Municipal Governance and Services Project (MGSP)

Environmental Assessment

Volume 2: Environmental Management Framework (EMF)

Draft Final Report

September 2013

Local Government Engineering Department (LGED)
And
Bangladesh Municipal Development Fund (BMDF)

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

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The Environmental Assessment report split in following two volumes.

Volume 1: Overall Environmental Assessment
Volume 2: Environmental Management Framework (EMF)

Both volumes have been prepared by Bureau of Research, Testing and Consultation (BRTC). Bangladesh University of Engineering and Technology (BUET), Dhaka

ABBREVIATIONS

BDT	Bangladesh Taka
BMD	Bangladesh Meteorological Department
BMDF	Bangladesh Municipal Development Fund
BNBC	Bangladesh National Building Code
BOD_5	5-day Biochemical Oxygen Demand
BRTC	Bureau of Research Testing and Consultation
BUET	Bangladesh University of Engineering and Technology
CC	City Corporation
COD	Chemical Oxygen Demand
DG	Director General
DoE	Department of Environment
EA	Environmental Assessment
ECA	Ecologically Critical Area
ECoP	Environmental Code of Practice
ECR	Environment Conservation Rules
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
IEF	Important Environmental Features
LGED	Local Government Engineering Department
MGSP	Municipal Governance and Services Project
MoEF	Ministry of Environment and Forests
NGO	Non Government Organization
OHS	Occupational Health and Safety
OP	Operational Policy
PAP	Project Affected Person
PCAIP	Public Consultation and Access to information Plan
PD	Project Director
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter with aerodynamic diameter $\leq$ 2.5 micrometers
PM_{10}	Particulate Matter with aerodynamic diameter $\leq$ 10 micrometers
PMO	Project Management Office
RCC	Reinforced Cement Concrete
SECs	Special Environmental Clauses
SIA	Social Impact Assessment
SMF	Social Management Framework
SMP	Social Management Plan
SPM	Suspended Particulate Matter
TDS	Total Dissolved Solids
ToR	Terms of Reference
ULB	Urban Local Bodies
WB	World Bank

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EXECUTIVE SUMMARY

E1.0 Background

The Government of Bangladesh (GoB) intends to enhance the capacity of urban local bodies (ULBs) in development and management of urban infrastructure, and improve municipal governance and services through undertaking the Municipal Governance and Services Project (MGSP) in selected Pourashavas and City Corporations. The Local Government Engineering Department (LGED) and the Bangladesh Municipal Development Fund (BMDF) will implement the project with participation of the selected ULBs. The project will be financed by IDA, with GoB contribution for land acquisition and management, and Municipalities equity for accessing BMDF competitive finance. Under the MGSP the LGED will implement about 20 types of sub-projects in 26 ULBs, which include 22 Pourashavas and 4 City Corporations; while the BMDF will implement about 13 types of sub-projects in 119 Pourashavas.

Both the LGED and the BMDF intends to ensure that the proposed infrastructure takes into account the environmental concerns in accordance with the Environment Conservation Rules 1997, and the World Bank Safeguard Policies. Details of the sub-projects to be implemented under MGSP will be finalized during project implementation phase and therefore, the exact locations, size and extent of the sub-projects will remain unknown during carrying out of the environmental assessment. Therefore a framework approach has been adopted for EA; the EA has two major components: (a) Overall environmental assessment, and (b) Development of Environmental Management Framework (EMF).

The Environmental Management Framework (EMF) has been prepared by LGED and BMDF based on the: (i) assessment of the environmental practices of the recently completed MSP; (ii) evaluation of the potential overall environmental impacts of the proposed project activities; (iii) suggestions for subproject specific standard environmental mitigation and monitoring plan with unit costing; (iv) public consultations; (v) identification of the institutional barriers and capacity building needs for environmental management; and (vi) agreements necessary on the institutional arrangements for the environmental management.

For “overall environmental assessment”, field visits have been made to 12 ULBs, which include two City Corporations and ten Pourashavas. The ULBs visited are:

(a) Along Dhaka-Chittagong Corridor: Comilla City Corporation, Chandina Pourashava, Patiya Pourashava and Chokoria Pourashava.
(b) Along Dhaka-Sylhet Corridor: Madhabdi Pourashava and Bhairab Pourashava.
(c) Dhaka-Mymensing Corriodor: Bhaluka Pourashava and Trishal Pourashava.
(d) Dhaka-Bogra-Rangpur Corridor: Rangpur City Corporation, Tangail Pourashava and Elenga Pourashava.
(e) Cluster: Gopalganj Pourashava.

During field visits, discussions were held with the Mayors, engineers and other officials of the UBLs on different issues including experiences from recently completed/ ongoing projects; proposed sub-projects to be implemented under MGSP; and capacity and institutional arrangement for environmental management of the proposed sub-projects. At each ULB, the sites of recently completed/ ongoing projects were visited, and discussions were held with ULB officials about environmental management of these projects. The sites tentatively selected for implementation of sub-projects under the MGSP were also visited. Apart from reconnaissance survey of sub-project sites, noise level measurements, water quality assessments were carried out. Focus Group Discussions (FGDs) were held at 6 ULBs during field visits, which were participated by a wide range of stakeholders. In addition, public consultations (in the form of informal discussion) were also carried out at the ULBs.

Discussions have been held with the LGED and BMDF officials on different aspects of project implementation and management, focusing on existing capacity and institutional arrangement for environmental management. Discussions were also held with the LGED, BMDF and the WB on the first draft EMF. Based on the overall environmental assessment and feedback from all stakeholders (including ULBs, LGED, BMDF, and the WB), the revised EMF has been prepared and presented in this report. The report also presents an overview of the major national environmental laws and regulations that are relevant and may apply to MGSP, institutional arrangement and national and sub-national level, and World Bank safeguard policies.

E 2.0 Environmental Management Procedures

Under the MGSP, the ULBs will be responsible for identification of sub-projects, preparation of sub-project description, “environmental screening” and “analysis of alternatives”. The EMF presents detail guidelines and formats for carrying out these activities by the ULBs. Based on these and other relevant documents, LGED/ BMDF will assess the need for further environmental assessment (IEE/ EIA).

The major activities to be carried out for IEE and EIA include: (i) identification of sub-project influence area; (ii) establishment of “baseline environment”; (iii) analysis of alternatives; (iv)identification of major sub-project activities; (v)assessment, prediction and evaluation of impacts of major project activities on the baseline environment; (vi) carrying out public consultations; (vii) identification of mitigation measures and preparation of EMP; and (viii) selection of environmental code of practice (ECoP). The EMF presents detail guidelines for carrying out each of these major activities.

The EMF also presents occupational health and safety guidelines, Terms of Reference (ToR) for third party monitoring of environmental management, guidelines for establishment of EMIS, and a set of special environmental clauses (SECs) for inclusion in Technical Specification and bidding document. The EMF also presents institutional framework for environmental management of the MGSP to be implemented by the LGED and the BMDF, and training requirements for ensuring successful environmental management of the MGSP.

E 2.1 Sub-project Categories

The category of a sub-project (according to WB and GoB guidelines) is an important determinant with regard to the requirements of its environmental assessment. The sub-projects to be implemented under the MGSP include, (1) Bridges (less than 30m); (2) Box Culverts; (3) Boat Landing Jetty; (4) Bus Terminal; (5) Community Center; (6) Cattle Market; (7) Drain; (8) Municipal/Kitchen Market; (9) Park; (10) Pedestrian Bridge; (11) Public Toilets; (12) Road (local); (13) Retaining Wall; (14) Sweeper Colony; (15) Slaughter House; (16) Street Light; (17) Solid Waste Management; (18) Traffic Control; (19) Truck Terminal; (20) Office Building Complex; and (21) Water Supply System (excluding treatment plant).

No large-scale infrastructure investment or major expansion will be implemented under the proposed project. Based on the types of subprojects to be financed under the project, it is expected that the project activities will not cause any significant, irreversible and long-term environmental impacts. The environmental impacts of the project are expected to be mostly construction related and limited within the project boundaries. Accordingly, the overall MGSP could be classified as a "Category B" and three Bank policies related to environment have been triggered: OP/BP 4.01 (Environmental Assessment), OP/BP 4.04 (Natural Habitats) and OP/BP 4.11 (Physical Cultural Resources). The Bangladesh 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. While a few of the sub-projects to be implemented under MGSP are listed in the ECR 1997, most are not. Based on an assessment of likely environmental impacts of these sub-projects (that are not listed), and experience of implementation of similar sub-projects in different ULBs, the most likely categories of these sub-projects have been identified and presented in Table E1.

Table E1: Classification of sub-projects according to ECR 1997 (DoE, 1997)

Sub-projects	Sub-project Category according to ECR 1997	Likely Sub-project Category
Local Road (construction/ rehabilitation/ expansion); Bridge construction (< 100 m); Public Toilet	Orange B	--
Drain; Box Culvert; Boat Landing Jetty; Bus Terminal; Truck Terminal; Community Center; Municipal/Kitchen Market; Cattle Market; Pedestrian Bridge; Retaining Wall; Sweeper Colony; Solid Waste Management; Office Building	Not specifically listed	May be classified as "Orange A" or "Orange B" depending on assessment of impact
Park; Street Light; Traffic Control	Not specifically listed	May be classified as "Green"
Slaughter House; Water Supply System	Not specifically listed	May be classified as "Orange B"

E 2.2 Environmental Considerations in Design

By incorporating/ considering certain features in the engineering design of a sub-project, it is often possible to reduce or eliminate some of the possible adverse environmental impacts during both construction and operational phases of a sub-project. For example, providing adequate clear height in the design of a bridge over a river/ channel would ensure free movement of water vessels underneath the bridge during its operational phase; while failure to do so would bring about significant adverse impacts on transportation/ communication through the river/ channel. Table E2 identifies possible adverse environmental impacts and environmental considerations to be included in the design for reducing/ eliminating such impacts for some major sub-projects to be implemented under MGSP.

Table E2: Environmental impacts and environmental considerations to be included in design to reduce/ eliminate the impacts for some major sub-projects

Sub-project	Environmental Impact	Design Considerations/ Actions to Reduce/Eliminate Impact
Road	• Water logging on road surface	• Proper slope of road surface (e.g., toward adjacent surface/storm drains) • Where appropriate, road construction/ rehabilitation to be preceded by drain construction/ improvement along the road • Provide adequate opening (preferable @500m interval) at flood prone area for water passing at traverse direction
Drain	• Clogging/ stagnation of flow in the storm drain	• Designing drain considering the downstream discharge point; adequate slope and x-section; RCC cover for drain, where appropriate
	• Backflow of water through drain (e.g., due to high water level at downstream discharge point, such as khal/ river)	• Considering installation of regulator to control inflow/ outflow through drain
	• Pollution of downstream water body due to disposal of polluted water from drain	• Not allowing direct connection to drain from sanitation facilities
Bridge	• Impact on water movement,; siltation and erosion	• Adequate opening for required water flow and inclusion of river training works, based on appropriate hydrologic studies
	• Obstruction to the movement of water vessels underneath bridge	• Keeping required clear height for movement of water vessels
Office building, Community Centre	• Water logging during rain	• Adequate provisions for storm water drainage; considering roof-top rain water harvesting system
	• Pollution from inadequate wastewater disposal	• Separate plumbing system for black water; provision for septic tank system;

Sub-project	Environmental Impact	Design Considerations/ Actions to Reduce/Eliminate Impact
	• Fire hazard	designing soakage pit considering depth of water table. • Keeping adequate provisions (including fire/emergency exits) for fire safety in accordance with National Building Code
Deep tubewell	• Contaminated water in tubewell	• Provision for adequate testing of water quality (specially for As, Mn, Salinity) before installation of tubewell
Street light	• Contribution to carbon emission	• Considering solar energy for street lights and promote energy efficient bulbs
Bus/ truck terminal, Cattle/ kitchen market, Community center, Office building	• Traffic congestion resulting from increased public congregation and vehicular movement • Adverse impact from inadequate rain/ storm water management • Contribution to carbon emission	• Adequate provisions for traffic circulation • Considering roof-top rain water harvesting system • Solar energy for a part of electricity supply
Cattle/ kitchen market, Slaughter house	• Pollution from wastewater and solid waste disposal	• Integration of waste disposal system (e.g., wastewater drainage, septic tanks) in design of market/ slaughter house • Provide proper composting system
Public Toilet	• Pollution and odor	• Adequate height with proper ventilation. • Provision of water supply and hand wash facility

E 2.3 Sub-project Descriptions, Environmental Screening and Analysis of Alternatives

According to the EMF, the ULBs will be responsible for preparation of sub-project description, carrying out environmental screening and analysis of alternatives of sub-projects. The purpose of "environmental screening" is to get a preliminary idea about the degree and extent potential environmental impacts of a particular sub-project, which would subsequently be used to assess the need for further EA. The environmental screening would involve: (i) reconnaissance of the sub-project area and its surroundings by ULB engineer(s); (ii) identification of the major sub-project activities; (iii) preliminary assessment of the impacts of these activities on the ecological, physic-chemical and socio-economic environment of the sub-project surrounding areas.

The 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 maximize the positive impacts. The analysis of alternatives should be carried out at two different levels: (a) by the ULBs, during formulation of a sub-project; and (b) during carrying out of IEE/ EIA, if needed. The nature of the analysis of alternatives would be different for different sub-projects. For example, for a storm drain sub-project, alternative route for the drain, alternative design (e.g., earthen versus RCC drain), and alternative technology (e.g., manual excavation versus mechanized excavation)

are important considerations. In general, for any sub-project, the analysis of alternative should focus on: Alternative location or route; Alternative design and technology; and No sub-project scenario. A simple format (**Form 3**) has been developed for analysis of alternatives (**Appendix D)**, along with guidelines for performing the analysis for different types of sub-projects by the ULBs. For convenience, "analysis of alternatives" for a "drain" sub-project and a "road sub-project" are also presented in Appendix E, as examples.

Based on the guideline presented in the EMF, the ULBs will be able to carry out the "environmental screening" of sub-projects by filling forms of the description of subproject (**Appendix B**), the "Environmental Screening Form" (**Appendix C**) and the analysis of alternatives (**Appendix D)**.

E 2.4 Need for Further Environmental Assessment

The level of EA of a sub-project would primarily depend on the class/category of the sub-project according to WB OP 4.01 and ECR 1997. For assessing the need for further EA, the LGED/BMDF will categorize the sub-project (e.g., Green Orange A, Orange B, or Red) based on the sub-project description (Form 1), environmental screening (Form 2), and analysis of alternatives (Form 3). If a particular sub-project is listed in the ECR 1997 (see Table 1), it will be indicated in the Sub-project Description Form 1, and it would be categorized accordingly. If a sub-project is not specifically listed in the ECR 1997, it would be categorized based on the level of impacts indicated in Form 2, and categorization of similar projects in ECR 1997. The nature of further EA would depend on the categorization of the sub-projects. For Green Category sub-projects, no further environmental assessment would be required; for Orange A Category sub-projects, no further environmental assessment would be required, but some additional information would be required; for Orange B category sub-projects IEE and EMP would be required; while for Red Category sub-projects, full-scale EIA would be required.

E 2.5 Guidelines for Carrying out IEE and EIA

None of the sub-projects to be implemented under the MGSP is likely to fall under Red Category, which would require full scale EIA. However, since the exact location, size and extent of the sub-projects are still unknown, the guideline for EA presented here cover both IEE and EIA. Both IEE and EIA would cover the same elements, but the level of details would be different; a full-scale EIA would require detailed and quantitative analysis of impacts.
The major activities involved in carrying out IEE and EIA include the following:

1) Identification of sub-project influence area;
2) Establishment of "baseline environment" within the sub-project influence area, against which impacts of the proposed sub-project would be evaluated;
3) Identification of major sub-project activities/ processes during construction phase and operational phase;
4) Assessment and evaluation of impacts of major project activities on the baseline environment during construction phase and operational phase;
5) Carrying out public consultations;

6) Development of Environmental Management Plan (EMP), including monitoring requirements, and estimation of cost of EMP; and
7) Preparation of Environmental Code of Practice (ECoP), including cost of ECoP.

The IEE/EIA will be carried out by LGED (by Environmental Unit/hired consultant/DSM consultant) and BMDF (by in-house expertise/hired consultant/M&S consultant). The following Section presents detail guidelines for carrying out each of these major activities.

E 2.5.1 Sub-project Influence Area

For carrying out IEE and EIA, it is important to have a clear understanding about the "sub-project influence area". The "baseline study" is typically carried out within the sub-project influence area. Based on the field visits to sub-project sites in 12 ULBs, it is apparent that the sub-project influence area would depend not only on the type of sub-project, but also on the site/area where it will be implemented. For example, for a storm drain sub-project, the sub-project influence area would include: (a) catchment areas of the drain; (b) downstream areas of the drain, including the final discharge point (e.g., khal, river); (c) routes of transportation of construction materials; and (d) areas of material storage, and labor shed for sub-project works. For road sub-project, the length of road up to the major intersections at either end of the road could experience impacts (e.g., traffic congestion, noise and air pollution) of the sub-project activities, and therefore should be considered as the sub-project influence area. For bridge (< 30 m) and box culvert sub-projects, areas on either side of the river/khal covering areas about half a km upstream and downstream of bridge/khal location could experience impacts (e.g., water pollution, drainage congestion, air and noise pollution) of sub-project activities, there therefore should be considered as sub-project influence area.

The EMF provides clear guidelines (in tabular form) for identification of sub-project specific influence area for all the sub-projects to be implemented under MGSP.

E 2.5.2 Environmental Baseline

For environmental assessment (IEE and EIA), it is very important to adequately define the "environmental baseline" against which environmental impacts of a sub-project would be subsequently evaluated. The characteristics of "environmental baseline" would depend on:

- Nature of the sub-project location,
- Nature/ extent of a sub-project and its likely impact,
- Level of environmental assessment (e.g., screening versus full scale EIA)

For systematic definition and recording, the baseline environment is usually classified into Physicochemical, biological, and socio-economic environment; and important features/ parameters under each category are identified and measured during baseline survey.

Physicochemical environment

The important Physicochemical parameters for defining Physicochemical baseline include: Important Environmental Features (IEFs), Climate, Topography and drainage, Geology and soil, Hydrology and water resources, Air quality, Noise level, Water quality, and Traffic. Depending

on the nature of sub-project and its potential impacts, the required data/ information could be could be collected either from secondary sources or through primary survey/ measurement. Table E3 presents guidelines for collection of primary and secondary data on Physicochemical environmental parameters for different types of sub-projects to be implemented under the MGSP.

Table E3: Guidelines for collection of sub-project specific Physicochemical data/ information

Sub-project	Data/ information from secondary source	Data from primary survey/ measurement
Local roads	IEFs; Climate; Geology and soil; Hydrology and water resources; Topography and drainage	IEFs; Air quality; Noise level; Traffic
Pedestrian Bridge	IEFs; Climate; Topography and drainage; Geology and soil; Hydrology and water resources	IEFs, Noise level, Traffic
Storm Drain	IEFs; Climate; Geology and soil; Hydrology and water resources; Topography and drainage	IEFs; Air quality (PM); Noise level; Water quality
Bus Terminal and Truck Terminal	IEFs; Climate; Geology and soil; Topography and drainage; Hydrology and water resources	IEFs; Air quality; Noise level; Traffic
Community Center; Office Building Complex; Park	IEFs; Climate; Geology and soil; Topography and drainage; Hydrology and water resources	IEFs; Air quality; Noise level; Traffic
Kitchen Market; Cattle Market; Slaughter House	IEFs; Climate; Geology and soil; Topography and drainage; Hydrology and water resources	IEFs; Air quality; Noise level; Traffic; Water quality
Public Toilet	IEFs; Climate; Geology and soil; Topography and drainage; Hydrology and water resources; Groundwater table	IEFs; Air quality; Noise level
Sweeper Colony	IEFs; Climate; Geology and soil; Topography and drainage; Hydrology and water resources	IEFs; Air quality; Noise level
Bridge; Box culvert; Boat landing jetty	IEFs; Climate; Geology and soil; Hydrology and water resources	IEFs; Air quality; Noise level; Traffic; Water quality
Retaining Wall	IEFs; Climate; Geology and soil; Topography and drainage;	Air quality; Noise level
Solid Waste Management (trash bins, carts, tractor/trailers)	IEFs; Climate; Geology and soil; Topography and drainage; Hydrology and water resources	IEFs; Noise level
Water Supply System (Tubewell, OH tank, water distribution lines)	IEFs; Climate; Geology and soil; Topography and drainage; Hydrology and water resources	IEFs; Air quality; Noise level

Biological environment

Important parameters for description of biological environment include:

- General bio-ecological features of the sub-project area and its surroundings (e.g., bio-ecological zone, rivers, wetlands, hills, agricultural lands)
- Wildlife sanctuary, game reserves, protected area, national park, ecologically critical area (ECA)
- Floral habitat and diversity (terrestrial and aquatic)
- Faunal (including fish) habitat and diversity (terrestrial and aquatic)
- Threatened flora and fauna

Most of the sub-projects under MGSP are likely to have minor ecological impacts, and for such sub-projects general bio-ecological description of the sub-project area would be sufficient for description of baseline biological environment. In most cases, the most significant direct impact would result from felling/clearing of trees/vegetation within the sub-project area. For a few sub-projects, a more detailed description of biological environment would be necessary. Table E4 provides guideline for collection and presentation of data on biological environment for different sub-projects.

Table E4: Guideline for collection of sub-project specific data/ information for describing biological environment

Sub-project	Data/ information from secondary source	Data from primary survey/ measurement
Local roads; Pedestrian Bridge; Bus and Truck Terminals; Community Center; Office Building Complex; Park; Public Toilet; Sweeper colony; Retaining wall; Street Light; Traffic control; Solid waste management; Water supply system; Municipal/kitchen/Cattle Market, Slaughter House	General bio-ecological features, Wildlife sanctuary, ECA etc.	Number of trees to be felled; Vegetation Area to be cleared
Storm Drain	General bio-ecological features, Wildlife sanctuary, ECA etc.	Floral and faunal diversity; (discharge water)
Bridge, Box culvert; Boat landing jetty	General bio-ecological features, Wildlife sanctuary, ECA etc.	Floral and faunal diversity; Endangered and threatened species (discharge from construction site)

Socio-economic environment

The socio-economic baseline should be established following the social management framework (SMF) of MGSP. In general, for major sub-projects (e.g., road, drain, bus/ truck terminal, park), it is important to have a clear understanding to the baseline socio-economic

condition of people living within the sub-project influence areas. A common approach for assessment of baseline socio-economic condition is questionnaire survey. The primary objectives of a questionnaire survey are: (a) to understand people's socio-economic condition; (b) to understand extent of people's access to basic services; and (c) to understand people's perception regarding the sub-project.

E 2.5.3 Identification of Major Sub-project Activities

In order to assess environmental impacts, it is very import to identify the major sub-project activities during both construction and operational phases. A common sub-project activity is mobilization of material and equipment and establishment of labor camp. The construction activities would be different for different types of sub-projects. For example, the major construction activities for a RCC storm drain sub-project would include earth works, in-situ RCC drain construction, fabrication of RCC cover slab for drains, connecting the storm drain with house storm lines and other lateral storm lines, and dismantling and removing all temporary structures (e.g., labor sheds), material and equipment from site. During operational phase, important issues include maintenance of drain, and effect of discharge of the drainage flow into the receiving water body (e.g., khal/river). Similarly, major activities during construction and operational phases of other sub-projects should be identified to assess their impacts on the baseline environment.

E 2.5.4 Assessment and Prediction of Impacts

Potential Significant Environmental Impacts during Construction Phase

After identification of the sub-project activities, the next step in the IEE/EIA involves assessment/ prediction of the impacts of these activities on the baseline environment. The potential impacts during construction phase of sub-projects could be categorized into: (a) ecological impacts; (b) Physicochemical impacts; and (c) socio-economic impacts.

Ecological impacts:

Based on the assessment of nature and scale of the proposed sub-projects and assessment of sub-project locations (based on field visits), it appears that ecological impacts are not likely to be significant for most of the proposed sub-projects. However, for a few sub-projects the significance of ecological impacts needs to be assessed. These sub-projects include: (i) bridge, (ii) box culvert, and (iii) boat landing jetty. In all these cases, the assessment should focus primarily on the water quality. The EMF provides detail guideline for assessment of ecological impacts for these sub-projects.

Physicochemical impacts:

Possible Physicochemical impacts from the sub-project activities may include: Drainage congestion, Noise pollution, Air pollution, Water pollution, Environmental pollution from solid/ construction waste.

Temporary drainage congestion often results from obstruction to 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. Noise and air pollution could results from a wide range of construction activities, including movement of vehicles, operation of

construction equipment and generators. Significant noise is generated from operation of pile drivers, bulldozers, dump trucks, compactors, mixing machines, and generators. Noise pollution is particularly important for sensitive establishment e.g., hospitals, educational/religious institutions. Sub-projects that could generate appreciable air pollution include road, drain, bridge, culvert, bus/truck terminal, community center, and sweeper colony. For these sub-projects, adverse impacts of air pollution are likely to be limited to the areas surrounding the sub-project sites.

Water pollution may result from discharge of wastewater (e.g., liquid waste from labor sheds), spills and leaks of oils/chemical into water bodies (e.g., drain, pond, khal, river). For bridge, culvert and boat landing jetty sub-projects, construction activities carried out within water could cause water pollution. For other sub-projects, the presence and existing use of water bodies surrounding the sub-project site would determine the level of impact.

Socio-economic impacts:

The SMF of MGSP should be followed for detail assessment of socio-economic impacts. Possible socio-economic impacts from the sub-project activities may include: loss of land, loss of income and displacement, traffic congestion, impact on top soil, health and safety, impact on archaeological/historical sites/physical and cultural resources, and employment and commercial activities.

Significant land acquisition will not be required for any of the sub-projects. Loss of income may result from inability to use a particular piece of land/ establishment (e.g., footpaths) during the construction phase for income generation activity; this should be assessed following the SMF of the MGSP. During construction phase, traffic congestion may result from stock piling of material by the sides of roads, increased movement of people and vehicles. Some of the sub-projects, such as road and drain, may aggravate the existing traffic problem during construction phase. This should be addressed with proper traffic management, and avoiding stockpiling of materials in a way that could hamper traffic movement. General construction activities pose safety risks, which should be addressed as part of occupational health and safety plan.

Archeological and historical sites are protected resources. Damage of such sites by digging, crushing by heavy equipment, uprooting trees, exposing sites to erosion, or by making the sites more accessible to vandals are of particular concern. A guideline for archaeological impact assessment is presented in **Appendix F**. 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 G.** The likely impacts to PCR for typical activities of the sub-projects are also discussed in Appendix G. The “Chance Find” procedure for protection of cultural property is presented in **Appendix H**, following the World Bank Operational Policy OP 4.11 (Physical cultural resources). During construction phase, some beneficial impact at local level would come in the form of employment in sub-project related works, which would depend on the nature and extent of the sub-project. This in turn would induce some positive impacts on some other parameters including commercial activities in the sub-project areas.

Potential Significant Environmental Impacts during Operational Phase

After identification of the activities/processes during operational phase of a sub-project, their potential impacts on the baseline environment need to be assessed. The potential environmental impacts during operational phase could also be categorized into: (a) ecological impacts; (b) Physicochemical impacts; and (c) socio-economic impacts.

Ecological impacts:

During operational phase, the possible impact of the sub-project activities on the biological environment would be insignificant, except for storm drain and boat landing jetty sub-project. Poor quality of drainage water (e.g., due to direct discharge of toilet wastewater into storm drain) could cause pollution of receiving water body (e.g., river, khal) and thus adversely affect local ecology. Similarly, discharge of oil (from engine driven boats) and other wastes at the boat landing jetty could cause pollution of the river/ khal, thereby affecting the aquatic ecology.

Physicochemical impacts:

Depending on the type of sub-project, a number of physicochemical parameters could experience both positive and negative impacts during operation phase. Important issues and parameters include: Drainage, Water quality, Air quality and noise level, and Environmental pollution from solid waste. As discussed above, for storm drain and boat landing jetty, possible pollution of water body (rivers/khals) is an important issue during operational phase. A number of sub-projects are likely to contribute to the betterment of water quality (and environment in general) through proper management of wastewater. These include public toilet, slaughter house, and properly operated kitchen market and cattle market. Implementation of the sub-project involving solid waste management (supply of bins, carts, etc.) would improve environmental condition and reduce the risk of clogging of drains by solid waste.

Socio-economic impacts:

The MGS project is aimed at bringing about improvement in the socio-economic conditions of the ULBs through improvement of basic infrastructure. Thus, implementation of the proposed sub-projects is likely to bring about significant improvement in the overall environmental and socio-economic conditions at the ULBs. Important socio-economic parameters likely to experience beneficial impacts due to implementation of the sub-projects include: traffic, public health and safety, employment and commercial activities.

E 2.6 Environmental Management Plan (EMP)

The primary objective of the EMP is to record environmental impacts resulting from sub-project activities and to ensure implementation of the identified “mitigation measures”. Besides, it would address any unexpected or unforeseen environmental impacts that may arise during implementation of the sub-projects. The major components of the EMP include:

- Mitigation and enhancement measures
- Monitoring plan
- Grievance redress mechanism

- Estimation of cost of EMP
- Institutional arrangement for implementation of EMP

E 2.6.1 Mitigation and Enhancement Measures

The overall impact assessment of the proposed sub-projects to be implemented at the ULBs 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. Table E5 shows typical activities to be carried out under different sub-projects, corresponding "general impacts" and suggested mitigation and enhancement measures. Table E6 shows "sub-project specific" impacts and corresponding mitigation/ enhancement measures. Table E7 shows some important sub-project specific impacts during operational phase and corresponding mitigation measures.

E 2.6.2 Monitoring Plan

The objective of the environmental monitoring is to record environmental impacts resulting from the sub-project activities and to ensure implementation of the "mitigation measures". Table E8 and Table E9 present the guidelines for monitoring of environmental parameters during construction phase and operational phase, respectively.

E 2.6.3 Grievance Redress Mechanism

Grievance Redress Mechanism (GRM) is a valuable tool which will allows affected people to voice concerns regarding environmental and social impacts for MGSP's sub-project activities. As a part of EMF, a grievance redress mechanism has been developed, including structure of a grievance redress committee.

E 2.6.4 Method for Estimation of Cost of EMP

Many of the activities to be carried out as a part of Environment Management Plan (EMP) would not involve any additional direct cost e.g., employing local work force, where appropriate; scheduling deliveries of materials/ goods in off-peak hours; good housekeeping; etc. A number of activities would require additional cost. The cost estimates for some of the mitigation measures as will be identified in the environment mitigation plan that are be part of civil works contract. On the other hand, Environmental monitoring would involve direct cost. Table E10 provides basis/ method of estimation of costs of Monitoring. Similar approach should be followed for estimation of cost of additional measures, if required.

Table E5: Typical "general impacts" during construction phase of sub-projects and corresponding mitigation and enhancement measures

Activity/Issues	Potential Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
Construction and operation of labor shed for workers	• Generation of sewage and solid waste; water/ environmental pollution	• Construction of sanitary latrine/ septic tank system. • Erection of "no litter" sign, provision of waste bins/cans, where appropriate • Proper disposal of solid waste	Contractor (Monitoring by ULB/LGED/BMDF)
	• Health of workers	• Raising awareness about hygiene practices among workers. • Availability and access to first-aid equipment and medical supplies	
	• Possible development of labor camp into permanent settlement	• Contractor to remove labor camp at the completion of contract	
	• Outside labor force causing negative impact on health and social well-being of local people	• Contractor to employ local work force, where appropriate; promote health, sanitation and road safety awareness	
General construction works for sub-projects	• Drainage congestion and flooding	• Provision for adequate drainage of storm water • Provision of adequate diversion channel, if required • Provision for pumping of congested water, if needed • Ensure adequate monitoring of drainage effects, especially if construction works are carried out during the wet season.	Contractor (Monitoring by ULB/LGED/BMDF)
	• Air pollution	• Ensure that all project vehicles are in good operating condition. • Spray water on dry surfaces/ unpaved roads regularly to reduce dust generation. • Maintain adequate moisture content of soil during transportation, compaction and handling. • Sprinkle and cover stockpiles of loose materials (e.g., fine aggregates). • Avoid use of equipment such as stone crushers at site, which produce significant amount of particulate matter.	
	• Traffic congestion, traffic problems	• Schedule deliveries of material/ equipment during off-peak hours. • Selection of alternative routes, where possible for sub-project vehicles • Depute flagman for traffic control • Arrange for signal light at night	

Activity/Issues	Potential Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
	• Noise pollution	• Use of noise suppressors and mufflers in heavy construction equipment. • Avoid using of construction equipment producing excessive noise at night. • Avoid prolonged exposure to noise (produced by equipment) by workers. • Regulate use of horns and avoid use of hydraulic horns in project vehicles.	
	• Water and soil pollution	• Prevent discharge of fuel, lubricants, chemicals, and wastes into adjacent rivers/ khals/ drains. • Install sediment basins to trap sediments in storm water prior to discharge to surface water.	
	Felling of trees, clearing of vegetation	• Replant vegetation when soils have been exposed or disturbed. • Plantation to replace felled trees	
	• Accidents	• Following standard safety protocol. • Environmental health and safety briefing. • Provision of protective gear.	
	• Spills and leaks of oil, toxic chemicals	• Good housekeeping. • Proper handling of lubricating oil and fuel. • Collection, proper treatment, and disposal of spills.	
All construction works	• Beneficial impact on employment generation	• Employ local people in the project activities as much as possible. • Give priority to poor people living in slums within project area in sub-project related works (e.g., excavation and other works, which do not require skilled manpower).	Contractor (Monitoring by ULB)
	• General degradation of environment	• Environmental enhancement measures, such as plantation, landscaping, traffic/ direction signs, boundary wall for road-side educational/ religious institutions (where appropriate)	

Table E6: "Sub-project specific impacts" during construction phase and corresponding mitigation measures

Activity/Issues	Potential Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
Road Sub-project			
Setting up and operation of asphalt plant and bitumen preparation area	• Air and noise pollution affecting nearby settlements	• Locate plant away from residential settlements • Consider use of emulsified bitumen	Contractor (Monitoring by ULB/LGED/BMDF)
	• Possible water pollution (surface and groundwater) by bitumen and solvents	• Avoid spills; surround plant area with a ditch with a settling pond/ oil trap at the outlet	
	• Cutting down trees to use a fuel wood for heating bitumen	• Strictly prohibit use of fuel wood for heating bitumen	
Road construction	• Effect on traffic and pedestrian safety • Water pollution from bituminous products/ solvents	• Employ traffic control measures and limit possible disruption to non-construction traffic • Strict control to avoid spills; provision for adequate clean up	
	• Discovery of historical items and cultural remains	• Follow "chance find procedure" (see Appendix H) for protection of cultural resources	LGED/BMDF, with support from Contractor, ULB
Drain Sub-project			
Excavation/ Earth works	• Erosion	• Limit earthworks to the dry season as much as possible; protect exposed earthworks with mulch, fabric and plant cover	Contractor (Monitoring by ULB/LGED/BMDF)
	• Unsightly spoil disposal from drain excavation by simple side tipping, affecting drainage/ runoff	• Disposal of soil to designated tipping areas	
	• Possible backflow of water through drainage canal causing flooding/ water logging	• Consider installing gates to control inflow and outflow through drainage canal	
	Discovery of historical items and cultural remains	• Follow "chance find procedure" (see Appendix H) for protection of cultural resources	LGED/BMDF, with support from Contractor, ULB

Activity/Issues	Potential Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
Bridge, Box-culvert, Boat Landing Jetty Sub-projects			
Construction activities within/ near water	• Ecological impacts including destruction of aquatic habitat	• Prevent discharge of fuel, lubricants, chemicals, and wastes into surface waters. • Preservation of aquatic habitats by restricting movement of people/ equipment into them, and preventing entry of sediments into these water bodies. • Keep noise level (e.g., from equipment) to a minimum level, as certain fauna are very sensitive to loud noise.	
Building complex, Sweeper colony, Community center, Markets, Slaughter house, Public toilets, Bus/Truck terminal			
Construction of wastewater/ sewage disposal system	• Groundwater pollution due to discharge of wastewater/effluent in deep soakage well	• Restrict construction of deep soakage well	

Table E7: "Sub-project specific impacts" during operational phase and corresponding mitigation measures

Activity/Issues	Potential Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
Road Sub-project			
Operation of the road	• Increase in traffic speed and accidents • Increased traffic congestion due to movement of increased number of vehicles • Damage to road by movement of heavy vehicles; spillage of water	• Better traffic management • Avoiding spillage of water on road from vehicles carrying fish/ fresh produce (through monitoring, creation of awareness)	ULB (with support from LGED/BMDF)
	• Increased air and noise pollution affecting surrounding areas	• Traffic management, increased vehicle inspection	
Drain Sub-project			
Operation of the drain	• Pollution of downstream water body due to disposal of polluted water from the drain	• Stop direction connection from sanitation facilities to storm drain; ensure installation of septic tank in all establishments	ULB (with support from LGED/BMDF)
	• Blockage in the drain due to disposal of solid waste	• Creation of awareness; improve SWM system, installing cover in open manholes (if any) • Regular maintenance/ cleaning of the drain	
Boat Landing Jetty Sub-projects			
Operation of boat landing jetty	• Pollution of water (e.g., from spent oil, other waste)	• Restriction on disposal of spent oil, food and other waste in water; creation of awareness	ULB (with support from LGED/BMDF)
Kitchen/ Cattle markets, Slaughter house			
Solid and liquid waste disposal	• Environmental/ water pollution; health risks • Clogging of drainage lines	• Proper SWM in markets; regular maintenance of septic tank, drains	ULB (with support from LGED/BMDF)

Table E8: Guidelines for monitoring of environmental parameters during construction phase

Sub-project	Monitoring Parameter and Scenario	Monitoring Frequency	Resource Required and Responsibility
Road, Drain, Bridge, Culvert, Bus/ truck terminal, Community center, and Sweeper colony	If significant air pollution is suspected: Particulate Matter (SPM/ PM_{10}/ $PM_{2.5}$)	As needed	Contractor, under the guidance of ULB/ LGED/ BMDF
Road, Pedestrian bridge, Drain, Bridge, Culvert, Boat landing jetty, Bus/ truck terminal, Markets, Community center, Sweeper colony, Water supply	Regular monitoring: Noise level	Once every week, particularly during operation of heavy equipment	Contractor, under the guidance of ULB/ LGED/BMDF
Bridge, Culvert, Boat landing jetty	Water quality (pH, BOD_5/COD, Oil and Grease)	Half-yearly (at a location downstream of the work area)	Contractor, under the guidance of ULB/ LGED/BMDF
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, BOD_5/COD, Oil and Grease)	As needed	Contractor, under the guidance of ULB/ LGED/BMDF
All sub-projects	Visual observation of drainage congestion, traffic within around sub-project location	Once a week; when drainage/ traffic congestion suspected	Contractor, under the guidance of ULB/ LGED/BMDF

Note: Actual monitoring time and location should be decided by the PD depending on the location of specific activities.

Table E9: Guidelines for monitoring of environmental parameters during operational phase

Sub-project	Monitoring Parameter and Scenario	Monitoring Frequency	Resource Required and Responsibility
Strom drain, Boat landing jetty	Water quality (for storm drain, of the water body receiving drainage water) (pH, BOD_5/COD, Ammonia, Phosphate)	Half-yearly (at a location downstream of the discharge point)	ULB, with support from LGED/BMDF
Road, Pedestrian bridge, Bus/ truck terminal, Markets, Community center	Qualitative assessment of traffic congestion, accidents	As needed	ULB, with support from LGED/BMDF

Note: Actual monitoring time and location should be decided by the PD depending on the location of specific activities.

Table E10: Method/ basis of estimation of cost of Monitoring

Item	Basis of cost / Estimated cost
Monitoring:	
Air Quality (SPM or PM_{10} or $PM_{2.5}$)*	Prevailing rate (~ Tk. 10,000/- per unit)
Noise level	Prevailing rate (~ Tk. 5000/- per unit per day)
Water quality (pH, BOD_5 /COD, Oil and grease	Prevailing rate (~ Tk. 15,000/- per sample)
Water quality (pH, BOD_5 or COD, NH_3)	Prevailing rate (~ Tk. 7,000/- per sample)
Installation of septic tank/ sanitary latrine/ portable toilet	Prevailing rate/ Latest PWD/ LGED rates
Health/ safety signs (size and number)	Prevailing PWD/ LGED rate / Lump sum
Water sprinkling on aggregates or unpaved roads in work area	Latest PWD/ LGED rate (if available)/ A fixed rate per square meter
Traffic control (estimate number of flagman needed and duration of work)	Latest PWD/ LGED rate (if available)/ A fixed rate per flagman per day/ Lump sum amount
Traffic light	Latest PWD/ LGED rate (if available)/ Lump sum amount
Protective gear	Contractor to quote rate of items of works considering provision of adequate protective gear for workers, in accordance to work
Plantation (including protection/ fencing and conservation during project period)	Prevailing rate (~ Tk. 1,000/- per plant)

* Depending on availability of facility for measurement

E 2.7 Public Consultations and Access to Information

The EMF presents a guideline for carrying out consultation, including guidelines on nature (FGD/informal meetings) and number of consultation, location, and type of participants. Summary of the EMF report and impact mitigation measures will 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 Pourashavas and City Corporations and will be made available to the public. The draft EA (two volumes) will also be uploaded in the website of ULBs/LGED/BMDF and in the Bank InfoShop before appraisal completion.

In addition, a national workshop has been planned in October, 2013 to present the EMF and SMF to the key stakeholders including field level staff of the implementing agencies (LGED, BMDF), ULBs, community representatives, NGOs, civil society etc. The comments and the findings from the workshop and other public will be reviewed and incorporated in the final EA report. During the implementation stage of project, the subproject specific screening/assessment report will periodically be posted in the LGED/BMDF website before the bidding process.

E 2.8 Environmental Code of Practice (ECoP)

The main objective of an ECoP is to manage construction operations in harmony with the environment. The ECoP is a guideline for reduce or eliminate environment risk due to various activities associated with different types of sub-projects considered in the MGSP.

The ECoP outlines 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) 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; and (14) Natural Habitats. A guideline has been developed for determining applicability of different ECoP activities for different sub-projects (**Appendix I**).

E 2.9 Institutional Arrangements

Under MGSP, the LGED will implement 20 types of sub-projects in 26 ULBs, while the BMDF will implement 13 types of sub-projects in 119 ULBs. The institutional arrangement for implementation of MGSP is slightly different for LGED and BMDF**.** Figure E1 and Figure E2 show the institutional set up, including major activities and assignment of responsibility for their execution, for implementation of MGSP by the LGED and BMDF, respectively.

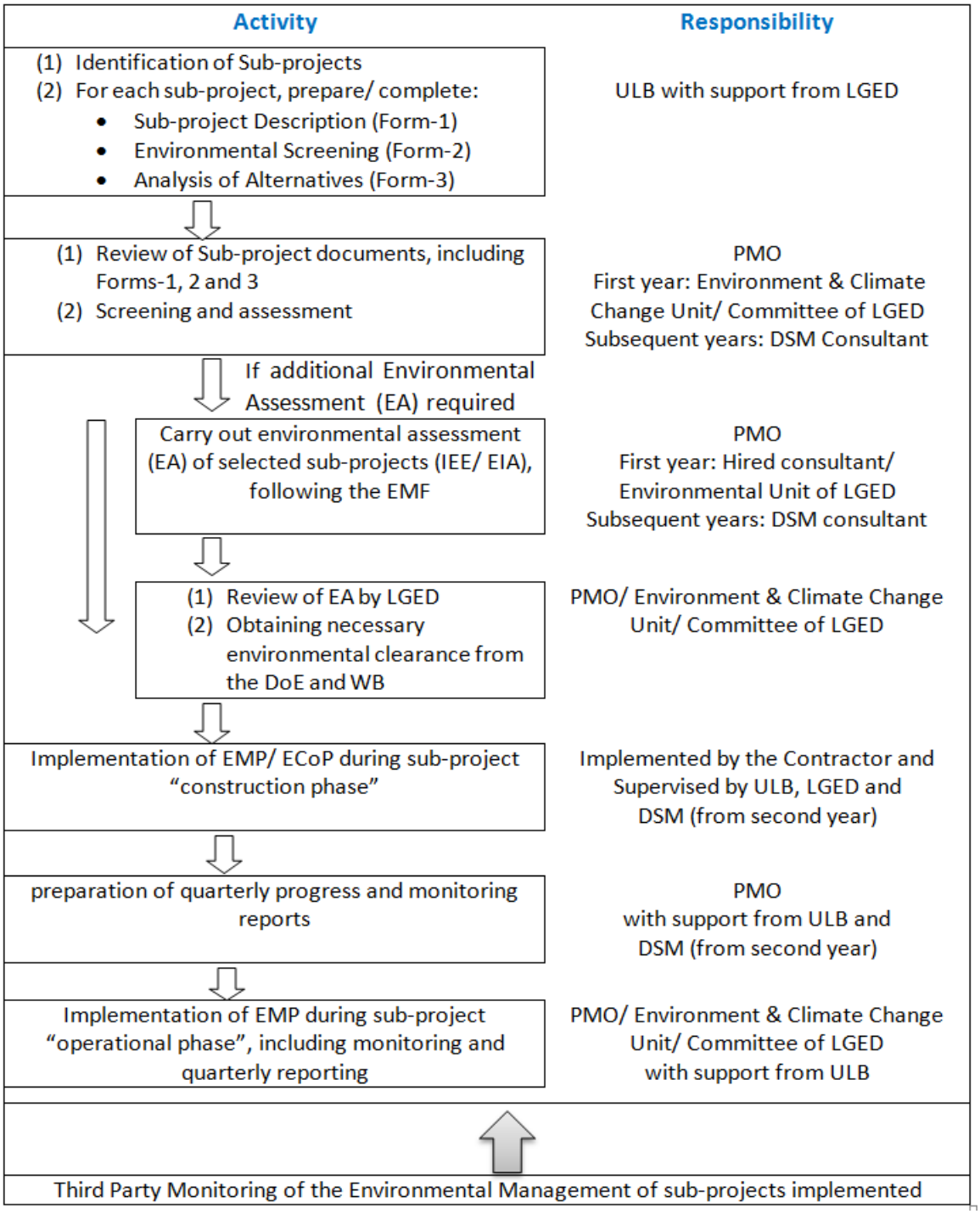


Figure E1: Institutional set up, including major activities and assignment of responsibility for their execution, for implementation of MGSP by the LGED

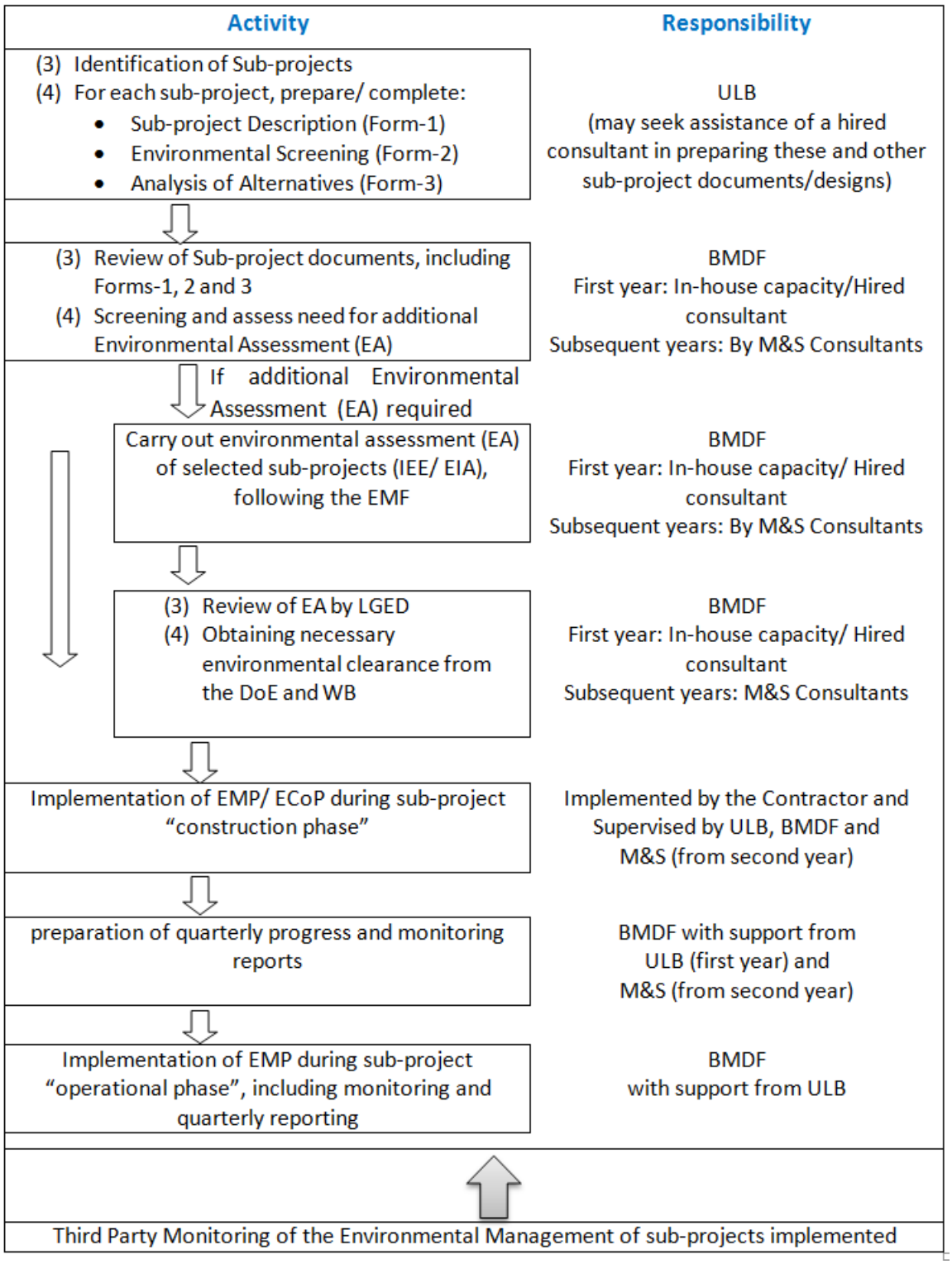


Figure E2: Institutional set up, including major activities and assignment of responsibility for their execution, for implementation of MGSP by the BMDF

E 2.10 Third Party Monitoring

Third party monitoring of environmental management, establishment of Environmental Management Information System (EMIS), Special Environmental Clauses (SECs) for inclusion in the bidding document, and training requirements for institutional strengthening have been presented separately in the EMF.

1.0 INTRODUCTION

1.1 Background

1. The Government of Bangladesh (GoB) intends to enhance the capacity of urban local bodies (ULBs; i.e., municipalities and city corporations) in development and management of urban infrastructure, and improve municipal governance and services through undertaking the Municipal Governance and Services Project (MGSP) in selected Pourashavas and City Corporations. The project will provide performance-based infrastructure improvement block grants and pilot O&M grants to approximately 200 urban local bodies (ULBs), comprising Pourashavas and City Corporations, located along the growth corridors. The Local Government Engineering Department (LGED) and the Bangladesh Municipal Development Fund (BMDF) under the Ministry of Local Government, Rural Development and Cooperatives will implement the project with participation of the selected ULBs. The project will be financed by IDA, with GoB contribution for land acquisition and management, and Municipalities equity for accessing BMDF competitive finance.

2. Since the IDA and GoB are the financing sources of the project, the environmental assessment of the proposed project should comply with the policies and legislative requirement of the World Bank and the GoB. Thus, the proposed project requires carrying out 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. In accordance to an agreement with the LGED, the Bureau of Research Testing and Consultation (BRTC) of Bangladesh University of Engineering and Technology (BUET) has been hired as consultant to prepare the Environmental Assessment (EA) of the proposed project.

3. Under the MGSP Sub-component 1.1 of Component 1 (Municipal Governance and Basic Urban Services Improvement), the LGED will implement 20 types of sub-projects in 26 ULBs, which include 22 Pourashavas and 4 City Corporations. Under MGSP Sub-component 2.1 of Component 2 (BMDF Operation and Institutional Improvement), the BMDF will implement about 13 types of sub-projects in 119 Pourashavas; the number of ULBs may increase in the future. The LGED and the BMDF intends to ensure that the proposed infrastructure takes environmental concerns into account. Details of the sub-projects to be implemented under MGSP will be finalized during project implementation phase and therefore, the exact locations, size and extent of the sub-projects will remain unknown during carrying out of the environmental assessment. Therefore a framework approach has been adopted for EA of the proposed project; the EA has two major volumes: (a) Overall environmental assessment, and (b) Development of Environmental Management Framework (EMF). The “overall environmental assessment” including the “overall project baseline”, evaluation of potential significant impacts of different sub-projects, and assessment of environmental practices in different ongoing and completed projects form the basis of the EMF. In summary, the EMF needs to be prepared based on:

(a) Assessment of environmental practices of the recently completed Municipal Services Project (MSP);
(b) Evaluation of potential environmental impacts of different types of sub-projects to be implemented under the MGS project at 26 ULBs;
(c) Development of sub-project specific standard mitigation measures (for negative impacts), enhancement measures (for positive impacts), and monitoring plan;
(d) Identification of institutional barriers and capacity needs of environmental management of all stakeholder organizations (including ULBs); and
(e) Development of institutional arrangement with assignment of responsibilities for environmental management and monitoring of sub-projects.

4. The EMF is intended to provide general policies, guidelines and procedures to be integrated into the design and implementation of all sub-projects under the proposed project; it will serve as a guide for preparation of the sub-project specific EAs when these will be identified.

1.2 Basis of the EMF

5. As noted earlier, the "overall environmental assessment" including assessment of environmental practices in different ongoing and completed projects in different ULBs is the basis of the EMF.To carrying out "overall environmental assessment" of different subprojects under the MGSP, field visits have been made to 12 ULBs, which include two City Corporations and ten Pourashavas. The ULBs visited are:

(a) Along Dhaka-Chittagong Corridor: Comilla City Corporation, Chandina Pourashava, Patiya Pourashava and Chokoria Pourashava.
(b) Along Dhaka-Sylhet Corridor: Madhabdi Pourashava and Bhairab Pourashava.
(c) Dhaka-Mymensing Corriodor: Bhaluka Pourashava and Trishal Pourashava.
(d) Dhaka-Bogra-Rangpur Corridor: Rangpur City Corporation, Tangail Pourashava and Elenga Pourashava.
(e) Cluster: Gopalganj Pourashava.

6. During field visits, discussions were held with the Mayors of the UBLs on different issues including major infrastructure related problems faced by the ULBs, difficulties in project formulation, implementation and management. Discussions were also held with engineers and other officials of the ULBs on recently completed/ ongoing projects; proposed sub-projects to be implemented under MGSP; and capacity and institutional arrangement for environmental management of the proposed sub-projects. At each of these ULBs, sites of recently completed/ ongoing projects were visited, and discussions were held with ULB officials about environmental management of these projects. In addition, the sites tentatively selected for implementation of different sub-projects under the MGSP were also visited, in order to obtain first-hand information and insight on the sub-project baseline scenarios. Apart from reconnaissance survey of these sub-project sites, noise level measurements were carried out. A surface water sample (typically from the water body receiving drainage water), and a

groundwater sample (typically from a randomly selected tubewell) were also collected for assessment of water quality. Focus Group Discussions (FGDs) were held at 6 ULBs during these field visits, which were participated by a wide range of stakeholders. The participants expressed their views on different aspects of the proposed sub-projects to be implemented in their ULBs, including possible environmental impacts of the sub-projects and possible mitigation/ abatement measures. In addition, public consultations (in the form of informal discussion) were also carried out at the ULBs.

7. As a part of the environmental assessment (EA), discussions have been held with the LGED and BMDF officials on different aspects of project implementation and management (including experience from recently completed Municipal Services Project, MSP), particularly focusing on existing capacity and institutional arrangement for environmental management of the proposed sub-projects. Discussions were also held with the LGED, BMDF and the WB on the first draft EMF. Based on the "overall environmental assessment" (presented in "Section A" of the EA report) and feedback from all stakeholders (including ULBs, LGED, BMDF, and the WB), the final EMF has been prepared and presented in "Section B" of the EA report.

1.3 Objectives and General Principles of EMF

1.3.1 Objectives

8. The Environmental Management Framework (EMF) is intended to provide general policies, guidelines, and procedures to be integrated in the formulation, design, implementation, operation and monitoring of all sub-projects to be implemented under the proposed MGS project. Its overall objective is to assist ULBs, LGED and the BMDF to ensure that:

- Sub-projects are formulated by the ULBs with active participation of people and peoples' representatives, especially those who would be directly benefited or impacted by the proposed sub-projects;
- Sub-projects are designed considering unique socio-cultural and environmental situation prevailing at the Pourashava or City Corporation where the sub-projects would be implemented;
- Possible impacts of all major sub-project activities during both construction and operational phases are identified during project formulation and design, appropriate mitigation/ enhancement measures are devised and monitoring plan prepared, as a part of the overall environmental management plan (EMP);
- Environmental Management Plan (EMP) and Environmental code of practices (ECoP) are properly followed; and
- Sub-projects comply with the relevant policies, rules and regulations of the GoB (e.g., Environmental Conservation Rules 1997) and safeguard policies of the WB.

The EMF will be a guiding document for sub-project specific:

- Environmental screening;
- Assessment of impacts (both positive and negative);
- Public consultation and disclosure;
- Environmental Management Plan (EMP);
- Implementation of EMP and ECoP; and
- Monitoring and reporting.

1.3.2 Overall Structure of the EMF

9. Under the MGSP, the ULBs are responsible for the identification of sub-projects and preparation of relevant sub-project documents. According to the EMF, the ULBs will be responsible for preparation of an adequate description of each sub-project (in accordance to the format provided in the EMF), including sub-project layout and other relevant information. The ULBs will also be responsible for carrying out "environmental screening" and "analysis of alternatives" of each sub-project in accordance to the formats provided in the EMF. The LGED will provide technical assistance to the ULBs in the preparation of all sub-project documents (including detail design, technical specification, cost estimation, and bid documents) and carrying out environmental screening and analysis of alternatives. Under the MGSP component to be implemented by the BMDF, the ULBs will be able to hire consultant(s) for preparation of the sub-project documents.

10. The sub-project description, "environmental screening", and "analysis of alternatives" prepared by the ULBs (in prescribed formats provided in the EMF), will be forwarded LGED/ BMDF for review. Based on review of these and other relevant information, the LGED/BMDF will assess the need for additional environmental assessment (IEE/EIA) for these sub-projects. If additional environmental assessment is necessary, LGED/ BMDF will take necessary steps for carrying out the assessment (e.g., through hiring a Consultant). The EMF presented in this report provides detail guideline for carrying out IEE/EIA (including preparation of EMP). The environmental assessment will be carried out following the EMF presented in this report. The LGED/BMDF will also be responsible for getting necessary environmental clearance from the Department of Environment (DoE).

2.0 POLICY LEGAL AND ADMINISTRATIVE FRAMEWORK

11. The proposed Municipal Services and Governance Project (MGSP) will be implemented in compliance with applicable environmental laws and regulations. Bangladesh has an environmental legal framework that is conducive to both environmental protection and natural resources conservation. This environmental legal framework applies to the proposed MGSP. In addition, a wide range of laws and regulations related to environmental issues are in place in Bangladesh. Many of these are cross-sectoral and partially related to environmental issues. This Section presents an overview of the major national environmental laws and regulations that are relevant and may apply to activities supported by the MGSP, institutional arrangement and national and sub-national level, and World Bank safeguard policies.

2.1 National Environmental Laws and Regulations

National Environmental Policy 1992

12. The concept of environmental protection through national efforts was first recognized and declared in Bangladesh with the adoption of the Environment Policy, 1992 and the Environment Action Plan, 1992. The major objectives of Environmental policy are to i) maintain ecological balance and overall development through protection and improvement of the environment; ii) protect country against natural disaster; iii) identify and regulate activities, which pollute and degrade the environment; iv) ensure environmentally sound development in all sectors; v) ensure sustainable, long term and environmentally sound base of natural resources; and vi) actively remain associate with all international environmental initiatives to the maximum possible extent.

Bangladesh Environmental Conservation Act (ECA), 1995 amended 2002

13. This umbrella Act 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 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 areas for different purposes;
- Promulgation of standard limits for discharging and emitting waste; and
- Formulation and declaration of environmental guidelines;

14. The first sets of rules to implement the provisions of the Act were promulgated 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

15. 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.

16. 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.

17. 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.

18. 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 60

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.

19. 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.

20. Rule 7 of Environment Conservation Rules (ECR) has classified the projects into 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.

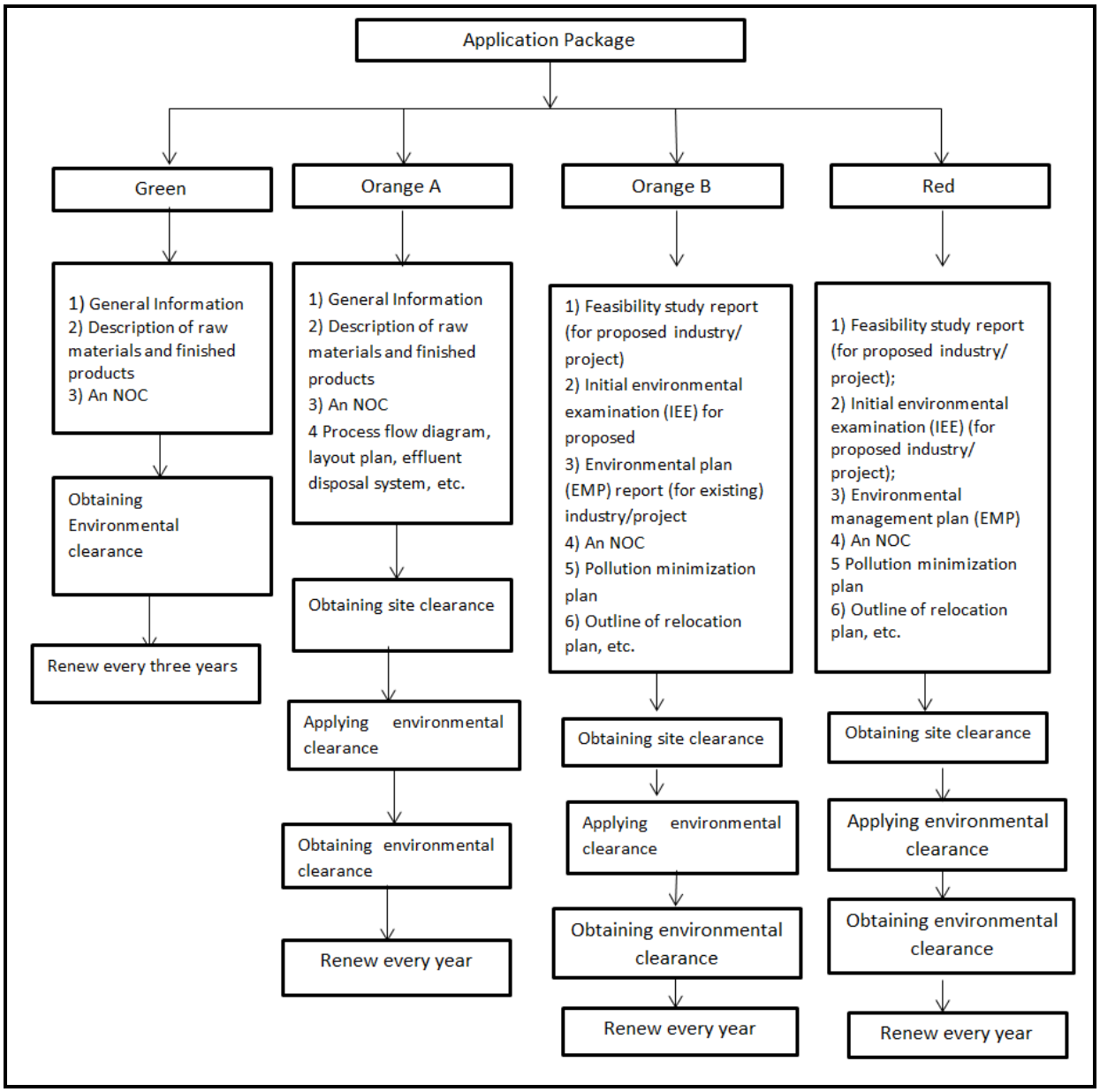
National Land-use Policy, 2001

21. The Government of Bangladesh has adopted national Land use Policy, 2001. The salient features of the policy objectives relevant to the proposed 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 natural environment;
- To use land resources in the best possible way and to play 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

22. 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.



NOC = No Objection Certificate, usually obtained from local government.

Figure 1: Process of application for environmental clearance in Bangladesh
(Source: The Environment Conservation Rules (ECR), 1997, Bangladesh)

Bangladesh Labor Act, 2006

23. 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 is the public procurement rules of Bangladesh and this rule 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 the adequate measure regarding the "Safety, Security and Protection of the Environment' in the construction works. This clause includes mainly, 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

24. 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.

25. 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.

26. 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".

27. 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 bye-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).

28. 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 openings 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

29. 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 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.

30. 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

31. 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.

32. 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.

33. 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 potentially important 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. With no systematic review or assessment process in place, however, 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.

34. The LGED plays a pivotal role in rural infrastructure development. In order to be able to deliver sustainable projects, LGED has pursued a strategy of mainstreaming environmental concerns in project development and implementation, and has supported training in

environmental management, both for its staff and other stakeholders, including contractors selected to execute works under LGED programs.

35. Environmental aspects have been considered in LGED projects since 1994, when the first edition of "Guidelines on Environmental Issues related to Physical Planning" was published. These guidelines have since been supplemented with more specific guidance, for example the "Environmental Codes of Practice" prepared for the Rural Transport Infrastructure Project supported by the World Bank. Under the same project, an Environmental Information Management System has also been piloted to ensure that top executives in the Department have access to environmental management information for all on-going projects. In 2008, LGED formulated the "Environmental Assessment Guidelines for LGED Projects" (LGED, 2008). The aim of the document is to provide the framework for EIA for different sector projects undertaken by LGED for planning, implementation and subsequent operation. The guidelines constitute simple procedures and formats to undertake IEE and EIA of proposed projects and subprojects to identify potential negative impacts and draw up an Environmental Management Plan (EMP) where necessary. The guidelines may also be used to conduct IEE and EIA of ongoing projects/subprojects to identify potential negative impacts and recommend environmental mitigation measures and monitoring programs.

2.3 World Bank Safeguard Policies

36. The objective of these 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 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

37. 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 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

38. 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

39. 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

40. 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

41. 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

42. 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

43. 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 through 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

44. 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.

45. 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

46. 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 Local language and must meet the World Bank standards.

2.4 Implications of National Policies and Regulations on MGSP

47. 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. As discussed in Section 4.1, most of the sub-projects to be implemented under MGSP would fall either under Orange A or Orange B category; a few would fall under Green category, and none are likely to fall under Red category.

48. For projects categorized as Orange B, according to ECR '97, a feasibility report and an IEE, an NOC from local authority 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.

49. 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 MGSP. It would be the responsibilities of the contractors (with supervision of ULBs) to make sure that these guidelines are followed in the workplace environment.

2.5 Implications of World Bank Safeguard Policies on MGSP

50. According to WB 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.

51. The sub-projects to be implemented under the Municipal Governance and Services Project (MGSP) do not involve large-scale infrastructure development (e.g., construction of sanitary landfill, water or wastewater treatment plant, major highways). The sub-projects would involve either minimum or no involuntary land acquisition. Thus, the sub-projects to be carried out do not appear to pose risk of significant adverse environmental impacts. In view of subprojects nature, the overall project is classified as a Category 'B' and the safeguard policy OP/BP 4.01 has been triggered for the proposed operation. The policy has been triggered to ensure that the sub project design and implementation will be focused on reducing adverse impacts and enhancing positive impacts. However, some of the individual sub-projects (e.g., street light, traffic control) may fall under "Category C".

52. It is highly unlikely that any natural habitant formed largely by native plant and animal species will be affected or modified by the subprojects activities to be implemented under MGSP because most of the infrastructure development works are small-scale and will take place in the built environments of municipalities adjacent to various other infrastructures. However, the EMF stipulated the code of practice on natural habitat as advance precautionary measures and Natural Habitats (OP/BP 4.04) has been triggered.

53. Also it is unlikely that any designated physical cultural resources will be affected by the subprojects. However, the impacts will be examined as part of the environmental screening/assessment of each sub-project. The EMF provided criteria for screening and assessment of physical cultural resources. In addition, 'Chance find' procedures conforming to local legislation on heritage would be evaluated that any physical or cultural resources will not be impacted. OP 4.11 (Physical Cultural Resources) has been triggered.

54. The activities of the project will not involve any pesticide application, include activities in forest areas or relate to protection of dams. Hence OP 4.09, 4.36 and OP 4.37 will not be relevant as well.

55. 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 MGSP 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.

56. The World Bank access to information policy would be directly followed. The MGSP project 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 LGED/BMDF website before the bidding process. Hard copies of these documents in English (including a summary in Bengali) will be made available in the offices of the respective Pourashavas and city corporations for the local stakeholders.

3.0 ENVIRONMENTAL MANAGEMENT PROCEDURE

57. As noted earlier, the draft Environmental Management Framework (EMF) presented here has been prepared based on field visits to 12 ULBs throughout the country, and consultation with all stakeholders including LGED, BMDF and the WB. The environmental assessment of the sub-projects to be implemented under MGSP needs to be carried out following the provisions of the Environment Conservation Rules 1997 (GoB, 1997), and the relevant World Bank Operational Policies [e.g., OP 4.01 Environmental Assessment; OP4.04 Natural Habitats and OP 4.11 Physical Cultural Resources). The environmental assessment requirements under these provisions vary significantly depending on the category of the sub-projects. The EMF presented here provides guidelines for categorizations of sub-projects according to GoB regulations and World Bank policies (see Section 3.1).

58. Under the MGSP, the ULBs will be responsible for identification of sub-projects, preparation of sub-project description, "environmental screening" and "analysis of alternatives". The EMF presents guidelines (in the form of a simple format) for preparation of description of the sub-projects (see Section 3.2). The EMF also presents a simple format for "environmental screening" of sub-projects (see Section 3.4) and "analysis of alternatives" (see Section 3.5), to be carried out by the ULBs. Based on these and other relevant documents, LGED/ BMDF will assess the need for further environmental assessment (IEE/EIA) (see Section 3.6).

59. The major activities to be carried out for IEE and EIA include: (i) identification of sub-project influence area; (ii) establishment of "baseline environment" against which impacts of the proposed sub-project would be evaluated; (iii) analysis of alternatives; (iv) identification of major sub-project activities during both construction and operational phases; (v) assessment, prediction and evaluation of impacts of major project activities on the baseline environment; (vi) carrying out public consultations; (vii) preparation of environmental code of practice (ECoP); and (viii) identification of mitigation measures and preparation of environmental management plan (EMP), including monitoring requirements, and grievance redress mechanism. The EMF presents detail guidelines for carrying out each of these major activities.

60. The EMF also presents occupational health and safety guidelines, Terms of Reference (ToR) for third party monitoring of environmental management, guidelines for establishment of EMIS, and a set of special environmental clauses (SECs) for inclusion in Technical Specification and bidding document. The EMF also presents institutional framework for environmental management of the MGSP to be implemented by the LGED and the BMDF. Finally, the EMF presents training requirements for ensuring successful environmental management of the MGSP.

3.1 Sub-project Types and Categories

61. The category of a sub-project (according to WB and GoB guidelines) is an important determinant with regard to the requirements of its environmental assessment. The sub-

projects to be implemented under the MGSP include the following: (1) Bridges (less than 30m); (2) Box Culverts; (3) Boat Landing Jetty; (4) Bus Terminal; (5) Community Center; (6) Cattle Market; (7) Drain; (8) Municipal/Kitchen Market; (9) Park; (10) Pedestrian Bridge; (11) Public Toilets; (12) Road (local); (13) Retaining Wall; (14) Sweeper Colony; (15) Slaughter House; (16) Street Light; (17) Solid Waste Management; (18) Traffic Control; (19) Truck Terminal; (20) Office Building Complex; and (21) Water Supply System. The sub-projects would involve rehabilitation of existing infrastructure (e.g., roads, drains), as well as new construction (e.g., kitchen markets, bus and truck terminals). The sub-projects to be implemented in different ULBs under the MGSP are presented in **Appendix A**. Table 1 shows the sub-projects to be implemented under LGED and BMDF components of the MGSP. Additional types of sub-projects could be considered in the future.

Table 1: Types of sub-projects to be implemented under LGED and BMDF of MGSP

Sub-projects	LGED Component	BMDF Component
Box-culvert, Bus Terminal, Community Centre, Drain, Kitchen/Municipal Market , Boat Landing Jetty, Public Toilet, Road, Slaughter House, Street Light, Truck Terminal, Water Supply System[1], Cattle Market, Park, Pedestrian Bridge, Retaining Wall, Sweeper Colony, Solid Waste Management, Traffic Control	√	√
Bridge	√	--
Office Building	--	√

62. During field visits to 12 ULBs, it was found that many ULBs are in the process of identification of sub-projects for possible implementation under MGSP. These potential subprojects will be further reviewed and analyzed for preparing short-list of sub-projects on priority based for possible implementation under MGSP. It was found that most of the ULBs are keen to implement road (construction/improvement/rehabilitation) sub-projects (both RCC and bituminous roads) and drain (both RCC and pipe drain) sub-projects under MGSP. For example, Chokoria Pourashava has initially identified 5 sub-projects involving improvement and rehabilitation of roads (length varying from 0.5 km to 2.0 km); Comilla City Corporation has also primarily selected 5 road improvement sub-projects (length varying from 0.385 km to 2.1 km) for possible implementation under MGSP. Bhaluka Pourashava has initially listed 9 sub-projects involving construction and improvement of roads (length varying from 0.57 km to 2.2 km), and one sub-project involving construction of about 0.5 km embankment. Tangail Pourashava has also in process of identification of a number of road and drain sub-projects for possible implementation under MGSP. These include 4 sub-projects involving rehabilitation of road (length 0.28 km to 3.37 km), construction of RCC sewerage drain (0.7 km to 1.075 km), cleaning of drain (1.75 km), repair of drain (1.0 km), and re-excavation of a canal. The sub-projects short-listed by Trishal Pourashava for possible implementation under MGSP include 11 road (length 0.2 km to 3.05 km), 10 drain (length 0.2 km to 1.137 km), one foot bridge (10 m), one kitchen

[1]Deep tubewell, pump houses, pipe lines, water meter etc., excluding water treatment plant

market (18 m by 6 m CI shed) and two public toilet sub-projects. Apart from 32 road (length 0.25 to 2.0 km) and 34 drain (length 0.3 km to 1.5 km) sub-projects, Madhabdi Pourashava has also primarily listed sub-projects involving construction of a park, a graveyard, an auditorium, a school and an Eidgha (Muslim pray ground) for possible implementation. Other ULBs visited were in the process short-listing sub-projects for possible implementation under MGSP.

63. Based on field visits to 12 ULBs and assessment of the nature, scale and extent of the proposed sub-projects to be implemented at these ULBs, it appears that none of the sub-projects would fall under Red Category (according to ECR 1997 classification). As shown in Table 1, two sub-projects as slaughter house and water supply system seems to have high significant impact. However, the scale of operation of the slaughter house being considered at the ULBs is relatively small; only a few animals are likely to be slaughtered at these facilities every day. As a result, the potential environmental impacts of these slaughter houses are not likely to be significant, and the sub-project could be categorized as Orange B. Similarly, the water supply sub-projects to be implemented at the ULBs mostly involve installation of tubewells; such sub-projects would not generate significant environmental impacts and therefore could be categorized as either Orange A or Orange B.

64. The sub-projects to be implemented under the Municipal Governance and Services Project (MGSP) do not appear to pose risk of significant adverse environmental impacts. Accordingly, the overall Municipal Governance and Services Project (MGSP) could be classified as a "Category B" project, according to WB project classification (OP 4.01). However, some of the individual sub-projects (e.g., street light, traffic control) may fall under "Category C".

65. Based on an assessment of likely environmental impacts of these sub-projects and experience of implementation of similar sub-projects in different ULBs, the most likely categories of these sub-projects have been identified and presented in Table 2.

Table 2: Classification of sub-projects according to ECR 1997 (GoB, 1997)

Sub-projects	Sub-project Category according to ECR 1997	Likely Sub-project Category
Local Road (construction/ rehabilitation/ expansion); Bridge construction (< 100 m); Public Toilet	Orange B	--
Drain; Box Culvert; Boat Landing Jetty; Bus Terminal; Truck Terminal; Community Center; Kitchen Market; Cattle Market; Pedestrian Bridge; Retaining Wall; Sweeper Colony; Solid Waste Management; Office Building	Not specifically listed	May be classified as "Orange A" or "Orange B" depending on assessment of impact
Park; Street Light; Traffic Control	Not specifically listed	May be classified as "Green"
Slaughter House; Water Supply System	Not specifically listed	May be classified as "Orange B" or "Red" depending on scale of impacts

Note: All sub-projects listed in this Table could be classified as "Category B" according to WB OP4.01, except for "Street Light" which could be classified as "Category C".

3.2 Sub-project Description

66. For proper environmental assessment, it is important that a sub-project is clearly defined by the project proponent (i.e., ULBs). The key information required for describing a particular sub-project would vary depending on the type of sub-project. According to ECR 1997, a project proponent is required to apply to the Department of Environment (DoE) for environment clearance or site clearance certificate in a prescribed form (Form 3 of ECR 1997), furnishing key project information. Following the format of the "DoE Form 3", a "Sub-project Description Form (Form 1)" has been developed (**Appendix B**) for documenting description of sub-projects to be implemented under the MGSP. Once an ULB prepares a sub-project description using Form 1, it will be easier to subsequently complete the "DoE Form 3" during submitting application for environmental/ site clearance certificate. The completed Sub-project Description Form 1 and the Environmental Screening Form 2 (see Section 3.4) will be sent by the ULBs to LGED/ BMDF for review, based on which the need for further environmental assessment will be determined.

67. The location map of the proposed sub-project should cover the entire physical extent of the sub-project and its surrounding areas; the location of the sub-project could be identified on the map of the ULB.

3.3 Environmental Considerations in Design

68. By incorporating/ considering certain features in the engineering design of a sub-project, it is often possible to reduce or eliminate some of the possible adverse environmental impacts during both construction and operational phases of a sub-project. For example, providing adequate clear height in the design of a bridge over a river/ channel would ensure free movement of water vessels underneath the bridge during its operational phase; while failure to do so would bring about significant adverse impacts on transportation/ communication through the river/ channel. Identification of such features at the design stage of a sub-project, and incorporation of these in the sub-project design could greatly reduce adverse impacts and facilitate proper environmental management of a sub-project. Table 3 identifies possible adverse environmental impacts and environmental considerations to be included in the design for reducing/ eliminating such impacts for some major sub-projects to be implemented under MGSP. These issues should be adequately addressed during the design phase of the sub-projects, as a part of environmental management.

Table 3: Environmental impacts and environmental considerations to be included in design to reduce/ eliminate the impacts for some major sub-projects

Sub-project	Environmental Impact	Design Considerations/ Actions to Reduce/Eliminate Impact
Road	• Water logging on road surface	• Proper slope of road surface (e.g., toward adjacent surface/storm drains) • Where appropriate, road construction/ rehabilitation to be preceded by drain construction/ improvement along the road
Drain	• Clogging/ stagnation of flow in the	• Designing drain considering the

Sub-project	Environmental Impact	Design Considerations/ Actions to Reduce/Eliminate Impact
	storm drain	downstream discharge point; adequate slope and x-section; RCC cover for drain, where appropriate
	• Backflow of water through drain (e.g., due to high water level at downstream discharge point, such as khal/ river)	• Considering installation of regulator to control inflow/ outflow through drain
	• Pollution of downstream water body due to disposal of polluted water from drain	• Not allowing direct connection to drain from sanitation facilities
Bridge	• Impact on water movement,; siltation and erosion	• Adequate opening for required water flow and inclusion of river training works, based on appropriate hydrologic studies
	• Obstruction to the movement of water vessels underneath bridge	• Keeping required clear height for movement of water vessels
Office building, Community Centre	• Water logging during rain	• Provisions for storm water drainage; roof-top rain water harvesting system
	• Pollution from inadequate wastewater disposal	• Separate plumbing system for black water; provision for septic tank system; designing soakage pit considering depth of water table.
	• Fire hazard	• Keeping adequate provisions (including fire/emergency exits) for fire safety in accordance with National Building Code
Deep tubewell	• Contaminated water in tubewell	• Adequate testing of water quality (specially for As, Mn, Salinity)
Street light	• Contribution to carbon emission	• Considering solar energy for street lights
Bus/ truck terminal, Cattle/ kitchen market, Community center, Office building	• Traffic congestion resulting from increased public congregation and vehicular movement	• Adequate provisions for optimum traffic circulation
	• Adverse impact from inadequate rain/ storm water management	• Considering roof-top rain water harvesting system
	• Contribution to carbon emission	• Considering solar energy for a part of electricity supply
Market, Slaughter house	• Pollution from wastewater and solid waste disposal	• Proper waste disposal system (e.g., wastewater drainage, septic tanks) in design of market/ slaughter house
Public Toilet	• Pollution and odor	• Adequate height with proper ventilation. • water supply and hand wash facility

3.4 Environmental Screening

69. All the sub-projects to be funded under MGSP will be subject to an environmental screening in order to prevent execution of projects with significant negative environmental

impacts. The purpose of "environmental screening" is to get a preliminary idea about the degree and extent potential environmental impacts of a particular sub-project, which would subsequently be used to assess the need for further environmental assessment. The Sub project will be identified by the ULBs Committee and the targeted beneficiaries. After selection of a subproject, the environmental screening will be integral part of the sub-project planning.

70. As noted earlier, the ULBs will be responsible for carrying out environmental screening. The environmental screening would involve: (i) reconnaissance of the sub-project area and its surroundings by ULB engineer(s); (ii) identification of the major sub-project activities; and (iii) preliminary assessment of the impacts of these activities on the ecological, physic-chemical and socio-economic environment of the sub-project surrounding areas.

71. The ULB engineers would carry out a reconnaissance survey surrounding the sub-project location in order to identify important environmental features (e.g., human settlements, educational/ religious/ historical establishments, 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 ULB (by completing Form 1). The ULB would carry out the "environmental screening" of sub-projects with a preliminary idea about the nature of the sub-project location and sub-project activities from **Appendix B** and by filling in the "Environmental Screening Form 2" presented in Appendix **C**.

72. As shown in Form 2 (Appendix C), the potential impacts of a sub-project have been divided into: (A) impacts during construction phase, and (B) impacts during operational phase. For each phase, the impacts have been further categorized into ecological impacts, physico-chemical impacts and socio-economic impacts. A number of parameters have been identified for each of these categories. In general, as a part of environmental screening, the potential impact with respect to each parameter has to be classified as "significant", "moderate" and "insignificant" or "none". The following Section provides guidelines for carrying out environmental screening of sub-projects using the Screening Form 2.

<u>Ecological Impacts:</u>

73. Three parameters have been considered for screening of ecological impacts during construction phase; these include felling of trees, vegetation and impact on aquatic (water) environment. If the sub-project involves felling/ cutting of significant number of trees, the impact would be classified as "significant"; if the sub-project involves feeling/ cutting of only a few trees, the impact could be classified as "moderate", while if felling of trees is not involved, the impact would be "insignificant" or "none". If there is a water body (e.g., khal, pond) close to the sub-project location, then depending the potential risk of pollution of the water body (e.g., through discharge of waste/ wastewater from sub-project activities, spills and leaks of oil/ chemical), the potential impact on aquatic environment would have to be classified as "significant' or "moderate" or "insignificant". As noted in the "screening form", sub-projects that could generate substantial ecological impacts include storm drain, bridge, box culvert, and boat landing jetty.

74. One parameter has been selected for screening of ecological impacts during operational phase: impact on aquatic environment. As noted in "Form 2", sub-projects that could generate such impact include drain and boat landing jetty; for other sub-projects, ecological impacts during operational phase are likely to be "minor" in nature. If the drainage water carried by the constructed storm drain is polluted (e.g., due to inflow of domestic wastewater), it will adversely affect the aquatic environment of the receiving water body. The nature of the receiving water body will also govern the possible extent of pollution; smaller water bodies with lower levels of flow would be more susceptible to pollution, compared to larger water bodies (e.g., a river) with higher flows. Considering the nature of the drainage water and the nature of the receiving water body, the ULB engineer would classify the impacts as "significant", "moderate" or "minor". Similarly, discharge of oil (from engine driven boats) and other wastes at the boat landing jetty could cause pollution of the river/khal, thereby affecting the aquatic environment. Depending on the potential use of the boat landing jetty (in terms of number of boats and people), the ULB will subjectively classify impacts as "significant", "moderate" or "minor".

Physicochemical Impacts:

75. The parameters considered for screening of physic-chemical impacts during construction phase include drainage congestion, noise and air pollution, and water/ environmental pollution. If the sub-project involves use 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 air pollution impact could be subjectively classified as "significant", "moderate" or "minor". Similar logic should be followed for classifying impacts related to drainage congestion, and water/ environmental pollution.

76. The parameters considered for screening of physic-chemical impacts during operational phase would depend on the type of sub-project. As shown in "Form 2", 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 ULB engineers would subjectively classify the potential impacts with respect to these parameters as "significant", "moderate" or "minor".

Socio-economic Impacts:

77. The parameters considered for screening of socio-economic impacts during construction phase include traffic congestion, health and safety, impact on archaeological/ historical sites, and employment. A number of projects, e.g., road, drain are likely to generate traffic congestion during the construction phase. Sub-projects that involve transportation and storage of significant construction materials (e.g., bridge, office building complex) 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.

78. The parameters considered for screening of socio-economic impacts during operational phase include traffic, safety, and employment. A number of sub-projects (such as road, bridge, box culvert, bus/truck terminal, pedestrian bridge office complex, market, community center, and park) would modify the traffic situation in the sub-project surrounding areas. Some of these sub-projects (e.g., road, bridge/box culvert, bus/truck terminal, pedestrian bridge) are likely to improve traffic situation, while others (e.g., office, market, community center, park) may generate more traffic and aggravate the traffic situation. Depending on the type and extent of a sub-project, the ULB engineer will classify the traffic impacts during 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 ULB engineers would classify the impact on safety (e.g., "significant improvement" for pedestrian bridge sub-project). 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 ULB engineer would classify the impact on employment generation as "significant", "moderate" or "insignificant".

Based on the guideline presented in the EMF, the ULBs will be able to carry out the "environmental screening" of sub-projects by filling forms of the description of subproject (**Appendix B**), the Environmental Screening Form (**Appendix C**) and the analysis of alternatives (**Appendix D)**.

3.5 Analysis of Alternatives

79. 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 maximize the positive impacts. The analysis of alternatives should be carried out at two different levels: (a) by the ULBs, during formulation of a sub-project; and (b) during carrying out of IEE/EIA of a sub-project, if needed (e.g., by the consultant engaged for this purpose).

80. The nature of the analysis of alternatives would be different for different sub-projects. For example, for a storm drain sub-project, alternative route for the drain, alternative design (e.g., earthen versus RCC drain), and alternative technology (e.g., manual excavation versus mechanized excavation) are important considerations. For a road sub-project, alternative route and alternative design (e.g., bituminous road versus RCC road) are important considerations. For sub-projects like pedestrian bridge, Municipal/kitchen/cattle markets, public toilet, boat landing jetty, bus/truck terminals, community centers, and office building complex – analysis of

alternative location is of primary importance. With respect to "location", important considerations include availability of Government/ULB-owned land, proximity to sensitive installations (e.g., hospitals, educational institutions), connectivity (e.g., surrounding road network), etc.

81. 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; and
    (d) No sub-project scenario.

82. A simple format (Form 3) for analysis of alternatives is presented in **Appendix D**, along with guidelines for performing the analysis for different types of sub-projects. For convenience, "analysis of alternatives" for a "drain" sub-project and a "road sub-project" are also presented in Appendix E, as examples. The guidelines and the examples would assist the ULB authorities in carrying out analysis of alternatives for different types of sub-projects. The outcome of the "analysis of alternatives", for example, with respect to location/ route of sub-project, design of the sub-project (e.g. RCC drain as opposed to earthen drain), method of construction (e.g., manual excavation as opposed to mechanized excavation) should be included in the sub-project description Form 1 (under the headings: sub-project description, major raw material to be used in sub-project, and major equipment to be used in sub-project).

83. Subsequently, if a particular sub-project requires further environmental assessment (IEE/EIA), the analysis of alternatives should be carried out in more details (by the consultant engaged for this purpose), including quantitative estimates for some parameters (e.g., cost of manual excavation versus cost of mechanized excavation). Based on the outcome of this detailed "analysis of alternatives", the sub-project location/route, sub-project design and method of construction may have to be modified.

84. Based on the guideline presented in the EMF, the ULB engineers should be able to carry out the "analysis of alternatives" of different sub-projects by filling Form 3. However, as discussed in Section 3.16, the capabilities of the ULB engineers in carrying out these activities could be greatly improved through imparting training on environmental assessment and management.

3.6 Need for Further Environmental Assessment

85. In general, the environmental screening process identifies what impacts will be generated and what type of mitigation measures will be required for sub-projects. Also the screening will help in determining whether a proposed subproject should be subjected to follow the Environmental Code of Practices (ECoP) for mitigate/avoid the impacts or need further detail assessment with preparation of separate environmental management plan. The level of environmental assessment (EA) of a sub-project would primarily depend on the class/category of the sub-project according to OP 4.01 and ECR 1997. As noted earlier (Section 3.1), almost all sub-projects to be carried out under MGSP could be classified as "Category B" according to OP

4.01; while a few could (e.g., street light, traffic control) may fall under "Category C". On the other hand, as shown in Table 2, most of the MGSP sub-projects are not specifically listed in the Environment Conservation Rules (ECR) 1997; only a few are listed under Category "Orange B". As discussed in Section 3.1, based on overall environmental assessment carried out as a part this study, it appears that most of these sub-projects would fall either under "Orange A" Category or "Orange B" Category, and a few would fall under "Green Category" (e.g., street light, traffic control). According to Environment Conservation Rules (ECR) 1997, for Green Category sub-projects, no further environmental assessment would be required; for Orange A Category sub-projects, no further environmental assessment would be required, but some additional information would be required; for Orange B category sub-projects Initial Environmental Examination (IEE) and Environmental Management Plan (EMP) would be required; while for Red Category sub-projects, full-scale EIA (including EMP) would be required.

3.7 Guidelines for Carrying Out IEE and EIA

86. As noted earlier, based on a review of the sub-project description (i.e., Form 1) and environmental screening (i.e., Form 2) prepared by the ULBs, the LGED/BMDF will determine the need for further environmental assessment (i.e., carrying out IEE/EIA, including EMP). However, since the exact locations, size and extent of the sub-projects are still unknown, the guideline for environmental assessment presented here cover both IEE and EIA (including EMP). Both IEE and EIA would cover the same elements. However, the level of details would be different; a full-scale EIA would present more detailed and quantitative (where appropriate) analysis of impacts, e.g., through application of models (such noise model). The level of details would be determined through "scoping" at the onset of the environmental assessment process, considering the nature of the sub-project (Form 1) and level of anticipated impacts (Form 2).

87. The major activities involved in carrying out environmental assessment (IEE and EIA) include the following:

(a) Identification of sub-project influence area;
(b) Establishment of "baseline environment" within the sub-project influence area, against which impacts of the proposed sub-project would be evaluated;
(c) Identification of major sub-project activities/processes during construction phase and operational phase;
(d) Assessment and evaluation of impacts of major project activities on the baseline environment during construction phase and operational phase;
(e) Carrying out public consultations;
(f) Identification of mitigation measures for reducing/eliminating adverse impacts and enhancing positive impacts;
(g) Identification of environmental code of practice (ECoP), including cost of ECoP (see Section 3.9); and
(h) Development of environmental management plan (EMP), including monitoring requirements, and estimation of cost of EMP (see Section 3.8).

88. As described in Section 3.14, the IEE/EIA will be carried out by LGED (by Environmental Unit/hired consultant/DSM consultant) and BMDF (by in-house expertise/hired consultant/

M&S consultant). The following Section presents detail guidelines for carrying out each of these major activities.

3.7.1 Sub-project Influence Area

89. For properly carrying out IEE and EIA, it is important to have a clear understanding about the "sub-project influence area" and "baseline environment". The EMF provides guidelines for identification of sub-project specific influence area and defining environmental baseline.

90. In order to establish a sub-project influence area, the activities to be carried out and processes that would take place during both construction phase and operational phase of the sub-project need to be carefully evaluated. Based on the field visits to sub-project sites in 12 ULBs, it is apparent that the sub-project influence area would depend not only on the type of sub-project, but also on the site/ area where it will be implemented. For example, for a storm drain sub-project, the sub-project influence area would include: (a) catchment areas of the drain; (b) downstream areas of the drain, including the final discharge point (e.g., khal, river), where the storm water carried through the drain would be discharged; (c) routes of transportation of construction materials (or construction wastes) to (or away from) the sub-project site; and (d) areas of material storage, and labor shed for sub-project works. Visual observation and water quality tests suggest that the water bodies (i.e., khals and rivers) receiving drainage water from the ULBs are heavily polluted at many ULBs (with high concentrations of BOD and ammonia, indication presence of domestic wastewater in the drainage water). Therefore, for a drain sub-project, water quality of the receiving water bodies is of particular importance.

91. For road construction/ rehabilitation sub-project, the length of road up to the major intersections at either end of the road could experience impacts (e.g., traffic congestion, noise and air pollution) of the sub-project activities, and therefore should be considered as the sub-project influence area. For bridge (< 30 m) and box culvert sub-projects, areas on either side of the river/ khal covering areas about half a km upstream and downstream of bridge/khal location could experience impacts (e.g., water pollution, drainage congestion, air and noise pollution) of sub-project activities, there therefore should be considered as sub-project influence area. For traffic control and street-light sub-projects, the sub-project impacts are not likely to be felt beyond the street length up to the major intersections at either end of the street, and this entire length should be considered as sub-project influence area.

92. Based on field visits and discussions with ULB officials, it appears that for a number of sub-projects (e.g., bus/truck terminal, community center, office building complex, park, kitchen/cattle market, slaughter house, public toilet, sweeper colony, retaining wall), the major environmental impacts during both construction and operational phases (e.g., drainage congestion, noise/air pollution, water/environmental pollution, traffic congestion) are unlikely to impact areas beyond one kilometer from the sub-project site. Thus, for these sub-projects, areas and communities within about one kilometer surrounding the proposed sub-project location may be considered as the sub-project influence area.

93. Construction of a bridge would have impact/influence in areas on either side of the river/ channel. For assessment of impacts, areas covering about one km upstream and downstream of bridge location (including major roads/intersection on either side that would be connected by the bridge) may be considered as sub-project influence area. The river/channel is also likely to be affected (e.g., in terms of water quality, navigation) due to the sub-project activities; therefore, river/channel about half a kilometer upstream and downstream of the bridge location could be considered as sub-project influence area. For a box culvert, the impacts are likely to be less significant compared to a bridge, and areas and communities within about one kilometer surrounding the location of box-culvert could be treated as sub-project influence area.

94. For Solid Waste Management (SWM) sub-project involving collection and transportation of solid wastes, the entire route of transportation of solid waste from the point of generation/ collection to the points/locations of ultimate disposal should be considered as the sub-project influence area. Also, better collection and disposal of solid waste may aggravate the environmental condition surrounding the disposal location; such areas should therefore be considered as sub-project influence for a SWM project. Similarly, for a water supply pipeline sub-project, the routes along which of the water distribution lines would be laid and the immediate surrounding areas are likely to experience impact of the sub-project activities, and should be considered as sub-project influence area. Table 4 provides general guidelines for identification of influence area for different types of sub-projects to be implemented under the MGSP.

Table 4: Guidelines for identifying influence area for different types of sub-projects

Sub-project	Influence Area
Local roads	Areas and communities on either side of the road, who are users of the road and who are likely to be affected during construction of the road; Entire road length up to the major intersections at either end of the road, including the drainage network (if any) along the road[1].
Pedestrian Bridge	Areas and communities within about half a kilometer surrounding the proposed bridge location.
Storm Drain	Areas and communities on either side of the drain alignment (i.e., catchment area of the drain section); Downstream section of the drain up to the discharge point[2]; Discharge point (water body; e.g., river, khal, another major drain).
Bus Terminal	Areas and communities within about one kilometer surrounding the proposed location of the bus terminal.
Truck Terminal	Areas and communities within about one kilometer surrounding the proposed location of the truck terminal.
Community Center	Areas and communities within about one kilometer surrounding the proposed location of the community center.
Office Building Complex	Areas and communities within about one kilometer surrounding the proposed location of the building complex.
Park	Areas and communities within about one kilometer surrounding the proposed location of the park.
Kitchen Market	Areas and communities within about one kilometer surrounding the proposed location of the kitchen market.
Cattle Market	Areas and communities within about one kilometer surrounding the

Sub-project	Influence Area
	proposed location of the cattle market.
Slaughter House	Areas and communities within about one kilometer surrounding the proposed location of the slaughter house.
Public Toilet	Areas and communities within about one kilometer surrounding the proposed location of the public toilet.
Sweeper Colony	Areas and communities within about one kilometer surrounding the proposed location of sweeper colony.
Bridge (< 30 m)	Areas on either side of the river covering areas about one km upstream and downstream of bridge location (including major roads/ intersection on either side that would be connected by the bridge); The river/ channel itself about half a kilometer upstream and downstream of the bridge location.
Box Culvert	Areas and communities within about one kilometer surrounding the proposed location of box-culvert; The channel/ khal itself about half a kilometer upstream and downstream of the box-culvert location.
Retaining Wall	Areas and communities within about one kilometer surrounding the proposed location of retaining wall.
Boat Landing Jetty	Areas and communities within about half kilometer of the proposed location of boat landing jetty (including roads/ intersection leading to the proposed jetty); The river/ channel itself about half a kilometer upstream and downstream of the proposed jetty location.
Street Light	Entire street length up to major intersections at either end of street
Traffic Control	Entire road length up to the major intersections at either end of the road, where traffic control sub-project would be implemented.
Solid Waste Management (trash bins, carts, tractor/trailers)[1]	Areas (e.g., markets, communities) where trash bins/ carts would be installed; The entire route of transportation of the collected solid waste from the point of generation/ collection to the points/locations of ultimate disposal[3]; Areas within about half a kilometer surrounding the points/ locations of ultimate disposal.
Water Supply System (OH tank, water distribution lines)	Areas and communities within about one kilometer surrounding the proposed location of bus terminal; Routes along which of the water distribution lines would be laid, and its surrounding areas.

1 It has been found that condition of road is intricately related to drainage; without proper drainage, roads become inundated and deteriorate quickly (especially when used by heavy vehicles).

2 Discontinuity in storm drain network appears to be common in ULBs; drains are often not constructed up to discharge point, and drains just carry storm water from one area to another without solving water logging problem. Also, storm drains are found to be filled with debris/ solid wastes dumped by the local residents.

3 Most ULBs do not have landfill/ dump site for disposal of solid waste; solid wastes are typically disposed in selected low-lying areas.

Note: For major projects (e.g., roads, bridge, drains, water supply system, bus/ truck terminal, community center) the routes of transportation of material/ equipment to the sub-project site should also be included under influence area

3.7.2Environmental Baseline

95. For proper environmental assessment (as a part of IEE and EIA), it is very important to adequately define the "environmental baseline" against which environmental impacts of a particular sub-project would be subsequently evaluated. The characteristics of "environmental baseline" would depend on:

- Nature of the sub-project location,
- Nature/ extent of a sub-project and its likely impact,
- Level of environmental assessment (e.g., screening versus full scale EIA)

96. For example, ambient air quality and noise level are important parameters for describing baseline scenario for sub-projects like road or bridge construction, because these parameters are likely to be impacted by the project works. However, these parameters are not likely to be important for sub-projects like "traffic control", "street light" or "public toilet". Similarly, ecological parameters (e.g., diversity of flora and fauna) are not likely to be critical for a sub-project to be carried out within an urban setting (e.g., local road through commercial area of a Pourashava); but these could be important for a sub-project like bridge construction, where aquatic floral and faunal habitat could be impacted by the sub-project activities. Obviously the depth of baseline information required for "environmental screening" at UBL-level or for a "green" category sub-project would be significantly different from those required for environmental assessment (as a part of IEE or EIA) of an "orange B" category sub-project.

97. For systematic definition and recording, the baseline environment is usually classified into Physicochemical environment, biological environment, and socio-economic environment; and important features/parameters under each category are identified and measured/ recorded during baseline survey. As noted above, the important features/ parameters would depend on the nature of sub-project location, category of sub-project, and level of environmental assessment. The following sections provide guideline on identification of important features/parameters and collection of sub-project specific environmental baseline data.

3.7.2.1 Physicochemical environment

98. The important Physicochemical parameters for defining baseline include:

- Important Environmental Features (IEFs),
- Climate,
- Topography and drainage,
- Geology and soil,
- Hydrology and water resources,
- Air quality,
- Noise level,
- Water quality, and
- Traffic

IEFs and Maps:

99. Typical Important Environmental Features (IEFs) include human settlements, educational institutions (school, college, madrassa, university), health care facilities (hospitals, clinics), commercial/ recreational establishments (markets, restaurants, parks, offices), religious establishments (mosques, temples, churches), major utility infrastructure (water/ wastewater treatment plants, water mains, sewers, power plants, sub-station, gas/ electricity transmission/ distribution lines), landfills, major ponds/ khals and rivers, and historical archaeological establishments, ecologically critical area (ECA), wildlife sanctuary, game reserve, protected area, and national park.

100. Under most circumstances, it is sufficient to identify IEFs within the sub-project influence area (see Section 4.6.1), based on a survey covering the sub-project influence area (see Table 2). All the sub-projects to be implemented under the MGSP could be categorized as small- to medium scale, and have relatively small influence area. Therefore, the IEFs within the sub-project influence area could be identified through a quick physical survey. It should be noted that many of the IEFs present in the Pourashava/ CC (e.g., historical/ archaeological sites, wildlife sanctuary, and national park) should already be identified and recorded in the Pourashava/ CC map or documents. These maps and documents should be utilized during identification of IEFs. For carrying out detailed environmental assessment (IEE or EIA), it may be necessary to identify the IEFs through a detailed survey and record their positions (GPS coordinates).

101. The sub-project layout and the identified IEFs within the sub-project influence area should be presented in a suitable map. For this purpose, the GIS maps (e.g., land-use maps) of ULBs available at LGED could be used; the sub-project layout and IEF locations should be superimposed in this map. Maps available at the ULBs could also be used for this purpose.

Climate:

102. It is important to have a general idea about the climate of the area where the sub-project would be implemented. Important climatic parameters include precipitation, temperature, relative humidity, wind speed and direction. These data should be collected from secondary sources (e.g., from the nearest station of Bangladesh Meteorological Department, BMD). It has been found that climatic data from 11 meteorological stations would be required to characterize climate of the 26 ULBs where the sub-projects will be implemented by the LGED. In fact, the required climatic data have already been collected from the Bangladesh Meteorological Department (BMD) and presented in the “overall environmental assessment” report. These climatic data could be readily used for environmental assessment of any sub-project, as required. Climatic data (mentioned above) for the ULBs not covered by these 11 meteorological stations should be collected from the BMD. The format used in the “overall environmental assessment” may be followed for presentation of climatic data.

Topography and drainage:

103. Data and information on topography are very important for the design of certain sub-projects, such as road, drain, and water distribution line. For example, it is important to know whether the area where the road would be constructed suffers from water-logging or

inundation problems, which could rapidly deteriorate the road condition. For the design of these sub-projects, it may be necessary to carry out topographic survey in the sub-project area. However, for environmental assessment (IEE and EIA), secondary information on topography and drainage should be sufficient. The format used in the "overall environmental assessment" could be followed for presentation of necessary data/ information on topography/ drainage.

Geology and soil:

104. Characteristics of soil could be important if a particular sub-project involves significant excavation/ earthworks, because wind-blown dust from these activities could contribute to air pollution. In such cases, characteristics of soils (particularly heavy metal content) are often determined as a part of baseline survey. However, considering the nature and scale of the sub-projects to be implemented under the MGSP, geology and soil characteristics do not appear to be critical for environmental assessment. The format used in the "overall environmental assessment" could be followed for presentation of general data/ information on geology and soil.

Hydrology and water resources:

105. For the design of some sub-projects such as storm drain, bridge, box culvert, boat landing jetty, information such as water level/ highest flood level are very important. In general, information on highest flood level is also an important design consideration for most sub-project types. Information on water resources is important in the design of water supply system. For environmental assessment (IEE and EIA), information on hydrology (e.g., river network, flow, highest water level) and water resources (e.g., discharge, groundwater level) may be collected from secondary sources (e.g., from Bangladesh Water Development Board, BWDB). The format used in the "overall environmental assessment" could be followed for presentation of necessary data/ information on hydrology and water resources.

Air quality:

106. Data on ambient air quality is not likely to be available for any of the ULBs covered under the MGS project. Particulate matter (particularly PM_{10} and $PM_{2.5}$) is the most important air quality parameter from health perspective. However, measurement of air quality is relatively expensive and facilities for air quality measurement are not widely available. Therefore, baseline air quality data (PM) should be collected only for carrying out detailed environmental assessment (IEE/ EIA) and only for sub-projects that could aggravate air quality significantly (see Table 3).

107. Air pollution is likely to be generated from operation of machines/ equipment (e.g., concrete mixers, generators), open asphalt burning, movement of sub-project vehicles to and from sub-project site, and earth works (excavation and filling). The extent/ scale of the sub-project is also an important consideration in this case. The sub-projects which could result in deterioration of air quality include road (due to asphalt/bitumen burning, earth works), bridge, box-culvert, bus/ truck terminals, office building complex and community center (due to increased vehicular movement, and possible use of heavy equipment/ machines). Particulate matter concentration (SPM/ PM_{10}/ $PM_{2.5}$) should be measured under baseline survey for

carrying out IEE/ EIA for these sub-projects (by the consultant engaged for this purpose). Considering the physical extent of the sub-projects and based on an understanding of the baseline situation from field visits to 12 ULBs, it appears that air quality (PM) measurement at a single point should be sufficient for characterization of baseline air quality.

Noise level:

108. Noise is typically generated from operation of machines and equipment (e.g., pile drivers, excavators, concrete mixing machine), and movement of sub-project vehicles. Noise is of particular importance if the sub-project is located close to sensitive installations such as educational institutions, health care facilities, religious establishments, and human settlements. Activities to be carried out during construction phase of many sub-projects would generate noise. For these sub-projects, baseline noise level should be measured and recorded, so that these could be compared with those generated during construction/ operation phase of the sub-projects. The location and frequency of baseline noise level measurements would depend on physical extent of project, and presence of sensitive installations within sub-project influence area, as noted above. The consultant engaged for carrying out IEE/ EIA should be responsible for measurement of baseline noise level at location(s) within the sub-project influence area. Both day-time and night-time noise levels should be measured, using a calibrated noise level meter.

Water quality:

109. A number of sub-projects are likely to have impacts on water quality. These include drain (impact of drainage water on receiving water body), municipal/kitchen/cattle markets, slaughter house (effect of drainage water from these establishments on receiving water bodies), bridge, box culvert, and boat landing jetty (effect of construction activities on water quality of river/ channel). For these sub-projects, baseline water quality of the relevant water body (as well as characteristics of drainage water for "drain" sub-project) should be measured, as a part of baseline survey (by the consultant engaged for carrying out IEE/EIA).

110. With respect to water quality, the dry season is the critical period, and hence water samples for water quality characterization should be collected during the dry season. Important water quality parameters include pH, TDS, TSS, ammonia, nitrate, phosphate, BOD_5, and COD. If industrial installations are present within an ULB, color and selected heavy metals (depending on the type of industrial installation present at the ULB) should also be measured.

Traffic:

111. Information on road traffic is important for environmental assessment (as well as design) of a number of sub-projects such as road, pedestrian bridge, street light, traffic control, bus terminal, truck terminal, kitchen/ cattle market; community center, bridge and box-culvert. Information on water transport is important for bridge, box culvert and boat landing jetty sub-projects. For these sub-projects, it would be necessary to collect traffic data from primary survey, as a part of carrying out IEE/EIA (by the consultant engaged for this purpose); both number and composition of traffic are important. For other sub-projects, traffic data are not critical.

112. Table 5 presents guidelines for collection of primary and secondary data on Physicochemical environmental parameters for different types of sub-projects to be implemented under the MGSP.

Table 5: Guidelines for collection of sub-project specific Physicochemical data/ information

Sub-project	Data/ information from secondary source	Data from primary survey/ measurement
Local roads	IEFs; Climate; Geology and soil; Hydrology and water resources; Topography and drainage	IEFs; Traffic
Pedestrian Bridge	IEFs; Climate; Topography and drainage; Geology and soil; Hydrology and water resources	IEFs, Noise level, Traffic
Storm Drain	IEFs; Climate; Geology and soil; Hydrology and water resources; Topography and drainage	IEFs; Noise level; Water quality (water bodies receiving drainage water)
Bus Terminal and Truck Terminal	IEFs; Climate; Geology and soil; Topography and drainage; Hydrology and water resources	IEFs; Air quality; Noise level; Traffic
Community Center; Office Building Complex; Park	IEFs; Climate; Geology and soil; Topography and drainage; Hydrology and water resources	IEFs; Noise level; Traffic
Municipal/Kitchen Market; Cattle Market; Slaughter House	IEFs; Climate; Geology and soil; Topography and drainage; Hydrology and water resources	IEFs; Air quality; Noise level; Traffic; Water quality (water bodies receiving waste water)
Sweeper Colony	IEFs; Climate; Geology and soil; Topography and drainage; Hydrology and water resources	IEFs; Air quality; Noise level
Bridge; Box culvert; Boat landing jetty	IEFs; Climate; Geology and soil; Hydrology and water resources	IEFs; Air quality; Noise level; Traffic; Water quality
Retaining Wall	IEFs; Climate; Geology and soil; Topography and drainage; Hydrology and water resources	Air quality; Noise level
Solid Waste Management (trash bins, carts, tractor/trailers)	IEFs; Climate; Geology and soil; Topography and drainage; Hydrology and water resources	IEFs; Noise level
Water Supply System (Tubewell, OH tank, water distribution lines)	IEFs; Climate; Geology and soil; Topography and drainage; Hydrology and water resources	IEFs; Noise level

3.7.2.2 Biological environment

113. Important parameters for description of biological environment include:

- General bio-ecological features of the sub-project area and its surroundings (e.g., bio-ecological zone, rivers, wetlands, hills, agricultural lands)

- Wildlife sanctuary, protected area, park, ecologically critical area (ECA)
- Floral habitat and diversity (terrestrial and aquatic)
- Faunal (including fish) habitat and diversity (terrestrial and aquatic)
- Threatened flora and fauna

114. It should be noted that most of the sub-projects to be carried out under MGSP are likely to have minor ecological impacts. In most cases, the most significant direct impact would result from felling/cutting of trees/plants within the sub-project area. A number of sub-projects could result in water pollution and as such impact aquatic fauna including fish. Most of the sub-projects are not likely to have any significant ecological impacts, and for such sub-projects general bio-ecological description of the sub-project area would be sufficient for description of baseline biological environment. It should be noted that such bio-ecological descriptions have already been developed for the 12 ULBs visited as a part of this study. These descriptions could be readily used for environmental assessment of any sub-project at these ULBs; similar description should be developed for other ULBs, as required. For a few sub-projects (see Table 6), a more detailed description of biological environment would be necessary for environmental assessment. Table 6 provides guidelines for collection and presentation of data for biological environment for different sub-projects to be implemented under the MGSP.

Table 6: Guidelines for collection of sub-project specific data/information for describing biological environment

Sub-project	Data/information from secondary source	Data from primary survey/ measurement
Roads; Pedestrian Bridge; Bus and Truck Terminals; Community Center; Office Building Complex; Park; Public Toilet; Sweeper colony; Retaining wall; Street Light; Traffic control; Solid waste management; Water supply system; Municipal/Kitchen Market; Cattle Market; Slaughter House	General bio-ecological features, Wildlife sanctuary, ECA etc.	Number of trees to be felled; Area of be cleared of vegetation
Storm Drain	General bio-ecological features, Wildlife sanctuary, ECA etc.	Floral and faunal diversity; (focusing on the water bodies receiving drain's water)
Bridge, Box culvert; Boat landing jetty	General bio-ecological features, Wildlife sanctuary, ECA etc.	Floral and faunal diversity; Endangered and threatened species.

3.7.2.3 Socio-economic environment

115. A separate management framework has been developed for social impact assessment (SIA) of the MGSP. Therefore, the socio-economic baseline should be established following the social management framework (SMF) of MGSP. This Section provides a brief overview of the important aspects of socio-economic baseline. For major sub-projects (e.g., road, drain, bus/

truck terminal, park), it is important to have a clear understanding to the baseline socio-economic condition of people, especially those living within the sub-project influence areas. A common approach for quick assessment of baseline socio-economic condition is questionnaire survey. The primary objectives of a questionnaire survey are:

(a) to understand people's socio-economic condition;
(b) to understand extent of people's access to basic services; and
(c) to understand people's perception regarding the sub-project.

The questionnaire used for socio-economic survey may therefore cover five major themes:

(a) Socio-economic background
(b) Basic services
(c) Education
(d) Economic situation, and
(e) Attitude toward the proposed sub-project.

3.7.3 Identification of Major Sub-project Activities

116. In order to assess environmental impacts of sub-projects, it is very import to identify the major sub-project activities during both construction and operational phases. The major activities would be different for different sub-projects. It should be noted that based on feasibility study of the MGSP and field visits carried out, it appears that no significant private land acquisition would be required for any of the sub-projects to be carried out in the ULBs. Hence, land acquisition is not likely to be a sub-project activity.

117. A common sub-project activity is mobilization of material and equipment and establishment of labor shed for carrying out the construction works. The actual construction activities would be different for different types of sub-projects. For example, the major construction activities for a RCC storm drain sub-project would include earth works (excavation and removal of excavated soil), in-situ RCC drain construction, fabrication of RCC cover slab for drains, connecting the storm drain with house storm lines and other lateral storm lines, commissioning and testing of drain functions, and dismantling and removing all temporary structures (e.g., labor sheds), material and equipment from the site. During operational phase, important issues would include maintenance of drain (especially ensuring that is it not obstructed by solid wastes, and does not receive direct toilet wastewater), and discharge of the drainage flow into the receiving water body (e.g., khal/ river). Similarly, major activities during construction and operational phases of other sub-projects should be identified to assess their impacts on the baseline environment.

3.7.4 Assessment and Prediction of Impacts

3.7.4.1 Potential Significant Environmental Impacts during Construction Phase

118. After identification of the sub-project activities during construction phase, the next step in the IEE/EIA involves assessment/prediction of the impacts of these activities on the baseline environment. The potential environmental impacts during construction phase of sub-projects could be categorized into: (a) ecological impacts; (b) physic-chemical impacts; and (c) socio-economic impacts.

Ecological impacts:

119. Based on primary assessment of the nature and scale of the proposed sub-projects and assessment of sub-project locations (based on field visits), it appears that ecological impacts are not likely to be significant for most of the proposed sub-projects. However, for a few sub-projects the significance of ecological impacts needs to be assessed. These sub-projects include: (i) bridge, (ii) box culvert, and (iii) boat landing jetty. In all these cases, the assessment should focus primarily on the water quality.

In general, the ecological impact should focus on:

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

120. Commonly, 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.

121. Table E-1 of **Appendix E** (Criteria for assessment of ecological impacts) presents the criteria for estimating "consequence" of any particular "sub-project" activity. As shown in Table E-1, for adverse/ negative 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.

122. Table E-2 of **Appendix E** 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").

123. 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:

$$Significance = Consequence \times Likelihood$$

124. Table7 shows "significance" ranking of ecological impacts and Table 8 shows a risk assessment matrix that could be used for estimating "significance" and "risk", respectively of ecological impacts for a particular sub-project activity. Table E-3 of **Appendix E** presents examples of estimating ecological impacts of some typical sub-project activities.

Table 7: Ecological impact significance rankings

Significance (Consequence × Likelihood)	Significance Level
>16	Critical
9-16	High
6-8	Medium
2-5	Low
<2	Negligible

Table 8: Risk assessment matrix

Likelihood / Frequency	Consequence Severity				
	Low	Minor	Moderate	Major	Critical
Almost certain	High	High	Extreme	Extreme	Extreme
Very Likely	Moderate	High	High	Extreme	Extreme
Likely	Low	Moderate	High	Extreme	Extreme
Unlikely	Low	Low	Moderate	High	Extreme
Very Unlikely	Low	Low	Moderate	High	High

Example: A bus terminal will be constructed near a tree planted area. The construction activity unlikely occur the 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 (Table 7) and the Risk is Low (Table 8)

Physicochemical impacts:

Possible Physicochemical impacts from the sub-project activities to be carried out in different ULBs may include the following:

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

Drainage congestion:

125. During execution of civil engineering projects, temporary drainage congestion often results from obstruction to 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. Such drainage congestions could create significant discomfort to people living in sub-project areas.

Noise pollution:

126. Noise pollution could results from a wide range of construction activities, including movement of vehicles (carrying equipment/material to and from site), operation of construction equipment and generators. 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. Such noise may cause discomfort to the people living in the surrounding areas at close proximity of the sub-project site, especially if such activities are continued during the night. Noise pollution is particularly important for sensitive establishment e.g., hospitals, educational/religious institutions.

127. Among noise generating activities, operation of pile drivers produces the most significant noise. 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. However, noise modeling should be considered only for sub-projects that involve use of heavy equipment like pile drivers, bulldozers etc. and require a full-scale EIA.

Air pollution:

128. During construction phase, air pollution may 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. Sub-projects that could generate appreciable air pollution include road, drain, bridge, culvert, bus/truck terminal, community center, and sweeper colony). For the sub-projects to be implemented under the MGSP, adverse impacts of air pollution are likely to be limited to the areas surrounding the sub-project sites.

Water pollution:

129. Water pollution may result from discharge of wastewater (e.g., liquid waste from labor sheds), spills and leaks of oils/ chemical into nearby water bodies (e.g., drain, pond, khal, drain, river). For bridge, culvert and boat landing jetty sub-projects, construction activities would be carried out on water bodies; hence these sub-projects are more likely to generate water pollution. For other sub-projects, the presence and existing use of water bodies surrounding the sub-project site would determine the level of impact. For example, if a pond located close to a sub-project site is used for washing/ bathing or for fish culture, pollution of the pond from sub-project activities would generate significant adverse impacts.

Environmental pollution from solid/ construction waste:

130. In many sub-projects, considerable construction debris (e.g., demolition of existing structures) is likely to be generated from different sub-project activities. Solid wastes will also be generated from labor sheds, particularly for labor-intensive sub-projects. Improper management of construction debris and solid waste could cause blockage of drainage line/ path and environmental pollution.

Socio-economic impacts:

131. The social assessment of the MGSP (carried out separately) presents detail discussions on socio-economic impacts, and also presents a social management framework. This Section

provides an overview of the possible major socio-economic impacts of the MGSP during 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 in different ULBs under MGSP may include the following:

- loss of land,
- loss of income and displacement,
- traffic congestion,
- impact on top soil,
- health and safety,
- employment and commercial activities,
- impact on archaeological and historical sites, and safeguarding physical cultural resources (PCR), and

Loss of land:

132. Acquisition of private land is often necessary for implementation of projects, and loss of land is one of the most significant socio-economic impacts. However, based on feasibility study of MGSP and field visits carried out so far, it appears that significant land acquisition will not be required for any of the sub-projects to be implemented in different ULBs. Many of the sub-projects involve rehabilitation/improvement/expansion of existing infrastructure/facilities, and sub-projects involving new construction would be carried out in government/ ULB owned land. Therefore loss of land is not likely to be an issue of concern for the proposed MGSP. However, if significant land acquisition becomes necessary for implementation of any sub-project, the issue should be addressed in light of the Government regulations and relevant WB operational guideline OP 4.12: Involuntary Resettlement (World Bank, 2001), following the framework developed for social impact assessment (SIA) of MGSP.

Loss of income and displacement:

133. Loss of income may result from inability to use a particular piece of land/establishment (e.g., footpaths) during the construction phase for income generation activity. Some of the proposed sub-projects may cause temporary displacement of people. For example, during construction/rehabilitation of a section of road or drain, road-side vendors or small temporary shops on footpaths may not be able to operate for a period of time. However, considering the extent and scale of the 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. Nonetheless, such impacts should be carefully assessed following the framework developed for social impact assessment (SIA) of MGSP.

Traffic congestion:

134. During construction phase of sub-projects, traffic congestion may result from stock piling of material by the sides of roads, increased movement of people and vehicles carrying material and equipment. Field visits carried out reveal that traffic congestion is a major problem in most ULBs. Some of the sub-projects, such as road and drain, may aggravate the

existing traffic problem during construction phase. This should be addressed with proper traffic management, and avoiding stockpiling of materials in a way that could hamper traffic movement.

Impact on top soil:

135. For sub-projects involving significant excavation (e.g., new storm drain, installation of underground water supply pipeline), conservation of top soil is an important issue. Utmost care should be taken to protect the topsoil (and thus maintain soil fertility) during excavation and backfilling. 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.

Health and safety:

136. Safety is an important issue during construction phase. General construction activities pose safety risks, which should be addressed as part of occupational health and safety plan. Section 3.11 provides guideline on occupational health and safety issues.

Employment and Commercial Activities:

137. During construction phase, some beneficial impact at local level would come in the form of employment in sub-project related works, which would depend on the nature and extent of the sub-project. For example, labor-intensive sub-project works (e.g., manual excavation) could generate employment for considerable number semi-skilled workforce. This in turn would induce some positive impacts on some other parameters including commercial activities in the sub-project areas.

Impact on archeological and historical sites:

138. Archeological and historical sites are protected resources. Damage of such sites by digging, crushing by heavy equipment, uprooting trees, exposing sites to erosion, or by making the sites more accessible to vandals are of particular concern. While there are archaeological and historical sites at many of the 12 ULBs visited, none of these would be directly affected by the sub-project activities. A guideline for archaeological impact assessment is presented in **Appendix F**.

Safeguarding physical cultural resources (PCR):

139. Since the exact locations of the sub-projects to be implemented under MGSP are not known at this moment, 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 G.** The likely impacts to PCR for typical activities of the sub-projects are also discussed in Appendix G. The “Chance Find” procedure for protection of cultural property is presented in **Appendix H**, following the World Bank Operational Policy OP 4.11 (Physical cultural resources).

3.7.4.2 Potential Significant Environmental Impacts during Operational Phase

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

Ecological impacts:

During operational phase, the possible impact of the sub-project activities on the biological environment would be insignificant, except for a couple of sub-projects. These include: (a) storm drain; and (b) boat landing jetty.

141. As explained earlier, 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 thus adversely affect aquatic flora, fauna and associated terrestrial fauna. Similarly, discharge of oil (from engine driven boats) and other wastes at the boat landing jetty could cause pollution of the river/khal, thereby affecting the aquatic ecology. Monitoring of water quality (for river/khal) is therefore necessary to detect possible adverse ecological at an early stage.

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:

142. The proposed sub-projects involving construction and rehabilitation of storm drains are likely to bring about improvement in the drainage condition in the sub-project areas, which is a major problem in many ULBs. However, blockage of the drains (e.g., by solid wastes due to improper maintenance) could aggravate drainage problem. Better management of solid waste could significantly facilitate the maintenance of storm drains.

Water quality:

143. For particularly two sub-projects, possible pollution of water body (rivers/ khals) is an important issue during operational phase; these are storm drain and boat landing jetty. As discussed above, poor quality of drainage water (e.g., due to direct discharge of toilet wastewater into storm drain) could cause pollution of the final receiving water body; discharge of oil (from engine driven boats) and other wastes could cause pollution of the river/ khal.

144. A number of sub-projects are likely to contribute to the betterment of water quality (and environment in general) through proper management of wastewater. These include public toilet, slaughter house, and properly operated kitchen market and cattle market.

Air quality and noise level:

145. During operational phase, vehicular movement would be the principal sources of air pollutants and noise. However, majority of the proposed road sub-projects involve rehabilitation, improvement and expansion of existing roads. Therefore in many cases, risk of air pollution (i.e., particulate pollution) would be reduced due to paving of the existing unpaved roads. However, increased movement of vehicles through roads, bridges, culverts to be constructed under the MGSP could generate higher air and noise pollution. Also, increased movement of people and vehicles surrounding public places like kitchen market, cattle market, and community center could generate higher noise and air pollution.

Environmental pollution from solid waste:

146. Implementation of the sub-project involving solid waste management (supply of bins, carts etc.) would significantly improve overall environmental condition and reduce the risk of clogging of drains by solid waste. However, lack of solid waste disposal facility at the ULBs is a concern.

Socio-economic impacts:

147. As noted earlier, the social assessment of the MGSP (carried out separately) presents detail discussions on socio-economic impacts, and also presents a social management framework. This Section provides an overview of the possible major socio-economic impacts of the MGSP during operational phase. The MGS project is aimed at bringing about improvement in the socio-economic conditions of the ULBs through improvement of basic infrastructure. Thus, implementation of the proposed sub-projects is likely to bring about significant improvement in the overall environmental and socio-economic conditions at the ULBs. Important 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 and commercial activities,

Traffic improvement:

148. Implementation of a number of sub-projects is likely to bring about significant improvement in the traffic situation at the ULBs. These include construction of roads, bridges, box culverts, pedestrian bridge, street light, traffic control measures, bus terminal and truck terminal, and boat landing jetty. However, efforts should be made to properly manage traffic surrounding kitchen market, cattle market, and community center, so that these places public congregation do not aggravate the traffic situation.

Public health and safety:

149. The proposed sub-projects are also likely to bring about significant positive impact on the public health and safety through improvement of general environment and enhancement

of public utility services. The important sub-projects in this regard are drain, kitchen market and cattle market, park, pedestrian bridge, public toilet, slaughter house, solid waste management and water supply system.

Employment and commercial activities:

150. A number of basic infrastructures to be developed under the MGSP are likely to generate opportunity for employment and expansion of commercial activities. These include kitchen market, cattle market, bus and truck terminal, road, bridge and culvert.

3.8 Environmental Management Plan (EMP)

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

152. The EMP should clearly lay out: (a) the measures to be taken during both construction and operation phases of a sub-project to eliminate or offset adverse environmental impacts, or reduce them to acceptable levels; (b) the actions needed to implement these measures; and (c) a monitoring plan to assess the effectiveness of the mitigation measures employed.

153. The environmental management program should be carried out as an integrated part of the project planning and execution. It must not be seen merely as an activity limited to monitoring and regulating activities against a pre-determined checklist of required actions. Rather it must interact dynamically as a sub-project implementation proceeds, dealing flexibly with environmental impacts, both expected and unexpected. For all sub-projects to be implemented under MGSP, 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
- Institutional arrangement for implementation of EMP

154. In addition, third party monitoring of environmental management, establishment of Environmental Management Information System (EMIS), Special Environmental Clauses (SECs) for inclusion in the bidding document, and training requirements for institutional strengthening have been presented separately in the EMF (Sections 3.12 through 3.16).

3.8.1 Mitigation and Enhancement Measures

Construction Phase:

155. The overall impact assessment of the proposed sub-projects to be implemented at the ULBs 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 standard mitigation and enhancement measures that could be applied to the sub-project under MGSP.

156. In order to identify mitigation/enhancement measures, the potential impacts have been categorized into: (a) "general impacts", which are typical common impacts to be experienced in most sub-projects, and (b) "sub-project specific impacts". Table 8 shows typical activities to be carried out under different sub-projects, corresponding "general impacts" and suggested mitigation and enhancement measures. It also assigns responsibility for implementation of mitigation and enhancement measures. Obviously all sub-projects would not generate all the impacts listed in Table 9 at the same level/magnitude. Table 9 provides general guidelines of mitigation and enhancement measures for the most significant "general impacts". Table 10 shows "sub-project specific" impacts and corresponding mitigation/enhancement measures. In devising the mitigation/enhancement measures, the environmental assessment guideline of LGED (LGED, 2008) has been extensively consulted.

Operational Phase:

157. During the operational phase, the ULBs will be responsible for the operation and maintenance of the infrastructure to be developed under the MGSP. Apart from regular operation and maintenance, a number of issues would require special attention for reducing/ avoiding possible adverse environmental impacts. These include regular maintenance and management of storm drains, and proper operation of boat landing jetty to reduce risk of water pollution; and proper operation and management of municipal/kitchen/cattle market/slaughter house because of their potential implications on health and environment.

158. With respect to 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 that 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. Improper management of boat landing jetty (e.g., disposal of spent oil and other wastes) would also lead to water pollution and associated adverse impacts (including adverse ecological impacts).

159. Disposal of solid and other 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.

160. Increased risks of accidents have been observed at some of the ULBs visited after construction of a new road. Such risks could often be minimized by proper management of traffic and pedestrian movement. Movement of heavy vehicles (loaded trucks) in local roads is a common cause of road damage at many ULBs visited. Table 11 shows some important sub-project specific impacts during operational phase and corresponding mitigation measures.

Table 9: Typical "general impacts" during construction phase of sub-projects and corresponding mitigation and enhancement measures

Activity/Issues	Potential Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
Construction and operation of labor shed for workers	• Generation of sewage and solid waste; water/ environmental pollution	• Construction of sanitary latrine/ septic tank system. • Erection of "no litter" sign, provision of waste bins/cans, where appropriate • Proper disposal of solid waste	Contractor (Monitoring by ULB/LGED/BMDF)
	• Health of workers	• Raising awareness about hygiene practices among workers. • Availability and access to first-aid equipment and medical supplies	
	• Possible development of labor camp into permanent settlement	• Contractor to remove labor camp at the completion of contract	
	• Outside labor force causing negative impact on health and social well-being of local people	• Contractor to employ local work force, where appropriate; promote health, sanitation and road safety awareness	
General construction works for sub-projects	• Drainage congestion and flooding	• Provision for adequate drainage of storm water • Provision of adequate diversion channel, if required • Provision for pumping of congested water, if needed • Ensure adequate monitoring of drainage effects, especially if construction works are carried out during the wet season.	Contractor (Monitoring by ULB/ LGED/BMDF)
	• Air pollution	• Ensure that all project vehicles are in good operating condition. • Spray water on dry surfaces/ unpaved roads regularly to reduce dust generation. • Maintain adequate moisture content of soil during transportation, compaction and handling. • Sprinkle and cover stockpiles of loose materials (e.g., fine aggregates). • Avoid use of equipment such as stone crushers at site, which produce significant amount of particulate matter.	
	• Traffic congestion, traffic problems	• Schedule deliveries of material/ equipment during off-peak hours. • Selection of alternative routes, where possible for sub-project vehicles • Depute flagman for traffic control • Arrange for signal light at night	

Activity/Issues	Potential Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
	• Noise pollution	• Use of noise suppressors and mufflers in heavy construction equipment. • Avoid using of construction equipment producing excessive noise at night. • Avoid prolonged exposure to noise (produced by equipment) by workers. • Regulate use of horns and avoid use of hydraulic horns in project vehicles.	
	• Water and soil pollution	• Prevent discharge of fuel, lubricants, chemicals, and wastes into adjacent rivers/ khals/ drains. • Install sediment basins to trap sediments in storm water prior to discharge to surface water.	
	Felling of trees, clearing of vegetation	• Replant vegetation when soils have been exposed or disturbed. • Plantation to replace felled trees	
	• Accidents	• Following standard safety protocol. • Environmental health and safety briefing. • Provision of protective gear.	
	• Spills and leaks of oil, toxic chemicals	• Good housekeeping. • Proper handling of lubricating oil and fuel. • Collection, proper treatment, and disposal of spills.	
All construction works	• Beneficial impact on employment generation	• Employ local people in the project activities as much as possible. • Give priority to poor people living in slums within project area in sub-project related works (e.g., excavation and other works, which do not require skilled manpower).	Contractor (Monitoring by ULB)
	• General degradation of environment	• Environmental enhancement measures, such as plantation, landscaping, traffic/ direction signs, boundary wall for road-side educational/ religious institutions (where appropriate)	

Table 10: "Sub-project specific impacts" during construction phase and corresponding mitigation measures

Activity/Issues	Potential Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
Road Sub-project			
Setting up and operation of asphalt plant and bitumen preparation area	• Air and noise pollution affecting nearby settlements	• Locate plant away from residential settlements • Consider use of emulsified bitumen	Contractor (Monitoring by ULB/LGED/BMDF)
	• Possible water pollution (surface and groundwater) by bitumen and solvents	• Avoid spills; surround plant area with a ditch with a settling pond/ oil trap at the outlet	
	• Cutting down trees to use a fuel wood for heating bitumen	• Strictly prohibit use of fuel wood for heating bitumen	
Road construction	• Effect on traffic and pedestrian safety • Water pollution from bituminous products/ solvents	• Employ traffic control measures and limit possible disruption to non-construction traffic • Strict control to avoid spills; provision for adequate clean up	
	• Discovery of historical items and cultural remains	• Follow "chance find procedure" (see Appendix H) for protection of cultural resources	LGED/BMDF, with support from Contractor, ULB
Drain Sub-project			
Excavation/ Earth works	• Erosion	• Limit earthworks to the dry season as much as possible; protect exposed earthworks with mulch, fabric and plant cover	Contractor (Monitoring by ULB/ LGED/ BMDF)
	• Unsightly spoil disposal from drain excavation by simple side tipping, affecting drainage/ runoff	• Disposal of soil to designated tipping areas	
	• Possible backflow of water through drainage canal causing flooding/ water logging	• Consider installing gates to control inflow and outflow through drainage canal	
	Discovery of historical items and cultural remains	• Follow "chance find procedure" (see Appendix H) for protection of cultural resources	LGED/ BMDF, with support from

Activity/Issues	Potential Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
			Contractor, ULB
Bridge, Box-culvert, Boat Landing Jetty Sub-projects			
Construction activities within/ near water	• Ecological impacts including destruction of aquatic habitat	• Prevent discharge of fuel, lubricants, chemicals, and wastes into surface waters. • Preservation of aquatic habitats by restricting movement of people/ equipment into them, and preventing entry of sediments into these water bodies. • Keep noise level (e.g., from equipment) to a minimum level, as certain fauna are very sensitive to loud noise.	Contractor (Monitoring by ULB/LGED/BMDF)
Building complex, Sweeper colony, Community center, Markets, Slaughter house, Public toilets, Bus/ Truck terminal			
Construction of wastewater/ sewage disposal system	• Groundwater pollution due to discharge of wastewater/ effluent in deep soakage well	• Restrict construction of deep soakage well	LGED/BMDF, with support from Contractor, ULB

Table 11: "Sub-project specific impacts" during operational phase and corresponding mitigation measures

Activity/Issues	Potential Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
Road Sub-project			
Operation of the road	• Increase in traffic speed and accidents • Increased traffic congestion due to movement of increased number of vehicles • Damage to road by movement of heavy vehicles; spillage of water	• Better traffic management • Avoiding spillage of water on road from vehicles carrying fish/ fresh produce (through monitoring, creation of awareness)	ULB (with support from LGED/BMDF)
	• Increased air and noise pollution affecting surrounding areas	• Traffic management, increased vehicle inspection	
Drain Sub-project			
Operation of the drain	• Pollution of downstream water body due to disposal of polluted water from the drain	• Stop direction connection from sanitation facilities to storm drain; ensure installation of septic tank in all establishments	ULB (with support from LGED/BMDF)
	• Blockage in the drain due to disposal of solid waste	• Creation of awareness; improve SWM system, installing cover in open manholes (if any) • Regular maintenance/ cleaning of the drain	
Boat Landing Jetty Sub-projects			
Operation of boat landing jetty	• Pollution of water (e.g., from spent oil, other waste)	• Restriction on disposal of spent oil, food and other waste in water; creation of awareness	ULB (with support from LGED/BMDF)
Kitchen/ Cattle markets, Slaughter house			
Solid and liquid waste disposal	• Environmental/ water pollution; health risks • Clogging of drainage lines	• Proper SWM in markets; regular maintenance of septic tank, drains	ULB (with support from LGED/BMDF)

3.8.2 Monitoring Plan

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

Monitoring during Construction Phase:

162. During implementation of all sub-projects, the LGED/BMDF with support from the ULB will be responsible to monitor and make 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.

163. 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. Table 12 presents guidelines for monitoring of specific environmental parameters during construction phase of different sub-projects.

Table 12: Guidelines for monitoring of environmental parameters during construction phase

Sub-project	Monitoring Parameter and Scenario	Monitoring Frequency	Resource Required and Responsibility
Road, Drain, Bridge, Culvert, Bus/ truck terminal, Community center, and Sweeper colony	If significant air pollution is suspected: Particulate Matter (SPM/ PM_{10}/ $PM_{2.5}$)	As needed	Contractor, under the guidance of ULB/ LGED/BMDF
Road, Pedestrian bridge, Drain, Bridge, Culvert, Boat landing jetty, Bus/ truck terminal, Markets, Community center, Sweeper colony, Water supply	Regular monitoring: Noise level	Once every week, particularly during operation of heavy equipment	Contractor, under the guidance of ULB/ LGED/ BMDF
Bridge, Culvert, Boat landing jetty	Water quality (pH, BOD_5/ COD)	Once during construction period (at a location downstream of the work area)	Contractor, under the guidance of ULB/ LGED/BMDF

Sub-project	Monitoring Parameter and Scenario	Monitoring Frequency	Resource Required and Responsibility
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, BOD_5/COD, Oil and Grease)	As needed	Contractor, under the guidance of ULB/ LGED/BMDF
All sub-projects	Visual observation of drainage congestion, traffic within around sub-project location	Once a week; when drainage/ traffic congestion suspected	Contractor, under the guidance of ULB/ LGED/BMDF

Note: Actual monitoring time and location should be decided by the PD depending on the location of specific activities.

Monitoring during Operational Phase

164. During operational phase, monitoring of environmental parameters would be required for certain sub-projects. Table 13 presents guidelines for monitoring of specific environmental parameters during operational phase of selected sub-projects.

Table 13: Guidelines for monitoring of environmental parameters during operational phase

Sub-project	Monitoring Parameter and Scenario	Monitoring Frequency	Resource Required and Responsibility
Strom drain, Boat landing jetty	Water quality (for storm drain, of the water body receiving drainage water) (pH, BOD_5/ COD, Ammonia, Phosphate)	Half-yearly (at a location downstream of the discharge point)	ULB, with support from LGED/BMDF
Road, Pedestrian bridge, Bus/ truck terminal, Markets, Community center	Qualitative assessment of traffic congestion, accidents	As needed	ULB, with support from LGED/ BMDF

Note: Actual monitoring time and location should be decided by the ULB engineer.

3.8.3 Grievance Redress Mechanism

165. Grievance Redress Mechanism (GRM) is a valuable tool which will allows affected people to voice concerns regarding environmental and social impacts for MGSP's sub-project activities. Relevant organizations including ULBs, LGED and BMDF would ensure that grievance redress procedures are in place and would monitor those procedures to ensure that grievance are handled properly. The LGED /ULB offices 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. The second may not totally avoid but may reduce the problem significantly.

166. As suggested in the Social Management Framework (SMF), a locally constitutes Grievance Redress Committee (GRC) will be formed in each ULB office. Table 14 presents the tentative structure of the Committee, in line with the proposition contained in the SMF. The GRC will ensure proper presentation of complaints and grievances, as well as impartial hearings and transparent decisions. Membership composition for GRCs in hilly areas municipalities/Pourashavas (e.g. Sylhet and Chittagong divisions) will take into account any traditional conflict resolution arrangements that indigenous people (IP) communities may practice.

167. The sub-project-affected persons can register their grievances at the complaint cell. All cases will be registered, categorized and prioritized by the Municipal/Pourashava level authority and by the Environmental Specialist at central level. The GRCs will meet periodically to discuss the merit of each case and fix a date for hearing and notify the PAP to submit necessary documents in proof of her/his claim/case; resolve grievances within one month of receipt of complaint. Additional details regarding the functioning of GRC is presented in the SMF.

Table 14: Tentative Structure of Grievance Redress Committee

Committee	Designation
ULB Mayor	Chairman
Representative of Local Administration	Member
Teacher from a Local Educational Institution	Member
Representative of a Local NGO	Member
Representative of Civil Society	Member
Female Ward Councilor	Member
Head of Engineering Section of ULB	Member Secretary
Note: If the aggrieved person/complainant is a woman, the GRC Chairman will ask a female Union Parishad/Pourashava Member to participate in the hearing. If the complainant is an indigenous person, a member of his/her community will be asked to be present at the hearing.	

3.8.4 Method for Estimation of Cost of EMP

168. Cost of implementing 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; these include of

installation of septic tank/sanitary latrine/portable toilets, installation of health and safety signs, awareness documents (signs/ posters), water sprinkling on aggregates and unpaved surfaces, traffic control (e.g., deputing flagman), traffic light, plantation, and protective gear. Table 15 provides basis/ method of estimation of costs of different items of EMP. Similar approach should be followed for estimation of cost of additional measures, if required.

Table 15: Method/ basis of estimation of cost of Monitoring

Item	Basis of cost/Estimated cost
Monitoring:	
Air Quality (SPM or PM_{10} or $PM_{2.5}$)*	Prevailing rate (~ Tk. 10,000/- per measurement)
Noise level	Prevailing rate (~ Tk. 5000/- per measurement per day)
Water quality (pH, BOD_5 or COD, Oil and grease	Prevailing rate (~ Tk. 10,000/- per sample)
Water quality (pH, BOD_5 or COD, NH_3, PO_4)	Prevailing rate (~ Tk. 7,000/- per sample)
Installation of septic tank/ sanitary latrine/ portable toilet	Prevailing rate/Latest PWD/LGED rates
Health/ safety signs (size and number to be estimated)	Prevailing PWD/LGED rate /Lump sum amount
Water sprinkling on aggregate	Latest PWD/LGED rate (if available)/A fixed rate per cubic meter of aggregate per day
Traffic control (estimate number of flagman needed and duration of work)	Latest PWD/ LGED rate (if available)/A fixed rate per flagman per day/ Lump sum amount
Traffic light	Latest PWD/ LGED rate (if available)/ Lump sum amount
Protective gear	Contractor to quote rate of different items of works considering the provision of adequate protective gear for workers, in accordance to the conditions of contract, specified in the Tender Document
Plantation (including protection/ fencing and conservation during project period)	Prevailing rate (~ Tk. 1,000/- per plant)

* Depending on availability of facility for measurement

3.8.5 Institutional Arrangement for Implementation of EMP

169. For sub-projects to be implemented by the LGED, the Project Management Office (PMO) of the LGED (with support from Environmental Unit of LGED) will be responsible for overall environmental management including implementation of mitigation measures and monitoring, and preparation of quarterly progress and monitoring reports. The PMO will be supported by the ULB and the DSM (Design Supervision and Management) consultant (to be hired by LGED). Similarly, the BMDF will be responsible for overall environmental management of sub-projects implemented by it, with support from ULB and M&S (Maintenance and Supervision) consultant.

Section 3.14 shows activities and institutional responsibilities for overall implementation of the MGSP.

170. 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.

3.9 Environmental Code of Practice (ECoP)

171. The Environmental Code of Practice (ECoP) is prepared as a guideline for environment management of the subprojects to be implemented in different ULBs under the MGSP. The main objective of an ECoP is to manage construction operations in harmony with the environment in an effort to contribute to the well-being of the community and the environment by:

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

172. The ECoP is designed to be used during the construction of different types of urban infrastructure (e.g., bridge, kitchen markets, drains, and roads) under the MGSP. The Code is also applicable to water supply and solid waste management systems where management of minor construction activities is addressed. The purpose of the Code of Practice is to ensure that construction activities are conducted in a manner that minimizes impacts on the environment. It promotes awareness and use of best practice in environmental management. ECoP is applicable to the construction sites and associated activities such as stockpile sites, disposal sites for clean excavated materials, etc. Responsibility lies with all the people involved in any given project to adopt environmentally responsible work practices. Best environmental management practice requires environmental awareness, and appreciation of one's environmental responsibilities. Measures taken to prevent environmental impacts are preferred to those designed to control the impact.

173. The Environmental Code of Practice (ECoP) includes a list of activities associated with different types of infrastructure development considered in the MGSP. 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

174. A particular sub-project within the MGSP may involve all or some of these issues. **Appendix I** presents the ECoPs and the Table 16 outlines applicability of different ECoP activities for different sub-projects.

Table 16: Possible Application of Environmental Code of Practice (ECoP) relating to different types of Infrastructures

Different activities related to ECoP	Infrastructure Type																					
	B	B/C	BL	BT	C	CM	D	KM	P	PB	PT	R	RD	RP	RW	SC	SH	SL	SWM	TC	TT	W
Project Planning and Design	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Site Preparation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Construction Camps	✓	✓	✓	✓	✓		✓					✓		✓		✓					✓	✓
Borrow Areas	✓			✓	☑	☑		☑	☑			✓		✓	✓	☑	☑		☑		☑	
Topsoil Salvage, Storage and Replacement	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Slope Stability and Erosion Control	✓	✓	✓	☑	☑	☑	✓	☑	☑		☑	✓		✓	✓	☑	☑		☑		☑	
Waste Management	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Water Bodies	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓
Water Quality	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓
Drainage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓
Public Health and Safety	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Material Storage, Transport & Handling	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tree Plantation	☑		✓	✓	✓	✓			✓			✓		✓	✓				✓		✓	
Natural Habitats	✓	✓	✓						✓			✓	✓	✓					✓			

Legend: B = Bridges, B/C = Box Culverts, BL = Boat Landing Jetty, BT = Bus Terminal, C = Community Centers, CM = Cattle Market, D = Drains, KM = Kitchen Market, P = Park, PB = Pedestrian Bridge, PT = Public Toilets, R = Road, RD = River Dredging, RP = River Protection, RW = Retaining Walls, SC = Sweeper Colony, SH = Slaughter House, SL = Street Lights, SWM = Solid Waste Management, TC = Traffic Control, TT = Truck Terminal, W = Water Supply Systems. ✓= ECoP required; ☑ = ECoP may be required depending on the site condition.

3.10 Public Consultations and Access to Information

3.10.1 Public Consultation

175. The Sub project under MGSP will be identified by the ULB through consultation with the community and the targeted beneficiaries. After selection of a subproject, the community level environmental screening will be integral part of the sub-project planning. The community meeting has been suggested to discuss the subproject, identify the community priority and identify the scope of work. Thus Consultation is a continuous process by which opinion from public is sought on matters affecting them. Public consultation is generally a continuous process aimed at engaging the stakeholder efforts throughout the planning, design, construction, and operation 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 ULBs/LGED/BMDF 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 ULBs/ LGED/ BMDF/ WB and stakeholders. It would help facilitate and streamline decision making whilst fostering an atmosphere of understanding among individuals, groups and organizations, who could affect or be affected by the sub-projects. As a part of IEE/EIA, an effective public consultation and access to information plan (PCAIP) needs to be developed. The specific objectives of PCDP are:

- To keep stakeholders informed about the sub-projects at different stages of implementation,
- To address the environmental and social concerns/ impacts, and device mitigation measures taking into account the opinion/ suggestions of the stakeholders,
- To generate and document broad community support for the sub-projects,
- To improve communications among interested parties, and
- To establish formal complaint submittal / resolution mechanisms (Section 4.6.7.3).

The following are the guidelines for carrying out consultation and access to information:

1. At least one consultation will be organized with stakeholders at an ULB focusing on the sub-project (s) to be implemented under the respective ULB. 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 environment issue, so that stakeholders can contribute their knowledge on better environmental management.
2. The composition of participants may differ depending on the nature and location of the sub-projects. For a road sub-project, important stakeholders would include people living in the sub-project surrounding areas; drivers of different types of vehicles using the road; students; businessmen; doctors; and representatives of educational/ religious institutions,

CBOs, and NGOs. For a community center sub-project, 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. A stakeholder analysis needs to be carried out to identify the key stakeholders and Project Affected Persons (PAPs).

176. Information on the PC/FGD needs to be published in national/local newspapers 7 to 10 days prior to the consultations. In general, 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 ULBs directly to ask questions and raise concerns on environmental and social issues. Create a responsive management system should be created for recording and responding to comments and concern on environmental and social issues. It should be ensured that the ULBs are capable of responding to questions/comments, appropriately.

3.10.2 Access to Information

177. Summary of the EMF report and impact mitigation measures will 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 Pourashavas and City Corporations and will be made available to the public. The draft EA (two volumes) will also be uploaded in the website of ULBs/LGED/BMDF and in the Bank InfoShop before appraisal completion.

178. In addition a national workshop has been planned in October, 2013 to present the EMF and SMF to the key stakeholders including field level staff of the implementing agencies (LGED, BMDF), ULBs, community representatives, NGOs, civil society etc. The comments and the findings from the workshop and other public will be reviewed and incorporated in the final EA report.

179. During the implementation stage of project, the subproject specific screening/assessment report will periodically be posted in the LGED/BMDF website before the bidding process.

3.11 Occupational Health and Safety Guidelines

180. In general, the objectives of occupational health and safety (OHS) plan are: (a) To develop, in the workplace, a collaborative approach to managing Occupational health and Safety between management and workers; (b) To provide and maintain safe working procedures and operations; (c) To ensure awareness of all potential work related risks and hazards and to develop preventive strategies against these risks and hazard; (d) To provide appropriate training to all concerned to work safely and effectively; (e) To maintain a constant

and continuing interest in the improvement of occupational health and safety performance and to provide the required resources necessary for the implementation and maintenance of the OHS plan.

181. For the sub-projects to be implemented under MSGP, the occupational health and safety primarily focuses on work equipment and protective gear. The following section provides guidelines/ directives for: (a) work equipment, (b) protective gear, and (c) safety and health signs.

3.11.1 Suggested Safety Directives for Work Equipment

182. It is employer's (contractor) obligation that every possible measure is taken to ensure the safety of the work equipment made available to workers. During the selection of the work equipment the employer shall pay attention to the specific working conditions which exist at the workplace, especially in relation of safety and health of the workers. A brief list of work equipment safety issues is given below:

- Work equipment control devices which affect safety must be clearly visible and identifiable and appropriately marked where necessary.
- Work equipment presenting hazards due to emissions of gas, vapor, liquid or dust must be fitted with appropriate containment and/or extraction devices near the sources of the hazard.
- Where there is a risk of mechanical contact with moving parts of work equipment which could lead to accidents, those parts must be provided with guards or devices to prevent access to danger zones or to halt movements of dangerous parts before the danger zones are reached.
- Work equipment may be used only for operations and under conditions for which it is appropriate.
- Work equipment must bear the warnings and markings essential to ensure the safety of workers.
- All work equipment must be appropriate for protecting workers against the risk of the work equipment catching fire or overheating, or of discharges of gas, dust, liquid, vapor or other substances produced, used or stored in the work equipment.
- All work equipment must be appropriate for preventing the risk of explosion of the work equipment or of substances produced, used or stored in the work equipment.
- All work equipment must be appropriate for protecting exposed workers against the risk of direct or indirect contact with electricity.
- Mobile work equipment such as Bulldozer or Road Rollers with ride-on workers must be designed to restrict, under actual conditions of use, the risks arising from work equipment roll-over.
- Fork-lift trucks carrying one or more workers must be adapted or equipped to limit the risk of the fork-lift truck overturning.
- Self-propelled work equipment, such percussion drills, which may, when in motion, engender risks for persons must have facilities for unauthorized start-up.

- Machinery for lifting loads, such as Crane, must be clearly marked to indicate its nominal load, and must where appropriate be fitted with a load plate giving the nominal load for each configuration of the machinery.
- Work equipment must be erected or dismantled under safe conditions, in particular observing any instructions which may have been furnished by the manufacturer.

3.11.2 Safety Directives for Protective Gears

183. Personal protective equipment is suggested to use when the risks cannot be avoided or sufficiently limited by technical means. All personal protective equipment must

- be appropriate for the risks involved, without itself leading to any increased risk
- correspond to existing conditions at the workplace
- fit the wearer correctly after any necessary adjustment.

184. The Contractor shall organize orientation to use of personal protective equipment. Workers shall be informed of all measures to be taken. Consultation and participation shall take place on the matters related to the use of the protective equipment. A partial list of protective gears to be worn by the workers at designated work areas is given below; Table 17 presents the list in tabular form.

185. *Head Protection:* Protective helmets will be put on at all times mainly at the building and bridge construction sites, under scaffolds, erection and stripping of formworks, etc., where there are possibilities of head injuries from falling/flying objects.

186. *Hearing Protection:* Ear plugs or ear muffs should be worn in areas where exposure to high noise level is expected. Examples of such activities include percussion drill, bolt driving, etc.

187. *Eye and Face Protection:* Spectacles, Goggles, Face Shield or Arc-welding Mask with Hand Masks, whichever is appropriate, should be worn at times when percussion drilling, spray painting, welding or similar activities are in progress at the field.

188. *Respiratory Protection:* In work areas such as septic tanks, dump sites, sewers etc., where exposure to harmful or toxic gases is likely the workers should wear gas masks, dust filters, or insulating appliances with air supply, whichever is appropriate.

189. *Hand and Arm Protection:* In the work involving piercing, cutting or vibration. For protection against toxic chemicals special chemical resistant gloves should be worn. Over sleeves must be worn to protect ones arms.

190. Foot *Protection:* In road and bridge constructions, working on or under scaffolds, roof works, formwork erection and dismantling safety shoes/boots are essential protective measures.

3.11.3 Safety and Health Signs

191. Safety signs, health signs, prohibition sign, warning sign, mandatory sign, emergency escape sign, first-aid sign, information sign, signboard, supplementary signboard, safety color, symbol, pictogram, illuminated sign, acoustic signal, verbal communication and hand signal are essential tools for preventing accidents by providing information in advance.

Table 17: Brief list of protective gears to be worn during the use of some equipment

Works/ Equipment Use	Safety Measures for Workers and/or Work Areas
Common Construction Works	HH, STB, HG
Earth-works	HH, STB, HG
Electric-works	RSB, HG
Wood-works	HH, STB, HG
Road Paving	HH, STB, HG, BP, FM
Cranes	HH, STB, HG, WB
Pile Driver	HH, STB, HG, EP, WB
Arc Welder	HH, WV, HG
Bull Dozer	HH, STB, WB
Heavy Roller	HH, STB, HG, WB
Concrete Mixer	HH, STB, HG, WB
Fork Lift	HH, HG, STB, WB
Percussion Drill	HH, STB, HG, WB, EG, EP, WB
Sledge/Pick Hammer	HH, STB, HG, WB
Vibrator	HH, STB, HG, WB
Pick Axe	HH, STB, HG, WB
Electric Saw	HG, EG, EM
Working on Scaffolds	HH, STB, HG, WB

Note:HH = Hard Hat, STB = Steel-tipped Boot, HG = Hand Gloves, BH = Body Harness
WB = Waist Belt, EM = Ear Muff, EP = Ear Plug, WV = Welding Visor, FM = Face Mask,
BP = Body Protective Apron, RSB = Rubber Soled Boot, EG = Eye protection Glasses

192. The Contractor will provide or ensure that appropriate safety and/or health signs are in place at their work sites where hazards cannot be avoided or reduced. Workers and their representatives must be informed of all the measures taken concerning health and safety signs at work and must be given suitable instruction about these signs.

3.12 Environmental Management and Information System (EMIS)

193. An Environmental Management Information System (EMIS) may be established for the MGSP. The purpose of establishing the EMIS is to manage the data of the Municipal Governance and Services Project (MGSP) and monitor the progress and impact. The EMIS will be a central repository for data on variety of environmental indicators relevant to EMF, IEE and

EIA and related to the sub projects. At the same time it will perform as a storehouse and knowledge management tool for the sector and facilitate more analytical evaluation on available data.

Key activities in establishing the EMIS are as below

- Assessment of information need 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 and ensure regular updating of those;
- 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.

Proposed outline of the EMIS

194. Data on different subprojects will be collected manually (as outlined in the EMP) at the field level and the local level supervisors (LGED/ BMDF) will authorize the collected datasets for entry in the EMIS. The entry may be made at local level over internet or the data will be sent at the EMIS anchorage point (LGED/ BMDF) for data entry. The entered data will be validated for further processing at the anchorage level. The validated data will be automatically processed by the EMIS and different reports and outputs will be generated for use. The authorized user can use the data, reports or generate customs report according to their credentials. The reports and data may also be made available in the web for use by third party users and other stakeholders. A diagram of the systems architecture is depicted in Figure 2.

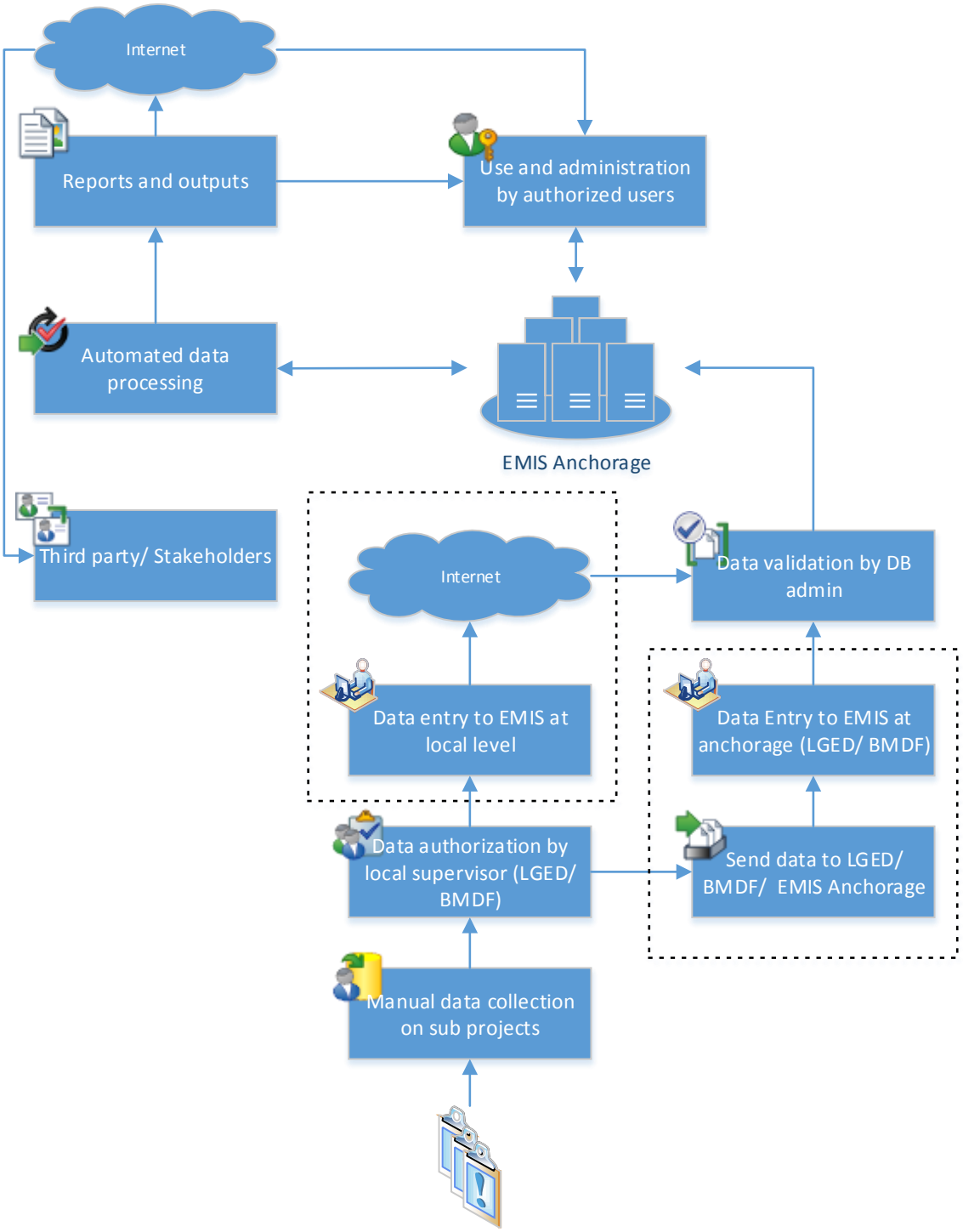


Figure 2: Proposed system architecture of the EMIS

3.13 Special Environmental Clauses (SECs) for Tender Document

195. 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):

196. 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:

197. 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, on 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 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 (attached) 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 latrine 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 (Pourashava or 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.

3.14 Institutional Arrangement

198. Under the MGSP, the LGED will implement 20 types of sub-projects in 26 ULBs, which include 22 Pourashavas and 4 City Corporations; while the BMDF will implement 13 types of sub-projects in 119 ULBs (Pourashavas). The institutional arrangement for implementation of MGSP is slightly different for LGED and BMDF**.** Figure 3 and Figure 4 show the institutional set up, including major activities and assignment of responsibility for their execution, for implementation of MGSP by the LGED and BMDF, respectively.

199. According to the EMF, the ULBs are responsible for the identification of sub-projects, preparation of relevant sub-project documents. Specifically, the ULBs will be responsible for:

(1) Preparation of Sub-project description by filling “Form 1: Sub-project Description” (see Appendix B)
(2) Carrying out environmental screening of the sub-project by filling “Form 2: Environmental Screening” (see Appendix C)
(3) Carrying out analysis of alternatives by filling “Form 3: Analysis of Alternatives” (see Appendix D)

200. The ULBs will receive technical assistance from the LGED in carrying out the above tasks, and in the preparation of other sub-project documents. For the BMDF component of the project, the ULBs may hire a consultant preparing these and other sub-project documents/designs. At each ULB, the senior ULB engineer will act as the environmental and social focal point.

201. The sub-project description, "environmental screening", and "analysis of alternatives" prepared by the ULBs, will be forwarded LGED/ BMDF for review. At the LGED, the Project Management Office (PMO) will be responsible for overall management of the sub-projects. During the first year, the Environmental Unit of the LGED will carry out the review; subsequently, LGED will get support from the hired DSM consultant. For taking care of environmental management, the DSM Consultant will have one Senior Environmental Specialist and four Junior Specialists. At the BMDF, the review will be carried out by in-house expertise or a hired consultant during the first year, and the hired M&S consultant in subsequent years. Through the review process, the LGED/BMDF will determine the need for further environmental assessment (i.e., IEE/ EIA).

202. If further environmental assessment (EA) is necessary, the Environmental Unit of LGED (or a hired consultant) will carry out the EA (following the EMF presented in this report) during the first year; while it will be the responsibility of the hired DSM consultant in the subsequent years. Similarly, the BMDF will also carry out the EA by in-house expertise or a higher consultant during the first year, while it will be the responsibility of the M&S consultant during the subsequent years. After completion of the EA, the LGED/BMDF will be responsible for getting necessary clearance from the DoE and the WB.

203. The PMO of the LGED will be responsible for implementing the EMP and ECoP of a subproject by the respective contractor with support from ULB and DSM consultant (from the second year onwards). Similarly, BMDF will be responsible for implementation of the EMP and ECoP of a subproject by the respective contractor through in-house expertise/hired consultant during the first year and through M&S consultant in subsequent years.

204. A "third party" for monitoring of overall environmental management of MGSP will be appointed separately by the LGED and BMDF. The ToR for third party monitoring is presented in Section 4.15.

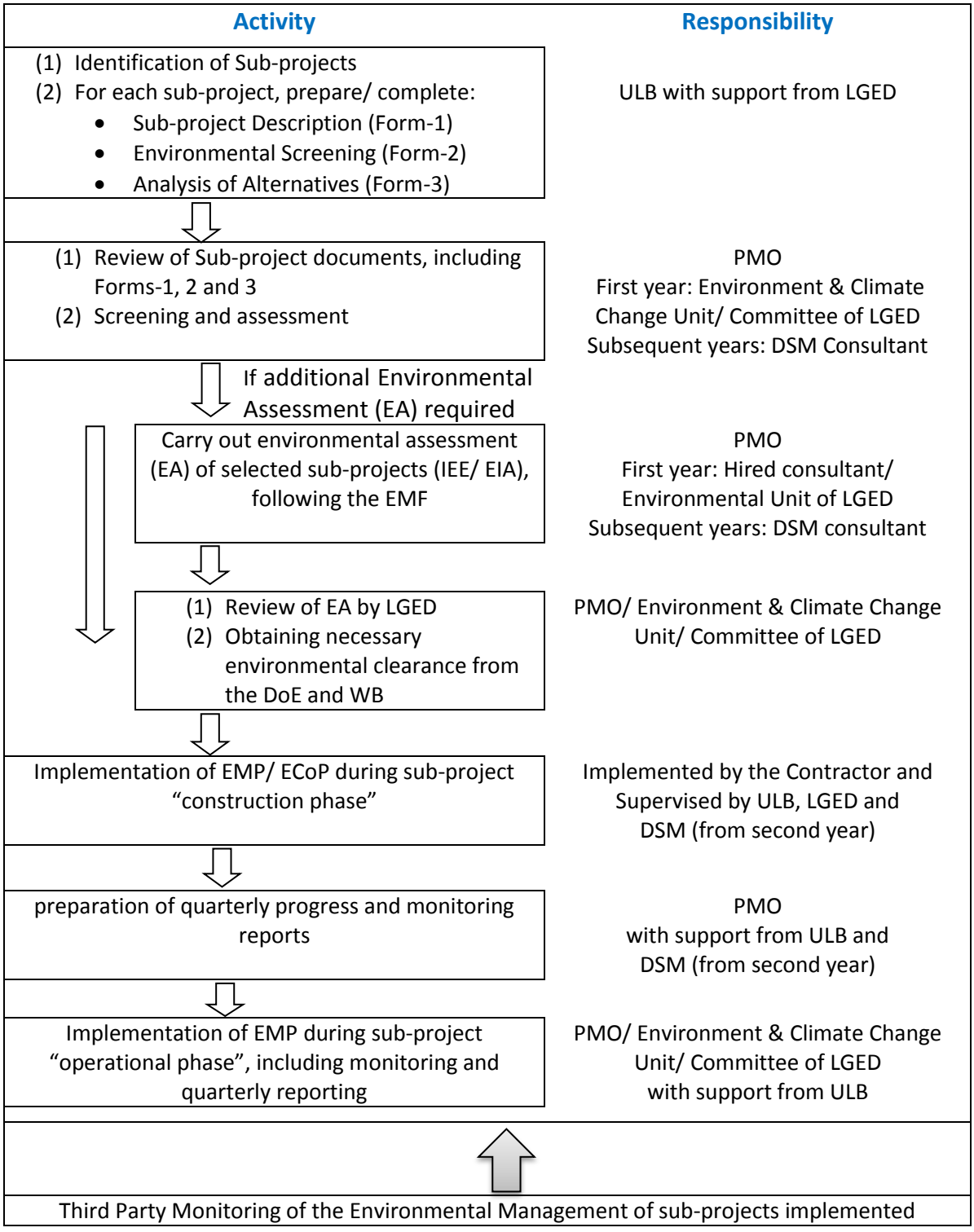


Figure 3: Institutional set up, including major activities and assignment of responsibility for their execution, for implementation of MGSP by the LGED

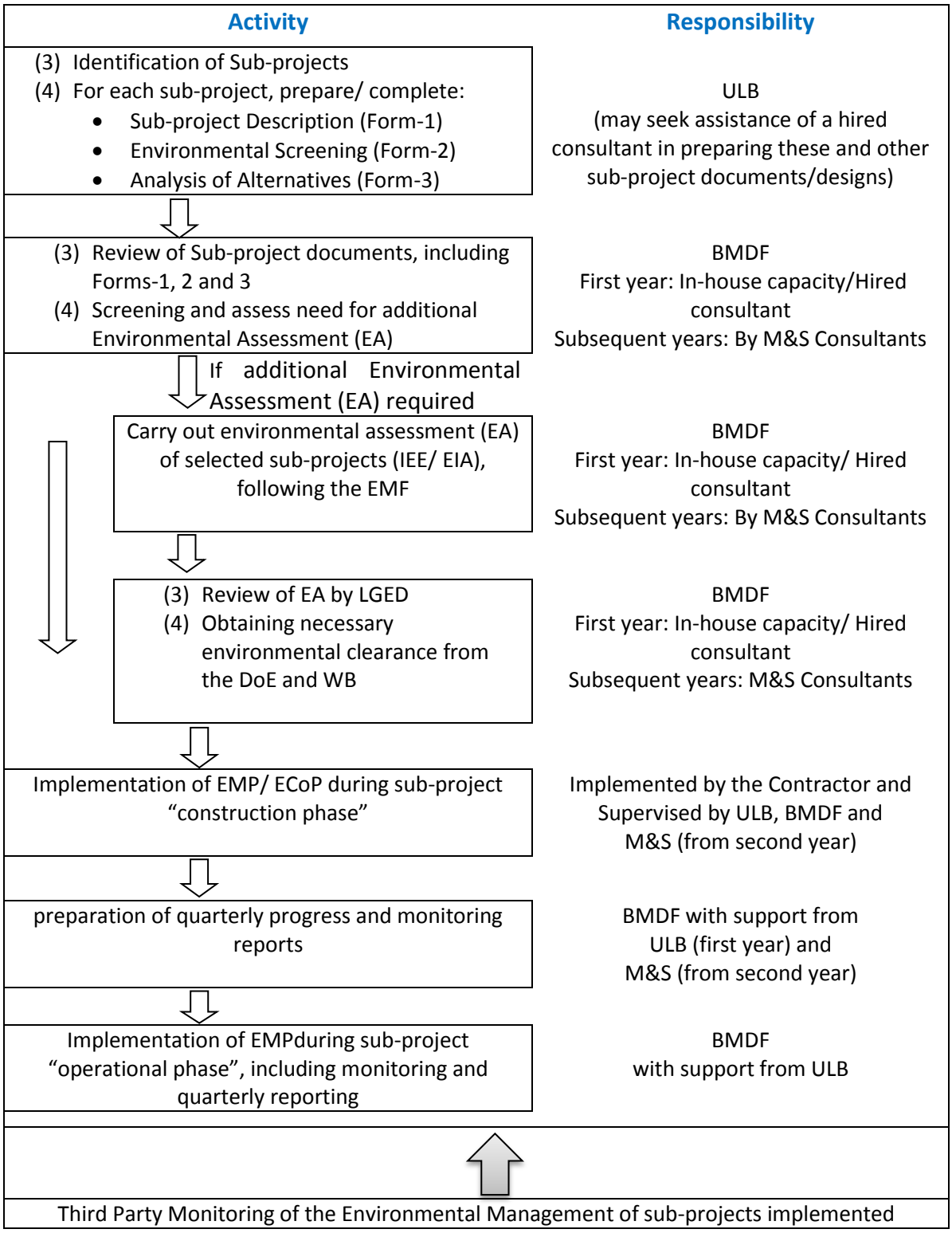


Figure 4: Institutional set up, including major activities and assignment of responsibility for their execution, for implementation of MGSP by the BMDF

3.15 Third Party Monitoring

205. As discussed in Section 3.14, in order to ensure proper environmental management of MGSP, a third party consulting firm (to be hired separately by LGED/ BMDF) will be given the responsibility to independently monitor the overall performance of environmental management of MGSP, including compliance with relevant GoB and WB regulations and the provision of the environmental management framework (EMF) and social management framework (SMF) developed for the project. **Appendix J** presents a ToR for a third party consulting firm to independently monitor the overall performance of environmental management of MGSP. As a part of the monitoring, the consulting firm will prepare a comparison of monitoring outcomes of same/similar sub-projects carried out in different ULBs, so that lessons learned and best practices could be replicated.

3.16 Training Requirements

206. As a part of the "overall environmental assessment", existing environmental practices in recently completed and ongoing projects and capacities of the organizations concerned (i.e., ULBs, LGED, and BMDF) have been evaluated through analysis of organizational set up and interviewing officials/ engineers. Details of the evaluation are presented under "Overall Environmental Assessment". It appears that the engineers at the UBLs have limited or no exposure to environmental assessment and management. For the MGSP, at each ULB, the senior ULB engineer will act as the environmental and social focal point. As discussed above, the ULBs 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 ULBs in carrying out their responsibilities under the MGSP. Training for the ULBs should be arranged in phase, i.e., ULBs where project activities would be initiated immediately would receive training first, others would gradually receive training as project work progresses. From logistic point of view, the trainings may be organized on a regional basis.

207. The BMDF is a relatively small organization. Its Engineering Section, comprising of 7 members, has only two engineers and one urban development specialist (social safeguard specialist). Most of the works to be carried out by the BMDF under the MGSP will be supported by the hired M&S consultant. However, since the overall responsibility of environmental management lies with BMDF, the BMDF needs to ensure that its consultants are carrying out their responsibilities properly. For this purpose, it is important that the BMDF engineers receive advanced training on environmental management and monitoring. Such training will assist them in properly overseeing the activities of the consultant engaged in environmental management of the MGSP, following the EMF.

208. The LGED has considerable experience in environmental management of a wide range of projects. The LGED has its own environmental assessment guidelines (LGED, 2008). However, advanced training on environmental management and monitoring (same as that designed for BMDF engineers), particularly emphasizing on the modalities of the MGSP (i.e., framework approach) would be useful for engineers of PMO/ Environmental Unit of LGED in successfully

implementing environmental management, following the EMF. Table 18 summarizes the training requirements of ULBs, BMDF and LGED. It is also advised to provide the basic training for key personnel on regulatory requirements, environmental impacts, and environmental assessment and management in home or abroad.

Table 18: Training requirements for environmental management of MGSP

Training Type/ Contents	Participants	Schedule
General environmental awareness, regulatory requirements, EMF frameworks for MGSP, environmental impacts and mitigation, analysis of alternatives, environmental management	Engineers of ULBs (at least one engineer from each ULB)	Prior to commencement of sub-project activities
Advanced training on environmental assessment, management (EMP, ECoP), monitoring, including details on EMF framework	Participants from: (a) Engineering Unit of BMDF, (b) PMO/ Environmental Unit of LGED	Immediately after project commencement

3.17 Budget Estimates

209. Cost estimates are prepared for all the mitigation and monitoring measures proposed in the EMF. The cost estimates for some of the mitigation measures as will be identified in the EMP that are be part of civil works contract and for monitoring measures are given in Table 15. The tentative cost estimates and the budget for the remaining suggestive activities are given in the Table 19.

Table 19: Tentative cost estimates for environmental management of MGSP

Activities	Amount (USD)
Budget for EA Consultants	
• For first year project preparation (BMDF)	10,000
• Preparation of full EA, if required for subprojects (BMDF)	70,000
• Preparation of full EA, if required for subprojects (LGED)	50,000
Establishment of proposed Environmental Management Information System (EMIS)	
• BMDF	100,000
• LGED	80,000
Engagement of "Third Party Monitor"	
• BMDF	250,000
• LGED	150,000
Training Requirements	
• BMDF	150,000
• LGED	100,000
EMP during construction	Will be included in Civil Works

210. The Development Project Proposal (DPP) of GoB for MGSP should reflect the above activities with budget for successful environmental management of the project.

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APPENDIX A

List of Projects to be implemented in Different ULBs under MGSP

LGED Component:

SL	Name of Pourashava/ City-Corporation	Type	Total Area (sq km)	Population	Infrastructure Type
1	Tangail Pourashava	A	29.43	128,786	R, D, KM, SH, W
2	Elenga Pourashava	C			R, D, KM, SH, BT, W
3	Sherpur Pourashava	A	24.75	104,000	R, D, KM, BT, SH, SWM, P
4	Madaripur Pourashava	A	10.05	150,000	R, D, KM, SH, SWM, P, BT
5	Shariatpur Pourashava	A	24.75	56,235	R, D, KM, SH, P, BT, SWM
6	Gopalganj Pourashava	A	13.82	114,950	R, D, SH, SWM, C, W
7	Saidpur Pourashava	A	34.42	200,000	R, D, KM, BT, SH, TC, SWM
8	Gobindaganj Pourashava	B	12.71	40,676	R, D, KM, SH, BT, SWM
9	Bhaluka Pourashava	A	10.68	160,000	R, D, KM, SH, SWM, BT
10	Trishal Pourashava	A	15.49	35,030	R, D, KM, SH, BT, SWM, W
11	Rangpur City Corporation		50.66	1,000,000	R, D, KM, BT, SH, TC, W, SWM
12	Daudkandi Pourashava	B	12.17	45,777	R, D, B/C, PT, SL
13	Chandina Pourashava	B	14.02	55,900	R, D, B/C, SL, KM, PT, W
14	Comilla City Corporation				R, D, SH, SWM, SL, TC, PT, P
15	Mirsharai Pourashava	B	10.5	20,071	R, D, B/C
16	Sitakunda Pourashava	B			R, D
17	Patiya Pourashava	A	10.36	61,819	R, D, KM, TT, PT, BL, C
18	Chakoria Pourashava	A			R, D, B/C, SL, PT, W, SWM
19	Feni Pourashava	A	27.2	300,000	R, D, SH, B, B/C, P, SC, SWM, W
20	Chaddagram Pourashava	B	18.44	37,962	R, D, KM, BT, SH, CM, SWM, PT, SL
21	Madhabdi Pourashava	A	5.09	155,000	R, D, BT, B, PB, P, CM, K
22	Shaistagonj Pourashava	B	10.4	26,679	R, D, KM, SL, PT, B/C, W, SWM
23	Madhabpur Pourashava	B	8.0	40,500	R, D, KM, SH, B, B/C, RD, SL, PT, SWM
24	Bhairab Pourashava	A	13.07	118,300	R, D, KM, B/C, SC, W, SWM
25	Sylhet City Corporation		26.5	500,000	R, D, KM, B/C, RW, PB,, PT, SC, SL,W, SWM
26	Narayanganj City Corporation		72.23	709,341	R, D, B, B/C, BL, KM, PT, SH, SL, W, SWM

LEGEND

1) B= Bridges
2) B/C= Box Culverts
3) BL= Boat Landing Jetty
4) BT= Bus Terminal
5) C= Community Centers
6) CM= Cattle Market
7) D= Drain
8) KM= Kitchen Market
9) P= Park
10) PB= Pedestrian Bridge
11) PT= Public Toilet
12) R= Road
13) RW= Retaining Walls
14) SC= Sweeper Colony
15) SH= Slaughter House
16) SL= Street Light
17) SWM= Solid Waste Management
18) TC= Traffic Control
19) TT= Truck Terminal
20) W= Water Supply System

BMDF Component:

SL	Name of ULBs	SL	Name of ULBs	SL	Name of ULBs
01	Ajmiriganj Pourashava-C	41	Galachipa Pourashava-B	81	Nalchiti Pourashava-B
02	Alamdanga Pourashava – A	42	Ghatail Pourashava-B	82	Nalitabari Pourashava-B
03	Amtali Pourashava - B	43	Ghoraghat-C	83	Nandigram Pourashava-C
04	Arani Pourashava –C	44	Ghorashal Pourashava-A	84	Nangolkot Pourashava-C
05	Bagerhat Pourashava –A	45	Golapganj Pourashava-A	85	Naogaon-A
06	Bagai Chari Pourashava- C	46	Gouripur Pourashava-B	86	Narail Pourashava-A
07	Bakerganj Pourashava – B	47	Gouranadi Pourashava-A	87	Natore-A
08	Bandarban Pourashava-A	48	Habiganj Pourashava-A	88	Netrakona Pourashava-A
09	Banskhali Pourashava-B	49	Hajiganj Pourashava-A	89	Noakhali Pourashava-A
10	Baraiyerhat Pourashava-B	50	Hatiya Pourashava-C	90	Pabna Pourashava-A
11	Barguna Pourashava-A	51	Homna Pourashava-B	91	Panchbibi Pourashava-A
12	Bashurhat Pourashava-A	52	Hossainpur Pourashava-C	92	Parbtipur Pourashava-B
13	Bauphal Pourashava-B	53	Jagannathpur Pourashava-B	93	Patharghata Pourashava-B
14	Beanibazar Pourashava-B	54	Jaldhaka Pourashava-C	94	Patuakhali Pourashava-A
15	Beanpole Pourashava-B	55	Jhenaidah Pourashava-A	95	Phulpur Pourashava-B
16	Bera Pourashava-A	56	Joypurhat Pourashava-A	96	Raiganj Pourashava-C
17	Betagi Pourashava-C	57	Kahaloo Pourashava-C	97	Rajbari Pourashava-A
18	Bhanga Pourashava-C	58	Kakonhat Pourashava-B	98	Ramgarth Pourashava-B
19	Bhangura Pourashava-B	59	Kalapara Pourashava-B	99	Ramganj Pourashava-A
20	Bhola Pourashava-A	60	Kalia-B	100	Rangamati Pourashava-A
21	Bogra Pourashava-A	61	Kaliakair Pourashava-A	101	Santahar Pourashava-B
22	Bonpara Pourashava-A	62	Kalihati-B	102	Satkania Pourashava-B
23	Brahmanbaria Pourashava	63	Kanchan Pourashava-B	103	Savar Pourashava-A
24	Chalna Pourashava-B	64	Keshorhat Pourashava-B	104	Sengarchar Pourashava-B
25	Chandanaish Pourashava-B	65	Khagrachari Pourashava-A	105	Shakhipur Pourashava-C
26	Chandpur Pourashava-A	66	Khetlal Pourashava-C	106	Sherpur Pourashava-A
27	Chhatak Pourashava-A	67	Kishorganj Pourashava-A	107	Singra Pourashava-A
28	Cox'sbazar Pourashava-A	68	Kurigram Pourashava-A	108	Sirajgonj Pourashava-A
29	Dagonbhuiyan Pourashava-B	69	Kustia Pourashava-A	109	Sonagazi Pourashava-B
30	Darshana Pourashava-B	70	Laksham Pourashava-A	110	Sreemangal Pourashava-A
31	Daulatkhan Pourashava-B	71	Lakxipur Pourashava-A	111	Sreepur Paurashava, Gazipur-B
32	Dhamrai Pourashava-B	72	Magura Pourashava-A	112	Sunamganj Pourashava-A
33	Dhanbari Pourashava-B	73	Manikganj Pourashava-A	113	Sunddarganj Pourashava-C
34	Dinajpur Pourashava-A	74	Matiranga Pourashava-C	114	Taherpur Pourashava-A
35	Dohar Pourashava-A	75	Moheshkhali Pourashava-C	115	Talora Pourashava-C
36	Domar-C	76	Mongla Port Pourashava-A	116	Tarabo Pourashava-B
37	Faridpur Pourashava-A	77	Moulvibazar Pourashava-A	117	Teknaf Pourashava-C
38	Faridpur Pourashava-C (Pabna)	78	Muladi Pourashava-B	118	Thakurgaon Pourashava-A
39	Fulbaria Pourashava-A	79	Munshiganj Pourashava-A	119	Zakigonj Pourashava, Sylhet-A
40	Gaffargaon Pourashava-A	80	Mymensingh Pourashava-A		

List of Sub-projects: Box-culvert, Bus Terminal, Community Centre, Drain, Kitchen/Municipal Market , Boat Landing Jetty, Public Toilet, Road, Slaughter House, Street Light, Truck Terminal, Water Supply System[2], Cattle Market, Park, Pedestrian Bridge, Retaining Wall, Sweeper Colony, Solid Waste Management, Traffic Control Office Building.

[2]Deep tubewell. pump houses, pipe lines, water meter etc. excluding water treatment plant

APPENDIX B

Form 1: Sub-project Description

(to be completed by ULBs)

Name of ULB :

(1) Name of sub-project :

(2) Brief description of sub-project :

(3) Location of sub-project :
(attach location map)

(4) Layout of the sub-project :
(attach a layout map)

(5) Ownership of sub-project land :
(a) Government/ ULB owned :
(b) Private land (need acquisition) :

(6) Brief description of sub-project site:
(indicate the information on present landuse, HFL for last 30 years and Important Environmental Features[3] (IEFs) adjacent the site)

(7) Brief information of environment within sub-project influence area[4]:
(description of water, flora, fauna, historical or culturally important sites)

[3] 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.

(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)

APPENDIX C

Form 2: Environmental Screening

(to be completed by ULBs following Guideline presented in Section 3.3 of EMF)

Name of ULB :
Name of Sub-project :

1) Potential Environmental Impact during Construction Phase:

(a) Ecological impacts: (important sub-projects include storm drain, bridge, box culvert, and boat landing jetty)

• Felling of trees	Significant □	Moderate □	Minor □	Number of tress ☐
• clearing of vegetation	Significant □	Moderate □	Minor □	
• Potential impact on species of aquatic (i.e., water) environment	Significant □	Moderate □	Minor □	

(b) Physicochemical impacts: (all sub-projects)

• Noise pollution	Significant □	Moderate □	Insignificant □
• Air pollution	Significant □	Moderate □	Insignificant □
• Drainage congestion	Very likely □	Likely □	Unlikely □
• Water pollution	Significant □	Moderate □	Insignificant □
• Pollution from solid/ construction waste	Significant □	Moderate □	Insignificant □
• water logging	Significant □	Moderate □	Insignificant □

(c) Socio-economic impacts: (all sub-projects)

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

2) Potential Environmental Impact during Operational Phase:

(d) Ecological impacts: (important sub-projects include storm drain and boat landing jetty)

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

(e) Physicochemical impacts: (all sub-projects)

• Potential air quality and noise level (especially for road)	Improvement □	No-improvement □	Deterioration □
• Drainage congestion (especially for drain)	Improvement □	Minor Improve □	No Impact □
• Risk of Water pollution (especially for storm drain and jetty)	Significant □	Moderate □	Minor □
• Pollution from solid waste (especially for SWM, and market)	Improvement □	No-improvement □	Deterioration □

(f) Socio-economic impacts: (all sub-projects)

• Traffic (especially for road, bridge, box culvert, bus/truck terminal)	Improvement □	No-improvement □	Adverse □
• Safety	Improvement □	No-improvement □	Adverse □
• Employment generation	Significant □	Moderate □	Minor □

3) Summary of Possible environmental impacts of the subproject :

4) Category of sub-project : (follow Table 1 of EMF)

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

5) Proposed mitigation measure (follow Appendix I or Table 9 of EMF as appropriate)

6) Overall Comments

7) Prepared by : (Name, designation, mobile number, signature, date) ----------

8) Reviewed by : (Name, designation, mobile number, signature, date)----------

APPENDIX D

Form 3: Analysis of Alternatives

(to be completed by ULBs)

Name of ULB :
Name of Sub-project :
Brief description of Sub-project :

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

The ULB authority 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 center, 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

Selected Route/ Alignment/ Location:

(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 ULB authority 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 ULB authority.

Design Alternatives	Advantages	Disadvantages

Selected Design:

(c) Analysis of alternative technologies/ methods of construction:

For some sub-projects, alternative methods of construction would have to be assessed. For example, for a drain sub-project, alternative methods of construction may include manual excavation and mechanized excavation. The ULB authority will identify alternative method of construction (where appropriate), and list their advantages and disadvantages. Based on an assessment of relative advantages and disadvantages, a method of construction will be selected by the ULB authority.

Construction method	Advantages	Disadvantages

Selected method of construction:

(d) No Sub-project Scenario: Briefly describe the difficulties the ULB will face if the sub-project is not implemented

(e) Conclusion: On selected method/design/technology and route/location of subproject.

Form 3: Analysis of Alternatives
(Example for a Strom "Drain" Sub-project)
(to be completed by ULBs)

Name of ULB :
Name of Sub-project : Construction of Strom Drain
Brief description of Sub-project :

(a) Analysis of alternative routes of storm drain:

Route/ Alignment	Advantages	Disadvantages
Alternative 1 (e.g., both sides of the road)	• Easier house connection • Ease of construction without much disruption to traffic	• Two drainage lines needs to be constructed
Alternative 2 (e.g., median/ center of the road)	• Single drain needs to be constructed along median	• Difficult to make house connection
Alternative 3 (e.g., one side of the road)	• Single drain needs to be constructed	• Difficult to make house connections from other side of road

Selected Route/ Alignment/ Location: **Alternative 1**

(b) Analysis of alternative designs:

Design	Advantages	Disadvantages
Alternative 1: RCC drain	• Not prone to encroachment • Area above drain could be used as a part of road	• Higher cost of construction
Alternative 2: Earthen drain	• Less cost of construction	• Need more land for construction of open earthen drain • Prone to encroachment, disposal of solid waste/ debris

Selected Design: **Alternative 1**

(c) Analysis of alternative technologies/ methods of construction:

Construction method	Advantages	Disadvantages
Alternative 1: Mechanized excavation	• Quick construction	• Most costly • Width of local road not suitable for entry of mechanical excavator
Alternative 2: Manual excavation	• Relatively less costly • Creation of employment	• Would require more time

Selected method of construction: **Alternative 2**

(d) No sub-project scenario: If the storm drain sub-project is not implemented, it will aggravate the water-logging problem in the locality, which will further damage the existing road.

(e) Conclusion: RCC drain at two sides of the road is selected. The drain will be excavated manually.

Form 3: Analysis of Alternatives
(Example for a "Road" Sub-project)
(to be completed by ULBs)

Name of ULB :
Name of Sub-project : Construction of Road
Brief description of Sub-project :

(a) Analysis of alternative roads: Many roads need to be constructed at the ULB. 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 XX 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 • Private land acquisition will be required for road construction

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 maintainability • Higher effective width • No asphalt heating induced pollution	• Marginally more costly
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 sub-project scenario: If the sub-project is not implemented, 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 bazaar 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 E:

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 function. • 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 (60 - 80%)	4	The activity is very likely to occur under normal operational conditions.
Likely (40 - 60%)	3	The activity is likely to occur at some time under normal operating conditions.
Unlikely (20 - 40%	2	The activity is unlikely to occur, but may occur at some time under normal operating conditions.
Very Unlikely (0 - 20%)	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 unlikely occur the 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 (Table 7) and the Risk is Low (Table 8)

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 / habitat destruction of terrestrial (burrow) fauna (amphibia, reptile, bird and mammal)	Flora and Fauna	• Direct, Negative • Short term, Local • Reversible	Unlikely	Minor	Low
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 (e.g. aves)	Fauna	• Direct, Negative • Short term, Local • Reversible	Unlikely	Minor	Low

APPENDIX F

Guideline for Archaeological Impact Assessment

Bangladesh has long cultural history right from 3rd century BC onwards. Enormous major and minor historical records are scattered in different parts of the country. The features of these antiquities have separated values and identities. During implementation of large-scale infrastructural development work/s 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 ULBs.
(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 three 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 at the Pourashava/ CC 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 G

Impact Screening and Assessment Guideline for

Physical Cultural Resources (PCR)

(Ref: Physical Cultural Resources Safeguard Policy Guidebook, World Bank, 2009)

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 MGSP will involve significant excavation works, movement of earth and temporary flooding. The Pourashavas and 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 MGSP, 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 centres), 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 MGSP 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.
   - New highways cutting off access to living-culture PCR by residents of settlements on other side of the highway.
   - 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.
   - In scenic areas, obtrusive highways having a negative visual impact on the landscape.
   - Roads and bridges which themselves constitute PCR being damaged by increased traffic.
   - Positive impacts may also occur, through the discovery of hitherto 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 value of 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 H). 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 MGSP, 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 H

Chance Find Procedures

(Ref: The World Bank Operational Manual, 1999 OP4.11)

Works 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 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 of 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 I

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 in the MGSP.

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.

1.5 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 ULBs 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. Scope of this ECoP includes only the measures to address environmental concerns expected during the site preparation.

2.2 Site Preparation Activities by the ULBs

- Informing the community and local village councils about the likely schedule of construction
- After obtaining the consent of the community the ULBs 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 the construction operations to the ULBs 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 Siting

During planning of the works 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 ULB. Areas those 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 affects 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 identified during the planning stage as unsuitable for such use. 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 one shower for personnel engaged either permanently or temporarily on the project. Pota-cabins or separate 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 shall be 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 similar condition to that prior to the commencement of the works or to a condition agreed to with 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.

4.2 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 ULBs.

4.3 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 not less than 15m from the toe of the bank, distance depending on the magnitude and duration of flood to be withstood.

4.4 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 ULBs.

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 by different ULBs under the MGSP due to,

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 of shoulders/berms.

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 (i) good growth (ii) dense ground cover and (iii) 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 off wastes that could not be re-used safely.
- The waste management practices adopted by the Contractor shall be reviewed by the ULBs 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 ULBs.
- 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 regular activities of Pourashava inhabitants near water body due to construction or rehabilitation work, following are the Contractor's responsibilities:

i. Restriction on use of water during construction, if any, should be intimated to the community in advance.
ii. Alternate access to the water body is to be provided in case there is interruption to use of exiting 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 ULBs 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 ULBs 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 ULBs.
    iv. Erosion and sediment control devises, if site conditions so 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 site 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 ULBs 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 ULBs 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

12.1 General

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 MGSP 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 eggs or emerging fry.

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 cold be harmful to users.

Concrete, which is typically made up of aggregates, cement, water, and possibly admixtures, 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 toa 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 sued 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 inspection procedures; and improving materials safe handling.

ECoP 13.0: Vegetation Management

13.1 General

- Besides improving aesthetics and ecology of the area, the vegetation provide fuel wood, act as noise barriers, provide visual screen for sensitive areas and also generate 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 projects location from their own funds.
- Watering of trees during the initial period of two to three years shall be the responsibility of the ULBs 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 MGSP infrastructure development projects by the ULBs 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 with in 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 ULBs 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 ULB 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 works must be carried out, by Engineer appointed by the ULB 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.

APPENDIX J

Sample Terms of Reference (ToR) for Third Party Monitor[5]

BACKGROUND

The Government of Bangladesh (GoB) intends to enhance the capacity of urban local bodies (ULBs; i.e., municipalities and city corporations) in development and management of urban infrastructure, and improve municipal governance and services through undertaking the Municipal Governance and Services Project (MGSP) in selected Pourashavas and City Corporations. The Local Government Engineering Department (LGED) and the Bangladesh Municipal Development Fund (BMDF) will implement the project with participation of and the selected Pourashavas. The project will be financed by IDA, with GoB contribution for land acquisition and management, and Municipalities equity for accessing BMDF competitive finance.

Under the MGSP Sub-component 1.1 of Component 1 (Municipal Governance and Basic Urban Services Improvement), the LGED will implement 20 types of sub-projects in 26 ULBs, which include 22 Pourashavas and 4 City Corporations. Under MGSP Sub-component 2.1 of Component 2 (BMDF Operation and Institutional Improvement), the BMDF will implement 13 types of sub-projects in 119 Pourashavas; the number of ULBs may increase in the future. The MGSP will be implemented over a period of six years. The sub-projects to be implemented under the MGSP include the following: (1) Bridges (less than 30m); (2) Box Culverts; (3) Boat Landing Jetty; (4) Bus Terminal; (5) Community Center; (6) Cattle Market; (7) Drain; (8) Kitchen Market; (9) Park; (10) Pedestrian Bridge; (11) Public Toilets; (12) Road (local); (13) Retaining Wall; (14) Sweeper Colony; (15) Slaughter House; (16) Street Light; (17) Solid Waste Management; (18) Traffic Control; (19) Truck Terminal; (20) Office Building Complex; and (21) Water Supply System. The sub-projects would involve rehabilitation of existing infrastructure (e.g., roads, drains), as well as new construction (e.g., kitchen markets, bus and truck terminals).

The LGED and the BMDF intends to ensure that the proposed infrastructure takes environmental concerns into account, in accordance with GoB regulations and WB operational policies. The details of the sub-projects to be implemented under MGSP will be finalized during project implementation phase and therefore, the exact locations, size and extent of the sub-projects will remain unknown during carrying out of the environmental assessment (EA). Therefore, a framework approach has been adopted for EA of the MGSP; a detailed Environmental Management Framework (EMF) has been developed for effective environmental management of all sub-projects to be implemented under MGSP. The EMF provides guidelines for selection, environmental screening and analysis of alternatives of sub-projects. It also provides detail guidelines for carrying out environmental assessment (IEE/ EIA/ EMP) of sub-projects. Similarly, a social management framework (SMF) has also been developed for the MGSP to adequately address the social impacts resulting from the project activities. During implementation of the sub- projects (both construction and operational phases), the LGED and BMDF will be responsible for implementation of sub-project specific EMP/ ECoP, as well as preparation of progress and environmental monitoring reports. In order to ensure proper environmental management of MGSP, a third party consulting firm will be given the responsibility to independently monitor the overall performance of environmental management of MGSP, including compliance with relevant GoB and WB regulations and the provision of the EMF and SMF developed for the project.

[5] Sample ToR for Third Party Monitor. LGED or BMDF will customize in respect to their component

A. OBJECTIVES OF THE CONSULTANCY SERVICES

The main objective of the consultancy services under this terms of reference (ToR) is to allow a third party team to monitor performance of the overall environmental management of the MGSP; specifically, the third party will monitor compliance of the project activities with the Environment and Safeguards documents, including the relevant GoB regulations, WB operational policies, and provisions of the EMF/ SMF developed for the MGSP.

B. SCOPE OF WORK

The consultant will work with the concerned experts/ officials of the World Bank, the LGED and BMDF to monitor and assess environmental management issues of the MGSP. The Consultant will carry out the tasks in accordance with accepted professional standards, utilizing sound engineering, economic, financial, and management practices. For all sub-projects to be implemented at the selected ULBs by the LGED and BMDF, the third party Consulting firm will monitor the following:

- Sub-projects are selected and approved by the ULBs following the standard practice (e.g., with discussion and approval in WLCC, TLCC and PouraParishad Meetings), in line with the feasibility study (if carried out)/ ULB master plan (if present).
- Sub-project description is prepared properly, and sub-project "environmental screening" and "analysis of alternatives" are carried out properly by the ULBs following the formats and guidelines provided in the EMF.
- Decision regarding environmental assessment (EA) of the sub-project is taken by LGED/ BMDF following the provisions of the relevant GoB regulations (ECR 1997) and WB operational policies.
- Environmental assessment (EA) of the sub-projects (i.e., IEE/ EIA/ EMP) is prepared following the EMF, and satisfying the relevant provisions of the GoB and WB; and necessary environmental clearance/ approval are taken from the DoE and WB for sub-project execution.
- Specific environmental requirements/ clauses are included in the bidding document and they are being met.
- The sub-project activities meet the EMP and ECoP requirements.
- Implementation and effectiveness of the mitigation and enhancement measures specified in the EMP.
- Actual and predicted changes to the environment, so that immediate actions could be taken to mitigate unanticipated impacts.
- Actual and predicted impacts, so that better prediction/ assessment of impacts could be made in the future;
- Environmental monitoring is carried out in the field as outlined in the EMP, monitoring and progress reports are regularly prepared and shared with LGED/ BMDF/ WB; the monitoring reports are recorded and evaluated (by LGED/ BMDF/ WB), and adequate feedbacks are provided to the field management.

In addition, for any observation of non-compliance, the third party consultant will provide specific recommendations for improvement of environmental management.

C. DELIVERABLES

The consultant shall prepare the reports as described below. The reports will be provided in soft and hard copies (five hard copies).

(i) Inception Report

The consultant will submit an inception report based on the initial findings, describing the work program at the end of third week after commencement of work. The consultant will identify any constraint and suggest solutions, together with any action required by LGED/ BMDF/ WB to facilitate the successful implementation of the work.

(ii) Quarterly Report

The consultant will submit quarterly reports, summarizing monitoring activities (as outlined in the scope of works). The reports will summarize the sub-project specific monitoring outcomes for each ULB separately. A comparison of monitoring outcomes of same/similar sub-projects carried out in different ULBs should be provided, so that lessons learned and best practices could be replicated.

(iii) Final/ Completion Report

This report will be prepared at the end of the project. It will be a comprehensive report on the consultancy services throughout the contract. This report will summarize the major findings, constraints, lessons learnt; and provide recommendation for proper environmental management and monitoring in future projects. The Table of Contents of the Report will be submitted for the clearance by LGED/ BMDF/ WB six months before completion of the contract. The draft report will be provided to LGED/ BMDF one month before completion of the contract.

D. TEAM COMPOSITION

Professional Staff Input:

Team Leader (Environmental Management Specialist): Must have at least Masters Degree in environmental engineering/ management/ science from a reputed university with at least 20 years of experience in unban infrastructure related projects, some of which should be in projects funded by multilateral financial institutions;

Environmental Specialist (1): Must have at least Masters Degree in environmental engineering from a reputed university with at least 10 years of experience in unban infrastructure related projects, some of which should be in projects funded by multilateral financial institutions.

Civil Engineers (2): Must have B.Sc. degree in civil engineering from reputed university with at least 8 years of experience in unban infrastructure related projects.

Junior Field Engineers (5): Must have B.Sc. degree in civil/ water resources/ environmental engineering from a reputed university with at least 2 years of experience in urban infrastructure related projects.

Socio-economic Specialist (1): Must have at least Masters degree in social science or related discipline from a reputed university with at least 8 years of experience in socio-economic issues of urban infrastructure related projects.

Junior Sociologist (3): Must have at least Bachelor degree in social science or related discipline from a reputed university with at least 2 years of experience in socio-economic issues of urban infrastructure related projects.

Ecologist (1): Must have at least M.Sc. degree in biological science or related discipline from a reputed university with at least 8 years of experience in biological / ecological issues of urban infrastructure related projects.

Junior Ecologist (2): Must have B.Sc. degree in biological science or related discipline from a reputed university with at least 2 years of experience in biological / ecological issues of urban infrastructure related projects.

Support Staff:
The Consultant will provide necessary support staff (draftsmen, surveyors, enumerators and office support staff) needed in order to carry out their tasks and fulfill their responsibilities effectively.

E. SUPPORT SERVICES

The Consultant will include cost of office accommodation, operating costs for vehicles and communication services for effectively conducting their assignment.