost of sub-project:** (Mil BDT)
10) **Schedule of implementation:**

    (a)Sub-project duration (months):

    (b)Tentative start date:

    (c)Tentative completion date:

11) **Potential benefit from sub-project:** (including estimated number of people benefited)

[13]human settlements, educational institutions, health care, pond, canal, river, utility infrastructure, park, green area etc. [4] Information especially required for road, bridge, building, terminal, slaughter house. Follow table 4 of EMF for influence area.

[14] Information especially required for road, bridge, building, terminal, slaughter house. Follow table 4 of EMF for influence area.

Appendix 2

Form 2: Environmental Screening

General Information

1. Name of location:
2. Who owns the land:
3. Brief description of site location
4. Please complete the table below:

Screening Questions	**Yes**	**No**	**Scale of Impact**	**Remarks** **(Note: The following questions need to be addressed as part of the screening process)**
			High Medium Low	
Adjacent to or within any of the environmentally sensitive areas**?**				What type of area? How far is it from an environmentally sensitive area?
Does it involve any involuntary resettlement?				If yes, Give the history and owner ship of the land
Lead to any agricultural land loss or crop loss?				If yes, where is the agricultural land? What type of crop is grown?
Will it have any impacts on species of aquatic environment				What species will be affected?
Will it cause any destruction of trees and vegetation?				How many trees are around? How many will be cut? Type of vegetation and tree?
Effects on surface water /groundwater quality?				How far is the surface water body? What is the depth of

				ground water
Will it create any impact on drainage or create water logging within the sub-project area?				What is the existing drainage condition?
Will the construction or operation of the sub-project cause any traffic congestion?				How many roads will be affected? What type of vehicles use these roads every day?
Are there any establishments such as schools/hospitals/mosques, located close to the construction site?				If so, what is the proximity? Will they be disturbed?
Will the sub project construction or implementation phase cause any noise pollution?				Which phase of the sub project is likely to cause noise pollution? Is there any existing noise in the area?
Degradation or disturbance of historical or culturally important sites (mosque, graveyards, monuments etc.)				What is the historically important site? How far is the sub project site from this?
Will there be significant air pollution from construction/implementation stage of the sub-project?				Will the air pollution be a health hazard?
Will the construction cause waste management issues?				What kind of waste generation can be expected? Will this be toxic to the surrounding environment?
Will the sub-project provide employment opportunities?				At which phase, construction or operational? What kind of employment can be expected?

5. Category of sub-project:

(a) According to ECR 1997: Green / Orange A / Orange B / Red / Not Listed
(b) According to WB classification: Category B / Category C

6. Proposed mitigation measure
7. Overall Comments
8. Prepared by: (Name, designation, mobile number, signature, date) ----------
9. Reviewed by: (Name, designation, mobile number, signature, date)----------

Appendix 3
Form 3: Analysis of Alternatives

Name of location cluster:

Name of sub-project:

Brief description of sub-project:

(a) Analysis of alternative routes/ alignments/ locations:

The DSCC authority or hired consultant will identify alternative route/ alignment (e.g., for a road, drain, bridge sub-project), and alternative locations (e.g., for public toilet, kitchen/ cattle market, bus/ truck stand, community centre, pedestrian bridge, sweeper colony) for the sub-project in question. Then the advantages and disadvantages of these alternatives will be listed in the following table. Based on the assessment the relative advantages and disadvantages, a route/ alignment/ location for a particular sub-project will be selected.

Route/Alignment/Location	Advantages/Considerations	Disadvantages/Considerations

(b) Analysis of alternative designs:

For some sub-projects, alternative designs would have to be assessed. For example, for a drain sub- project, alternative designs may include earthen drain and RCC drain; for a road sub-project, alternative designs may include asphalt road, and RCC road. The DSCC authority or hired consultant will identify alternative designs for the sub-project (where appropriate), and list the advantages and disadvantages of these alternative designs. Based on an assessment of relative advantages and disadvantages, a design will be proposed by the implementing agency.

Design Alternatives	Advantages	Disadvantages

Selected method of construction:
(d) No Action alternative: Briefly describe the difficulties the implementing agency will face if no action is taken
(e) Conclusion: On selected method/design/technology and route/location of subproject.

Form 3: Analysis of Alternatives
Example of a "Road" Sub-project
(to be completed by the implementing agency)

Name of location:

Name of sub-project: construction of road

Brief description of sub-project:

a) **Analysis of alternative roads:** In case road construction is one of the interventions under DCNUP. The following table shows an analysis for prioritizing the potential road choices:

Route/ Alignment	**Considerations**
Alternative 1: Road on the eastern side of Bazar	• The road will reduce the existing serious traffic congestion in the Bazar area. • The road will ease communication with the adjacent national highway. • No private land acquisition will be required.
Alternative 2: Road by the side of the residential area	• The road will facilitate movement of large number of people living in the residential area. • Alternative road is available, but it is relatively narrow. •

Selected road: Alternative 1

(b) Analysis of alternative design:

Design	**Advantages**	**Disadvantages**
Alternative 1: RCC road (rigid pavement)	• Less prone to damage from drainage water from market. • Better durability and	• Marginally more costly

	maintainability • Higher effective width • No asphalt heating induced pollution	
Alternative 2: Bituminous Road (flexible pavement)	• Relatively less costly	• Susceptible to damage due from exposure to water from the market (existing bituminous road on the other side of the bazar is in poor condition due to exposure to water)

Selected Design: **Alternative 1**

(c) Analysis of alternative technology/ method of construction: Not relevant

(f) No Action alternative: If the sub-project is not implemented/no action is taken, the existing traffic congestion in the bazar area will further aggravate with time. The proposed road will also serve as a link road, connecting the bazar with the adjacent highway. The absence of a suitable link road is adversely affecting the trade and commerce in the bazar.

(g) Conclusion: RCC road on eastern side of Bazar is selected.

Appendix 4
Criteria for Assessment of Ecological Impacts

Table E-1: Categories and definition of "Consequence" levels for ecological impacts

Category	Ranking	Definition
Critical	**5**	• Very serious environmental effects with impairment of ecosystem functions • Long-term, widespread effects on significant environment (e.g. habitat, national park) • Habitat restitution time >100 years and requiring extreme substantial intervention.
Major	**4**	• Serious environmental effects with some impairment of ecosystem function (e.g. displacement of species). • Relative widespread medium–long term impacts. • Habitat restitution time >10 years and requiring substantial intervention. • Potential for continuous non-compliance with environmental regulations
Moderate	**3**	• Moderate effects on biological environment but not affecting ecosystem function. • Moderate short-medium term widespread impacts • Habitat restitution time 1-5 years (possible limited and local areas up to 10 years) with potential for full recovery and limited or no intervention required. • Potential for short to medium term noncompliance with environmental regulations and/or company policy.
Minor	**2**	• Minor effects on biological environment. • Minor short-medium term damage to small area of limited significant • Full recovery in < 1 year without intervention required. • Any potential non-compliance with environmental regulations and/or company policy would be minor and short-term.
Low	**1**	• No lasting effect

		• Low-level impacts on biological environment. • Limited damage to minimal area of low significant. • Compliance with environmental regulations and/or company policy at all times. • Possible beneficial effect or ecosystem improvement.
None	**0**	• No impact on ecosystem damage. • No compliance required for environmental regulations and/or company policy at all times. • Possible beneficial effect or ecosystem improvement.
Limited Positive	+	• Some beneficial improvement to ecosystem. • Benefits to specific flora and / or fauna.
Modest Positive	++	• Moderate beneficial improvement to ecosystem. • Medium benefits to specific flora and / or fauna.
Significant Positive	+++	• Major beneficial improvement to ecosystem. • Large scale benefits to specific flora and / fauna.

Table E-2: "Likelihood of occurrence" and corresponding rankings

Impact Likelihood	**Ranking**	**Definition**
Almost certain (80-100%)	5	The activity will occur under normal operating conditions.
Very likely	4	The activity is very likely to occur under normal operational conditions.
Likely	3	The activity is likely to occur at some time under normal operating conditions.
Unlikely	2	The activity is unlikely to occur, but may occur at some time under normal operating conditions.
Very Unlikely	1	The activity is very unlikely to occur under normal operating conditions but may occur in exceptional circumstances.

Example:A bus terminal will be constructed near a tree planted area. The construction activity is unlikely to cause any damage of adjacent biological environment and the result will be 'low-level impacts.

From the problem Consequence is Low with ranking 1 (Table E-1) and the Likelihood of occurrence is Unlikely with ranking 2 (Table E-2), the "Significance" of ecological impact of this sub-project activity will be as follows:

Significance = Consequence × Likelihood Significance = 1 × 2= 2

So, the Significance Level is Low and the Risk is Low

Table E-3: Example of estimating ecological impacts of typical sub-project activities

Potential Impacts Source / Project Activities	**Impact**	**Ecological Receptor Type**	**Description**	**Likelihood**	**Consequence**	**Risk Rating**
Material storage or placement	Habitat destruction of terrestrial flora (herb, shrub) and borrowing fauna; and disturbance in movement of terrestrial fauna (amphibia, reptile and mammal)	Flora and Fauna	•Direct, Negative •Short term, Local. •Reversible	Likely	Low	Low
Vehicle movement	Impairment of terrestrial flora (herb and shrub), terrestrial fauna (amphibia, reptile & mammal)	Flora and Fauna	•Direct, Negative •Short term, Local. •Reversible	Likely	Low	Low
Soil excavation	Habitat destruction of aquatic flora (herb, shrub) and movement disturbance /	Flora and Fauna	•Direct, Negative •Short term, Local.	Unlikely	Minor	Low

	habitat destruction of terrestrial (burrow) fauna (amphibia, reptile, bird and mammal)		•Reversible			
Noise disturbance	Disturbance of terrestrial faunal livelihood (movement, foraging, breeding) (amphibia, reptile, bird and mammal)	Fauna	•Direct, Negative •Short term, Local. •Reversible	Unlikely	Minor	Low
Exhaust from generators	Disturbance in movement of terrestrial fauna	Fauna	•Direct, Negative •Short term, Local. •Reversible	Unlikely	Minor	Low

Appendix 5
Guideline for Archaeological Impact Assessment

Bangladesh has a renowned cultural history. Enormous major and minor historical records are scattered in different parts of the country. The features of these antiquities have separate values and identities. During implementation of large-scale infrastructural development an archaeologist needs to be present to rescue or recover any cultural resources present at the site.

To reduce the possibility of damaging archaeological objects, in case they are found while undertaking excavation works for different types of constructions, an authorized archaeological unit or at least an archaeologist should be asked to monitor the site periodically. The archaeologist, according to the Rules and Regulation of the Government of Bangladesh will study, make inventory and record it for the future.

Tasks:

(i) Conduct archaeological impact assessment for development programs at location clusters selected under DCNUP.
(ii) Execute sampling excavation and assess the significance of the materials found, propose mitigation measures to safeguard buried archaeology or erected/surface remains and suggest future research activity.
(iii) Assess risks to these archaeological materials by the proposed infrastructure and suggest changes to the infrastructural works.
(iv) Identify suitable mitigation measures and prepare environmental management plan.

Investigation

Archaeological impact assessment in the project area and its vicinity to identify impacted sites/remains in relation to the infrastructural work proposed. A team of experts need to conduct an extensive study and survey at the sub-project areas.

The objective of this survey will also be to develop proposal of appropriate mitigation measures to be undertaken to safeguard the buried or surface archaeology.

The other objective is to suggest for changes, if any, to the proposed infrastructure works which could better assure the safeguarding of archaeological materials of cultural and historical significance and also suggest for future archaeological research and excavation of the buried archaeology.

The team can adopt different methods for this purpose.

a. Examination of available cartographic and other photographic records.
b. Review of available literature, reports of archaeological researches and explorations conducted atthe selected sites and surrounding areas.
c. Combing the city block by block or lane by lane through site inspection to unveil the historical facts.
d. On-site interaction with local people and to investigate clues if any in their traditions and legends.

Appendix 6
Guideline for Identification of PCR

As stated in the World Bank PCR Safeguard Policy Guidebook, The PCR policy applies to projects having any one or more of the following three features:

(i) Projects involving significant excavations, demolition, movement of earth, flooding or other major environmental changes.
(ii) Projects located within or in the vicinity of a recognized PCR conservation area or heritage site.
(iii) Projects designed to support the management or conservation of PCR.

The sub-projects under the DCNUPalthough not finalized yet may involve some excavation works, movement of earth and temporary flooding. The City Corporations have religious institutions (mosques, temples, Buddhist temples), few sites of archaeological importance, public libraries, cinema halls, community centers, which can be considered PCRs. However, the sub-project area of influence may or may not intersect these regions (since the sub-projects are generic in nature, actual locations of most of them still undetermined). Therefore, a generic impact assessment of Physical Cultural Resources is outlined in this section.

Guidance on identification of PCR:

In the context of DCNUP, the probable examples of PCR may be the following:

1. Human made: Religious buildings such as temples, mosques, churches, exemplary indigenous or vernacular architecture Buildings, or the remains of buildings of architectural or historic interest, Historic or architecturally important townscapes Archaeological sites (unknown or known, excavated or unexcavated), Commemorative monuments.
2. Natural: historic trees, natural landscapes of outstanding aesthetic quality.
3. Combined man-made or natural: Sites used for religious or social functions such as weddings, funerals, or other traditional community activities (community centers), burial grounds, family graves, cultural landscapes.
4. Movable: registered or unregistered artifacts in temples or mosques, paintings, statues of important historical figures, religious artifacts, cultural artifacts etc.

Assessment of probable impacts due to activities:

Below is a list of project activities or features under the context of DCNUP which may commonly give rise to negative impacts on PCR, divided into two periods: construction phase and operational phase.

Construction phase:

1. Establishment of work camps:
- Vandalism, theft and illegal export of movable PCR, and of pieces of monumental PCR accessible directly or indirectly to migrant laborers,
- Desecration of sacred sites.

2. Excavation, construction and soil compaction:
- Direct physical damage to natural, manmade and buried PCR on site

3. Construction traffic:
- Vibration, soil, air and water pollution causing damage to natural or manmade PCR on site.
- Noise pollution can interfere with the use and enjoyment of PCR such as tourist destinations, historic buildings, religious establishments and cemeteries.

4. Mobilization of heavy construction equipment:
- Damage to natural or manmade PCR on site
- Soil compaction, damaging buried PCR (archaeological) onsite, and damaging pipelines and drains serving built PCR in the vicinity.

5. Flooding and Inundation:
- Submergence or destruction of human-made, natural or buried PCR.
- Barrier to access of all types of PCR.
- Raised water table can lead to damage to all types of PCR.
- Damage to aesthetics of scenic landscapes.

6. Waste disposal or landfill:
- Burial or damage to natural, buried or underwater PCR.

Operation phase:

1. New and upgraded Roads:
- Increased human traffic enjoying improved access to PCR of public interest leading to increased wear and damage, sacrilege of sacred sites, theft and vandalism of movable and, breakable PCR.

- Increased air pollution and vibration from traffic causing damage to man-made PCR, particularly monuments and buildings.
- Increased noise pollution interfering with enjoyment of people in tourist destinations, historic buildings, religious establishments and cemeteries.
- Roads and bridges which themselves constitute PCR being damaged by increased traffic.
- Positive impacts may also occur, through the discovery of previously unknown sites and artifacts and generation of tourism.

2. Induced development:
- Induced development leading to increased wear and damage, sacrilege of sacred sites, theft and vandalism of movable and breakable PCR, and damage to the aesthetics of scenic landscapes and townscapes.

3. Urban development:
- Changes in demography or settlement patterns leading to decay of inner cities and abandonment and neglect of older residential areas containing built PCR such as vernacular architecture.
- Developments which are out-of-character with their surroundings diminishing the aesthetic valueof the townscape, decline in property values and ultimately, neglect of built PCR in the area.
- Damage to the aesthetics of scenic landscapes and townscapes.

Guidelines for ToR for the PCR component:

In case of a sub-project which is not expected to have any impacts on PCR, it may be sufficient to include procedures for chance finds (Appendix 7). In case of Category "B" project where there may be a likely impact on PCR due to activities carried out under any of the sub-projects, the ToR may be tailor-made to the specific requirements. The ToR is expected to include potential major PCR issues, the likely impacts on PCR, the PCR impact areas, which will set boundaries for collecting the PCR baseline data along with any specialized PCR knowledge or skills required. In projects such as the DCNUP, since the subproject locations are not yet determined, it will not be possible at this stage to identify the PCR impact areas and the type of PCR data that should be collected. In such cases, the ToR should require the EA team to establish these parameters at the beginning of the assignment, and propose provisions for identifying and managing PCR during project implementation.

The EA report for the corresponding sub-projects should be modified accordingly to incorporate the issues related to PCR in those cases. The investigations and findings with respect to PCR should form an integrated part of the EA report since OP 4.11 does not call for a separate report.

Therefore, the ToR for consultants for the generic EA assessment of sub-projects would still be valid with a few additional assignments on behalf of the consultants with respect to PCR:

- Regulatory environment: (Identification of any regulations and guidelines which will govern the conduct of the assessment) This section should also list any relevant national acts or regulations pertaining to the safeguarding of PCR.
- Background information: (description of the physico-chemical, ecological and socioeconomic environment) All registered and unregistered, movable or immovable PCRs in the sub-project areas need to be identified in this part preferably using visual identification, consulting with local people. The report should have descriptions and visual illustrations of the PCRs.
- Impact assessment: (the consultant will identify the likely biophysical and social impacts in sufficient detail to be able to design suitable mitigation measures). Impacts on all types of PCR should be considered, both natural and man-made, registered and unregistered, movable an immovable.
- Analysis of alternatives: (the consultant will include PCR aspects when considering alternative projects or project locations)
- Environmental Management Plan including institutional arrangement for implementation and monitoring: (The ToR should state that mitigating measures arising from PCR impacts should be agreed to by the concerned and affected parties before they are submitted as recommendations in the EMP.)
- Public Participation: (The ToR should point out the importance of the consultative process for the physical cultural resources component).

Appendix 7
Chance Find Procedure

Activities for sub projects under DCNUP could impact sites of social, sacred, religious, or heritage value. “Chance find” procedures would apply when those sites are identified during the design phase or during the actual construction period and the related activity will not be eligible for financing under the project.

(1) Cultural property includes monuments, structures, works of art, or sites of significant points of view, and are defined as sites and structures having archaeological, historical, architectural, or religious significance, and natural sites with cultural values. This also includes cemeteries, graveyards and graves.
(2) The list of negative subproject attributes which would make a subproject ineligible for support includes any activity that would adversely impact cultural property.
(3) In the event of finding properties of cultural value during construction, the following procedures for identification, protection from theft, and treatment of discovered artifacts should be followed and included in standard bidding document:

a) Stop the construction activities in the area of the chance find;
b) Delineate the discovered site or area;
c) Secure the site to prevent any damage or loss of removable objects.
d) Notify the supervisory engineer who in turn will notify the responsible local authorities;
e) Responsible local authorities and the relevant Ministry would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures.
f) Decisions on how to handle the finding shall be taken by the responsible authorities and the relevant Ministry. This could include changes in the layout (such as when finding an irremovable remain of cultural or archeological importance), conservation, restoration and salvage.
g) Implementation of the authority decision concerning the management of the finding shall be communicated in writing by the relevant Ministry.
h) Construction work could resume only after permission is given from the responsible local authorities and the relevant Ministry concerning safeguard of the heritage.

(4) These procedures must be referred to as standard provisions in construction contracts. During project supervision, the site Engineer shall monitor the above regulations relating to the treatment of any chance find encountered.
(5) Relevant findings will be recorded in World Bank Supervision Reports and Implementation Completion Reports will assess the overall effectiveness of the project’s cultural property mitigation, management, and activities, as appropriate.

Appendix 8

Environmental Code of Practice (ECoP)

The Environmental Code of Practice (ECoP) is a guideline for reduce or eliminate environment risk due to various activities associated with different types of sub-projects considered under the DCNUP.

ECoP 1.0: Planning and Design Phases of a Project

1.1 General

This code of practice details the factors to be considered during project preparation to avoid/address environmental concerns through modifications in project design and incorporation of mitigation measures.

1.2 Finalization of Alignment/Project Location

Adequate consultations with the communities to identify the concerns and preferences need to be taken up during selection of the alignment. Alignment shall conform to the natural topography as far as possible to avoid excessive cut and fill. Special care should be taken to align the roads along the hillside, which is stable and where cutting on hillside causes least disturbance. Consultations with the local communities are to be conducted to obtain their suggestions and incorporate their concerns to address the potential environmental impacts. In case of flood prone areas and/or areas with very flat slopes, hydrological surveys have to be conducted before alignment finalization.

1.3 Compliance to Legal Requirements

The bid document shall include the various applicable clearances pertaining to environmental management and shall contain the necessary procedures for compliance of the same.

1.4 Cost Estimation

Some activities included in ECoP 1.0 have certain monetary involvement. These activities are outlined below:

1. There will be one Focus Group Discussion (FGD), with at least 15 participants from different communities of the society, for adequate consultations to identify the concerns and preferences related to a particular infrastructure development project.
2. Two surveyors will carry out a Key Informant Information (KII) of at least 50 participants from different communities of the society affected by the infrastructure development project.
3. Two surveyors will carry out a hydrological survey before finalizing alignments and/or reduced levels for infrastructure development projects in a flood prone area and/or with very flat slopes.

ECoP 2.0: Site Preparation

2.1 General

The preparation of site for construction involves:
i. Marking and clearance of the required project area of all encroachments by the implementing agency prior to mobilization of Contractor;
ii. Informing the local community about construction schedule; and

iii. Site preparation by the contractor prior to commencement of construction. The scope of this ECoP only includes the measures to address environmental concerns expected during the site preparation.

2.2 Site Preparation Activities by the implementing agency

Informing the community and local councils about the likely schedule of construction after obtaining the consent of the community the implementing agency shall be responsible to stake out the subproject locations.

2.3 Site Preparation Activities by the Contractor

The contractor shall submit the schedules and methods of operations for various items during construction operations to the implementing agency for approval. The clearance of site shall involve the removal of all materials such as trees, bushes, shrubs, stumps, roots, grass, weeds, part of topsoil and rubbish.

Towards this end, the Contractor shall adopt the following measures:

- To minimize the adverse impact on flora and vegetation, only ground cover/shrubs that impinge directly on the permanent works shall be removed.
- In locations where erosion or sedimentation is likely to be a problem, clearing and grubbing operations should be so scheduled and performed that grading operations and permanent erosion and sedimentation control features can follow immediately, if the project conditions permit.
- The disposal of wastes shall be in accordance with the provisions of ECoP 7.0, “Waste Management”.
- All regulatory clearances shall be obtained before actual start of work.

ECoP 3.0: Construction Camps

3.1 General

ECoP 3.0 provides guidelines on the selection, development, maintenance and restoration of construction camp sites in order to avoid or mitigate against significant adverse environmental effects, both transient and permanent.

3.2 Construction Camp Sating

During planning of the work, consideration shall be given to the location of construction camps for the sub-project. Construction camps and areas identified that may be suitable for the development of such camps shall be raised in consultation with the Engineer of the concerned location cluster. Areas that are not suitable for reasons such as environmental, cultural or social sensitivity shall also be identified. Wherever possible, construction camps shall be planned in areas that will have minimal adverse environmental effects. In identifying such areas particular care shall be taken to evaluate the adverse effects of water, noise and air pollution, which, although transient, will preclude the use of some areas as construction camp sites.

3.3 Construction Camp Location

Construction camp sites shall be located such that permanent adverse environmental effects can be avoided or mitigated against and transient adverse environmental effects are minimized. Camp sites shall not be located in areas that were identified as unsuitable for such use during the planning stages. The site or sites shall be selected such that mitigation measures stipulated in this ECoP can be implemented with reasonable facility.

3.4 Private Land

Where construction camps are to be located on land outside the road reserve the contractor shall obtain the approval of the landowner to establish the camp site on such land and pay agreed compensation as per the Resettlement and Rehabilitation Framework. Environmental protection measures established by this ECoP shall apply to all land regardless of ownership.

3.5 Construction Camp Facilities

The construction camp shall be provided with the following minimum facilities:

- A perimeter security fence at least 1.5m in height constructed from appropriate materials.
- Ablution block with a minimum of one water closet toilet or Pota-cabin, one urinal and oneshower for personnel engaged either permanently or temporarily on the project.
- Pota-cabins orseparate toilet and wash facilities shall be provided for male and female employees.
- A sickbay and first aid station.
- Areas for the storage of fuel or lubricants and for a maintenance workshop. Such an area shallbe bounded and have a compacted/impervious floor to prevent the escape of accidental spillage of fuel and or lubricants from the site.

- Surface water drainage from bounded areas shall be discharged through purpose designed and constructed oil traps.

- Empty fuel or oil drums may not be stored on site.
- Storm water drainage system to discharge all surface run off from the camp site to a silt retention pond which shall be sized to provide a minimum of 20 minutes' retention for storm water flow from the whole site that will be generated by a 20 year return period rainfall having a duration of at least 15 minutes. The run-off coefficient to be used in the calculation of the silt pond volume shall be 0.9. Silt ponds shall be maintained in an efficient condition for use throughout the construction period with trapped silt and soil particles being regularly removed and transported and placed in waste material disposal areas as per ECoP7.0.
- All discharge from the silt retention pond shall be channeled to discharge to natural water via a grassed swale at least 10 meters in length with suitable longitudinal gradient.
- All camp facilities shall be maintained in a safe clean and or appropriate condition throughout the construction period.

3.5.1 Construction Camp Development Plan

A development plan of the construction camp shall be prepared describing the following:

- Perimeter fence and lockable gates Workshop
- Accommodation
- Ablutions
- Water supply
- Wastewater disposal system Bounded fuel storage area
- Proposed power supply
- Proposed all weather-surfaced areas.

3.6 Site Restoration

At the completion of the construction work, all construction camp facilities shall be dismantled and removed from the site and the whole site restored to a condition that is similar to the conditions prior to the commencement of the work or to a condition that is still agreeable to the owner of the land.

All oil or fuel contaminated soil shall be removed from the site and transported and buried in waste soil disposal areas.

ECoP 4.0: Borrow Areas

4.1 General

Embankment or filling material is to be procured from borrow areas designated for the purpose. The scope of this ECoP extends to measures that need to be incorporated during borrow area identification, material extraction and rehabilitation with regard to environment management.

a. Pre-construction Stage

The contractor shall identify the borrow area locations in consultation with the owners, after assessing the suitability of the material. The suitable sites shall be selected and finalized in consultation with the implementing agency and the local councils involved.

b. Construction Stage

The contractor should adopt the following precautionary measures to minimize any adverse impacts on the environment:

i. Borrow pits situated less than 0.5 km (if unavoidable) from villages and settlements should not be dug for more than 30 cm after removing 15cm of topsoil and should be drained.
ii. The Contractor shall maintain erosion and drainage control in the vicinity of all borrow pits and make sure that surface drains do not affect the adjacent land or future reclamation.
iii. In case the borrow pit is on agricultural land, the depth of borrow pits shall not exceed 45 cm and may be dug out to a depth of not more than 30 cm after stripping the 15 cm top soil aside.
iv. In case of riverside, borrow pit should be located any less than 15m from the toe of the bank, distance depending on the magnitude and duration of flood to be withstood.

c. Post Construction Stage

It needs to be ensured that all reclamation has been carried out in accordance with the restoration plan. Certificate of Completion of Reclamation is to be obtained by the Contractor from the landowner that "the land is restored to his satisfaction". The final payment shall be made after the verification by implementing agency and the local area councils.

ECoP 5.0: Topsoil Salvage, Storage and Replacement

5.1 General

Loss of topsoil will be a long-term impact along implementation of different infrastructure development projects under the DCNUP.

i. Site clearance and excavation for road, markets, embankment and other infrastructures
ii. Development of borrow areas
iii. Temporary construction activities as material storage locations, diversion routes etc.

Scope of this ECoP includes removal, conservation and replacement of topsoil.

5.2 Pre-construction Stage

The arrangements for temporary usage of land, borrowing of earth and materials by the Contractor with the land owner shall include the conservation/preservation of topsoil.

5.3 Construction Stage

The stockpiles for storing the topsoil shall be designed such that the slope does not exceed 1:2 (vertical to horizontal), and the height of the pile is restricted to 2m. In cases where the topsoil has to be preserved for more than a month, the stockpile is to be stabilized within 7 days. The stabilization shall be carried out through temporary seeding. It consists of planting rapid-growing annual grasses or small grains, to provide initial, temporary cover for erosion control. After spreading the topsoil on disturbed areas, it must be ensured that topsoil is seeded, and mulched within 30 days of final grading. During construction, if erosion occurs from stockpiles due to their location in small drainage paths, the sediment-laden runoff should be prevented from entering nearby watercourses. The Contractor shall preserve the stockpile material for later use on slopes or shoulders.

5.4 Post Construction Stage

The topsoil shall be re-laid on the area after taking the borrow earth to maintain fertility of the agricultural field, finishing it to the required levels and satisfaction of the farmer. All temporary arrangements made for stockpile preservation and erosion control are to be removed after reusing the stockpile material.

ECoP 6.0: Slope Stability and Erosion Control

6.1 General

Stability of slopes is a major concern in hill areas and locations of high embankment. Soil erosion is consequent to high runoff on hill slopes, high wind velocities cause erosion of embankments made up of cohesion-less sandy soils. Embankments made up of silty and sandy soils are eroded, in the absence of vegetative cover, when the slopes are steep, say more than 20 degrees. Erosion control is provided to prevent soil damage done by moving water. The scope of this ECoP includes measures to minimize the adverse environmental impacts on slope stability and soil erosion due to the construction of embankments. The adverse environmental impact can be:

i. damage to adjacent land,
ii. silting of ponds and lakes disturbing the aquatic habitat
iii. erosion of rich and top fertile top layer of soil
iv. contamination of surface water bodies and
v. reduction in road formation width due to erosion

6.2 Pre-construction Stage

Interceptor ditches are constructed in hill areas to protect the road bench and hillside slope from erosion due to heavy rainfall and runoff. Interceptor ditches are very effective in the areas of high intensity rainfall and where the slopes are exposed.

6.3 Construction Stage

The vegetative cover should be planted in the region where the soil has the capacity to support the plantation and at locations where meteorological conditions favors vegetative growth. On side slopes in hills, immediately after cutting is completed and debris is removed, vegetative growth has to be initiated by planting fast growing species of grass.

In regions of intensive rainfall, locations of steep slopes, regions of high soil erosion potential and regions of short growing seasons, erosion control matting should be provided. Adequacy of drainage for erosion control

6.4 Post Construction Stage

All the exposed slopes shall preferably be covered with vegetation using grasses, bushes etc. Locally available species possessing the properties of good growth, dense ground cover, and deep root, shall be used for stabilization.

ECoP 7.0: Waste Management

7.1 General

This code of practice describes procedures for handling, reuse and disposal of waste materials during construction. The waste materials generated can be classified into
i. Construction Waste and
ii. Domestic waste.

7.2 Pre-construction Stage

The contractor shall identify the activities during construction that have the potential to generate waste and work out measures for the same in the construction schedule. The Contractor shall educate his workforce on issues related to disposal of waste, the location of disposal site as well as the specific requirement for the management of these sites.

7.3 Construction Stage

- The contractor shall either re-use or dispose the waste generated during construction depending upon the nature of waste.
- The contractor shall dispose waste material that could not be re-used safely.
- The waste management practices adopted by the Contractor shall be reviewed by the implementing agency appointed body/consultant hired during the progress of construction.

7.4 Post Construction Stage

After decommissioning of construction sites, the Contractor shall hand over the site after clearing the site of all debris/wastes to the implanting agency.

In case of disposal of wastes on private land, certificate of Completion of Reclamation is to be obtained by the Contractor from the landowner that "the land is restored to his satisfaction".

ECoP 8.0: Water Bodies

8.1 General

Water bodies may be impacted when the infrastructure development project activities are adjacent to it or the runoff to the water body is affected by change of drainage pattern due to construction of embankment. The following activities are likely to have an adverse impact on the ecology of the area:

i. Earth moving
ii. Removal of vegetation
iii. Waste disposal from construction works

8.2 Pre-Construction Stage

When there is interruption to the regular activities of the local area inhabitants near water body due to construction or rehabilitation work, following are the Contractor's responsibilities:

i. Restriction on use of water during construction, this should be discussed with the community in advance.
ii. Alternate access to the water body is to be provided in case there is interruption to use of existing access.
iii. If the water body affected is a drinking water source for a habitation, alternate sources of water are to be provided to the users during the period for which its use is affected.

8.3 Construction Stage

- It should be ensured by the contractor that the runoff from construction site entering the water body is generally free from sediments.
- Silt/sediment should be collected and stockpiled for possible reuse as surfacing of slopes where they have to be re-vegetated.
- Cutting of embankment reduces the water retention capacity and also weakens it, hence:

i. The contractor should ensure that the decrease in water retention should not lead to flooding of the construction site and surroundings causing submergence and interruption to construction activities.
ii. Any perceived risks of embankment failure and consequent loss/damage to the property shall be assessed and the contractor should undertake necessary precautions as provision of toe protection, erosion protection, sealing of cracks in embankments. Failure to do so and consequences arising out of embankment failure shall be the responsibility of the contractor. The implementing agency shall monitor regularly whether safe construction practices near water bodies are being followed.

- Alternate drain inlets and outlets shall be provided in the event of closure of existing drainage channels of the water body.
- Movement of workforce shall be restricted around the water body, and no waste from construction sites shall be disposed into it.

8.4 Post Construction Stage

The zones of the water body have to be left clean and tidy with the completion of construction. Engineers of the City Corporation will check if drainage channels of adequate capacity have been provided for the impacted water body.

ECoP 9.0: Water Qualities

9.1 General

Small-scale road construction, small-scale drainage, and small-scale embankment construction may affect the aquatic environment, by lowering or raising water levels, and decreasing water quality. Deterioration of water quality and disturbance of aquatic environment by lowering or rising of water levels.

9.2 Pre-Construction Stage

Following measures are to be undertaken by the contractor prior to the commencement of construction:

- Base line data of the water quality is necessary.
- In addition, the availability of enough water during the lean season needs to be assessed as part of the baseline data collection.

9.3 Construction Phase

- Improper disposal of solid and liquid waste including excreta generate from sites will pollute the water quality and proper prevention measure should be taken.

- Wastewater disposal, sanitation/latrines may have positive cumulative effects on human health but if not improperly implemented may affect ground and surface and ground water quality; the contractor should give proper attention on it during construction stage.
- Protect water bodies from sediment loads by silt screen or bubble curtains or other barriers.

9.4 Post Construction

Inspection of water quality shall be done regularly.

ECoP 10.0: Drainage

10.1 General

Drainage is designed for and installed on roads to direct surface or subsurface flow away to a safe outfall without damage to the structure, adjoining property or agricultural fields. A road with good drainage is a good road. Inadequate and faulty drainage arrangements result in obstruction to natural drainage pattern. Provision of cross-drainage and longitudinal drainage increases the life of the road and consequently reduces water logging and related environmental impacts. The present code seeks to address the environmental concerns related to drainage aspects during different stages of the project execution.

10.2 Pre-Construction Stage

Following measures are to be undertaken by the contractor prior to the commencement of construction:

i. The downstream as well as upstream user shall be informed one month in advance.
ii. The contractor shall schedule the activities based on the nature of flow in the stream.
iii. The contractor should inform the concerned departments about the scheduling of work. This shall form part of the overall scheduling of the civil works to be approved by implementing agency.
iv. Erosion and sediment control devises, if site conditions to warrant, are to be installed prior to the start of the civil works.
v. All the safety/warning signs are to be installed by the contractor before start of construction.

In case of utilization of water from the stream, for the construction, the contractor has to take the consent from the concerned department.

10.3 Construction Phase

- Drainage structures at construction sites shall be provided at the earliest to ensure proper Compaction.
- In hill areas sub-surface drains, if required, shall be provided immediately after cutting the slopes and forming the roadbed (sub grade).
- Safety devises and flood warning signs to be erected while working over streams and canals.

10.4 Post Construction

Inspection and cleaning of drain shall be done regularly to remove any debris or vegetative growth that may interrupt the flow. Temporary structures constructed during construction shall be removed before handing over to ensure free flow through the channels.

ECoP 11.0: Public Health and Safety

11.1 General

The safety and health of the public is impacted due to the hazards created during the construction period. This code of practice describes the measures that need to be taken to mitigate the impacts.

11.2 Pre-construction Stage

In order to incorporate public health and safety concerns, the implanting agency and the Contractor shall disseminate the following information to the community:

i. Location of subproject activities,
ii. Borrow areas,
iii. Extent of work
iv. Time of construction
v. Involvement of local labors in the road construction
vi. Health issues - exposure to dust, communicable diseases etc.

11.3 Construction Stage

The Contractor shall schedule the construction activities taking into consideration factors such as:

i. Sowing of crops
ii. Harvesting
iii. Local hindrances such as festivals etc.
iv. Availability of labor during particular periods

Proper safety/warning signs are to be installed by the contractor to inform the public of potential health and safety hazard situations during the construction phase in the vicinity of the project.

The implementing agency or the consultant hired by the implementing agency shall carry out periodic inspections in order to ensure that all the measures are being undertaken as per this ECoP.

11.3 Post-construction Stage

The construction site shall be cleaned of all debris, scrap materials and machinery on completion of construction for the safety of public and users.

ECoP 12.0: Material Storage, Transport and Handling

12.1General

Activities related to materials storage, handling, and transfer that are considered to potentially have negative environmental effects include:

- Transportation, storage, handling and of construction materials;
  Storage, handling, and transfer of petroleum, oil, and lubricant (POL) products;
  Application of asphaltic concrete and asphalt binder;
- Storage and handling of hazardous materials other than POL products; and
- Storage and application of road salt and sand.

Some materials used during implementation of projects associated with DCNUP may have potentially hazardous effects on the environment if not properly stored and handled.

12.2 Transportation, Handling and Storage of Cement and Aggregates

- The Contractor shall be responsible for ensuring that all trucks and carriers are clean and dry prior to loading them with cement or aggregates.
- All trucks and carriers for transporting cement/aggregates shall be equipped with weather proof closures on all openings.
- All cement/aggregates that will be brought to the site shall be kept free from contact with deleterious matter.
- All cement/aggregates shall be placed on impervious mat spread over the storage area to prevent direct contamination of top soil in the storage area.
- Stockpiling of cement/aggregates should be limited to minimum space and should be covered with weatherproof closures. Stockpiles shall be built up in horizontal or gently sloping layers.
- Overlap of different materials shall be prevented by suitable walls of ample distance between stockpiles.
- The Engineer shall approve the site for the storage of all aggregates.
- The Engineer shall approve the methods of handling aggregates and the equipment used.

12.3 Environmental Concerns with Materials used for Construction and Maintenance of Infrastructure Development Projects.

Concerns are related to accidental releases into the environment, such as spills, refueling losses, and leakage from equipment that could result in contamination of soil, groundwater, or surface waters.

Groundwater may transport the contaminants off-site to down-gradient aquifers or water supplies, or discharge them into surface waters. Therefore, release of potential contaminants on the ground surface could have significant environmental impacts that could ruin groundwater (well supplies).

12.3.1 Petroleum, Oil, and Lubricants

The toxic effect of a petroleum product in the aquatic environment varies considerably due to the different chemical composition of each petroleum product. The toxicity of petroleum products is related largely to its solubility in water. Petroleum pollution from accidental spills may affect aquatic birds, fish and vegetation. The effect of oil on birds' feathers (loss of insulation) is an important cause of death. Oil polluting the water may also be toxic to birds if they ingest it.

Plants in marshes or in wetlands (haor, baor, ponds and others) and steams may die off for short periods. Long-term impacts of spilled petroleum products are associated with the portion, which sinks and becomes incorporated into bottom sediments. This causes the petroleum products to degrade very slowly and they may persist for many years.

Petroleum products can stick to the gills of fish and interfere with normal respiration. Under relatively mild pollution, fish may produce mucus as a defensive mechanism to remove the oil. However, in heavy pollution, this mechanism is inefficient and the oil tends to accumulate on the gills and smother the fish. Petroleum products contain soluble materials, which can be ingested by fish. The flavor of the fish flesh may, therefore, become tainted, or if ingested in enough quantity, may become lethal. Groundwater sources contaminated with petroleum products may have potentially toxic effects on consumers.

12.3.2 Asphalt Products

Environmental concerns with tack asphalt binder, and asphaltic concrete are also related to the hydrocarbon components, which are toxic to aquatic life, wildlife, and humans. As mentioned above, if these materials sink to the bottom, they may destroy the fish's source of food supply and smother the egg.

12.3.3 Other Hazardous Materials

The following hazardous materials are used in structures construction or maintenance activities and have potential environmental concerns:

- Paints;
- Solvents; and
- Fresh concrete and admixtures.

Paint materials, which are lead – or oil-based, may affect aquatic life if significant amounts enter a watercourse. Specific concern exists with lead, as this compound may have a direct toxic effect on young fish. Toxins can accumulate over time in aquatic fish, bugs, and plants. Upon consumption by animals such as birds and small mammals, some metals could be transferred to the consumer and affect their health.

Some solvents used for cleaning purposes may contain components, which are toxic to aquatic life, wildlife, and humans. If solvents enter a watercourse/water supply, and significant concentrations occur in the water, this could be harmful to users.

Concrete, which is typically made up of aggregates, cement, water, is very alkaline because of its calcium (lime) content. If concrete enters a watercourse in significant amounts, the pH of the water may be affected locally over the short-term. If the pH of the receiving water is altered, this may cause physiological stress in fish, which may result in death.

12.4 Storage, Transport and Handling of POL Products

Care must be taken with the storage, transfer, handling of POL products to prevent potential environmental damage. All empty containers and drums shall be returned to the maintenance depot. It shall be ensured that all drums and containers are closed and not tipped over and all waste oil, lubricants, and solvents shall be stored in closed containers.

12.4.1 Storage

Any container, drum, or tank that is dented, cracked, or rusted will probably eventually leak. Make sure all containers, drums, and tanks that are used for storage are in good condition. Check for leakage regularly to identify potential problems before they occur.

The proper storage of materials will greatly reduce the risk of accidental spills or discharges into the environment. For temporary outdoor storage, put containers and drums in clearly marked areas, where they will not be run over by vehicles or heavy machinery. The area should preferably slope or drain to a safe collection area in the event of a spill. Tanks should have appropriate secondary containment (i.e. double-walled or surrounded by a dyke) that will collect spilled material in case of a leak. Permanent storage areas for containers or drums should be on an impermeable floor that slopes to a safe collection area in the event of a spill or leak.

12.4.2 Transport and Handling

At all times when products are being handled or transported, care must be taken to prevent any product from being spilled, misplaced, or lost and possibly entering and contaminating the soil or a natural waterway. When equipment and vehicle maintenance or repair is required in the field, it should be undertaken at least 30 m away from any watercourse. Minimize the potential for entry of hydraulic fluids or oil into a watercourse by using sorbent materials to collect spilled petroleum products. Return all used sorbent materials to the appropriate storage yards for safe disposal.
Return all diesel or fuel used to wash asphalt emulsion pumps to the maintenance depot for safe storage or disposal. Also return all solvents used to wash spray-painting or other equipment to the appropriate storage yards for safe disposal.

Wash equipment in maintenance areas equipped with oil/water separators so that any petroleum products can be removed prior to discharge of the wastewater. Oil/water separators are only effective if they are properly maintained. At sites without oil/water separators, minimize the amount of wash water used and wash in areas where the potential for entry of wash water into a waterway is minimized by proper grading or curbing.

Tankers should not be washed near watercourses. Wash out should be done in places where proper grading or curbing minimizes the potential for entry of wash water into a waterway. Re-fuelling or servicing of equipment and vehicles to be done at least 30 m away from any watercourse. Re-fuelling over liner material with an absorbent pad (e.g. sand bed) will help to contain potential spills. If re- fuelling is done from a bulk tanker, the hose/nozzle assembly should be replaced to its proper position upon completion.

12.5 Spills and Spill Cleanup

Quick action in the event of a spill of hazardous materials is important in order to prevent environmental damage.

Things to do when a spill occurs:

1. Identify the material involved and make a quick assessment:
   How extensive is the spill?
   Are there any watercourses nearby?
   Are the watercourses down gradient from the spill?
   Are there drainage systems down gradient from the spill, which lead to a nearby watercourse?
2. Stop the flow of product, if it can be done safely.
3. Notify the Engineer and Authorities immediately.
4. Control and contain spilled product until expert help arrives, if it can be done safely.

12.5.1 How to Control and Contain a Spill

When a limited oil spill occurs on level land, scoop up the affected soil and dispose at a site approved by the Engineer and the Department of Environment. When an extensive oil spill occurs on level land, dig sump hole and pump excess oil into a temporary container. The remaining contaminated soil must be scooped up and disposed of at a site approved by the Engineer and the Department of Environment. When an extensive spill occurs on a slope or hillside, a trench can be dug downhill from the spill to intercept the spilt material. Should petroleum products reach a watercourse, several temporary spill containment measures can be used to help stop the spreading of products.

12.6 Storage and Handling of Dangerous Materials

Workers may be at risk from exposure to dust particles or toxic fumes from chemicals used in road works and materials testing. Specific measures to reduce risks include limiting time of exposure to dust particles, chemicals and noise; enhancing safety and inspecting procedures; and improving materials safe handling.

ECoP 13.0: Vegetation Management

13.1 General

Besides improving aesthetics and ecology of the area, the vegetation provides fuel wood, act as noise barriers, provides visual screen for sensitive areas and also generates revenue by sale of its produce.

This code of practice elaborates on the approach towards planting trees. Emphasis has been laid on a greater involvement of communities in planting and maintenance of trees.

13.2 Project Planning and Design Stage

Tree felling, if unavoidable, shall be done only after compensatory plantation of at least three saplings for every tree cut is done. The species shall be identified in consultation with officials of forest department/local community, giving due importance to local flora. It is recommended to plant mixed species in case of both avenue or cluster plantation. The plantation strategy shall suggest the planting of fruit bearing trees and other suitable trees.

13.3 Post-construction Stage

The project proponents would take up the planting of fruit bearing and other suitable trees, on both sides of the roads or other infrastructure development project locations from their own funds. Watering of trees during the initial period of two to three years shall be the responsibility of the implementing agency, local council or the agency designated by it.

ECoP 14.0: Natural Habitats

14.1 General

This code of practice envisages measures to be undertaken during implementation of DCNUP infrastructure development projects by the implementing agency near natural habitats. These measures shall be undertaken in addition to the measures laid down in the other ECoPs.

As per the World Bank OP 4.04, the conservation of natural habitats, like other measures that protect and enhance the environment, is essential for long-term sustainable development. A precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development has been adopted for the project.

14.2 Pre-construction Stage

Contractor in consultation with forest ranger or any other concerned authority shall prepare a schedule of construction within the natural habitat. Due consideration shall be given to the time of migration, time of crossing, breeding habits and any other special phenomena taking place in the area for the concerned flora or fauna.

14.3 Construction Stage

Collection of any kind of construction material from within the natural habitat shall be strictly prohibited. Disposal of construction waste within the natural habitat shall be strictly prohibited.

14.4 Post Construction Stage

The infrastructure development projects near the natural habitat shall be declared as a silence zone. Compensatory tree plantation within the project area shall be done. The implementing agency must ensure maintenance of drainage structure as per ECoP 10.0.

The Cost Estimation of ECoPs

Some activities included in ECoPs have certain monetary involvement. The generic method of determining the cost of the ECoP is outlined below:

1. The Engineer of the implementing agency will carry out a survey of the intended project site to identify appropriate locations and also identify sites unsuitable in terms of topography, proximity to water courses, and environmental sensitive areas such as forests, wetlands, or other sensitive area.

2. Survey and monitoring work must be carried out, by the Engineer appointed by the City Corporation authorities, throughout the pre-construction, construction, and post-construction phases to make sure the items and specifications (e.g low cost sanitation facilities, top soil management, waste disposal, tree plantation, storm water drainage etc) provided in this ECoP are properly addressed and estimated the cost.