

# Initial Environmental Examination

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## BAN: Second City Region Development Project – Manikganj Drainage Subproject

Package No. CRDP-II/LGED/Manikganj/NCB/2018/W-01

Prepared by Local Government Engineering Department, Government of Bangladesh for the Asian Development Bank.

## **CURRENCY EQUIVALENTS**

(as of 21 February 2019)

Currency Unit = taka (Tk)

Tk1.00 = \$0.0119

\$1.00 = Tk83.89

## **ABBREVIATIONS**

ADB	-	Asian Development Bank
CRDP	-	City Region Development Project
DOE	-	Department of Environment
EARF	-	environmental assessment and review framework
ECC	-	Environmental Compliance Certificate
ECR	-	Environmental Conservation Rules
EHS	-	environmental, health and safety
EIA	-	environmental impact assessment
EMP	-	environmental management plan
GRC	-	grievance redress committee
GRM	-	grievance redress mechanism
IEE	-	initial environmental examination
LGED	-	Local Government Engineering Department
PDSC	-	preparation, design and supervision consultant
NGO	-	nongovernment organization
NOC	-	no objection certificate
O&M	-	operation and maintenance
PIU	-	project implementation unit
PMCU	-	project management and coordination unit
REA	-	rapid environmental assessment
ROW	-	right-of-way
SPS	-	Safeguard Policy Statement

## **WEIGHTS AND MEASURES**

°C - degree Celsius

ha - hectare

km - kilometer

m - meter

mm - millimeter

## **NOTE**

In this report, "\$" refers to United States dollar.

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## EXECUTIVE SUMMARY

The Second City Region Development Project (the project) will support development in the city regions of Dhaka and Khulna by building upon infrastructure and capacity building initiatives implemented during the first City Region Development Project (CRDP) funded by the Asian Development Bank (ADB). The project will finance additional crucial infrastructure in urban and peri-urban areas needed to stimulate growth and improve livability in Dhaka and Khulna, two densely populated rapidly growing city regions of Bangladesh. The project will also continue strengthening capacity for project development, sustainable service delivery, and community awareness. The project will be implemented over a 5-year period.

**Subproject Scope.** This initial environmental examination (IEE) report has been prepared for one of the subprojects of the project in the municipality of Manikganj that is covered under package number CRDP-II/LGED/ Manikganj/NCB/2018/W-01. This subproject is composed of activities for the rehabilitation of the Manikganj Khal (“khal” is the local term for “canal”), which are: (i) re-excavation to remove the silts along Manikganj Khal; (ii) slope rehabilitation and protection, including construction and/or rehabilitation of footpaths along the river banks; and (iii) landscaping selected areas of the river banks. The total length of the canal to be rehabilitated is 6.15 kilometers (km) and its slope protection including walkway construction is 6.0 km. All construction, rehabilitation and improvement works will be undertaken within existing rights of way.

**Categorization.** ADB requires the consideration of environmental issues in all aspects of ADB’s operations, and the requirements for environmental assessment are described in ADB SPS, 2009. Using ADB rapid environmental assessment checklist, the subproject is classified as Environmental Category B per the ADB SPS, 2009 as no diverse, irreversible or unprecedented significant impacts are envisaged. ADB’s Environment and Safeguards Division confirmed this categorization on 27 August 2018. Accordingly, this IEE has been undertaken, which assesses in more detail the likely environmental impacts of the subproject and provides an environmental management plan (EMP) specifying the required mitigation and monitoring measures to ensure that these impacts are managed to acceptable levels. This IEE also emphasizes the need to incorporate pollution prevention and control technologies during the design, construction, and operation of the subproject and adhere to internationally recognized standards such as the World Bank Group’s Environment, Health and Safety (EHS) Guidelines.

**Environmental Management.** The potential impacts and mitigation measures have been identified through review of the subproject designs, discussion with the designers, and stakeholder consultation. An EMP is included as part of this IEE, which discusses the following:

- (i) mitigation measures for environmental impacts during implementation; and
- (ii) an environmental monitoring program, and the responsible entities for mitigating, monitoring, and reporting.

The subproject alignments are not within or located near any ecologically critical areas, and will not have any significant negative impact on the physical, biological and social environment. This IEE has been conducted to evaluate any potential environmental impacts of the subproject and propose measures to mitigate these impacts, including monitoring.

The subproject does not involve any special considerations regarding location since the drainage itself occupies existing rights-of-way (ROW). There will be no drainage widening beyond these ROWs, and therefore no land acquisition is required. No private property will be affected and the methods to be used for site preparation, construction and commissioning, as well as associated

arrangements to ensure sound environmental management and safety at all times, are to be defined by the Contractor in a site-specific environmental management plan (SEMP) based on the EMP of this IEE. Contractor will submit its SEMP to Manikganj project implementation unit (Manikganj PIU) for approval. These will cover the following areas of impact which are potentially significant but can be mitigated by the adoption of good practices: (i) impedance of traffic, (ii) noise pollution and vibration, (iii) waste generation, (iv) release of silt from excavations, (v) water pollution, (vi) air and dust pollution, (vii) community health and safety risks, and (viii) occupational health and safety.

**Grievance Redress Mechanism.** The project will adopt the grievance redress mechanism (GRM) outline of the first CRDP. The GRM shall be set up to register grievances of the people regarding technical, social and environmental aspects. The process will be designed to be transparent, gender responsive, culturally appropriate and commensurate to the risks and adverse impacts of the project, as well as readily accessible to all segments of the affected people. The project GRM will not supersede any legal government grievance procedures. Affected people are to be informed about the mechanism through media and public outlets. This participatory process shall ensure that all views of the people are adequately reviewed and suitably incorporated in the design and implementation process.

**Implementation Arrangement.** The executing and implementing agency is the Local Government and Engineering Department (LGED) of the government of Bangladesh. The LGED will establish a project management and coordination unit (PMCU) comprising officials including an Environmental Safeguard Officer who is a permanent employee of LGED. The PMCU will be strengthened with external experts or consultants in environmental and social safeguards, including experts on finance, procurement, technical areas, and contract management. PIUs will be established at the local level where subprojects are located. In this subproject, Manikganj *pourashava* will serve as the PIU. The PMCU and Manikganj PIU will have responsibility for overseeing project management, including overseeing EMP implementation.

For civil works, the Contractor will be required to (i) obtain all statutory clearances prior to commencement of civil works; (ii) establish an operational system for managing environmental impacts; (iii) prepare a SEMP based on the EMP of this IEE, and submit to Manikganj PIU for approval; (iv) carry out all of the monitoring and mitigation measures set forth in the approved EMP; and (v) implement any corrective or preventive actions set out in safeguards monitoring reports that the PMCU will prepare from time to time to monitor implementation of this IEE, EMP, and SEMP. The Contractor shall allocate a budget for compliance with these EMP measures, requirements and actions.

**Monitoring and Reporting.** The EMP compliance monitoring will be undertaken by the PMCU and Manikganj PIU, with support of external experts or consultants. Contractors will submit monthly reports to Manikganj PIU, while Manikganj PIU submits quarterly reports to the PMCU. Consistent with reporting requirements set out in the Project Administration Manual, PMCU will prepare and submit reports to ADB on a semi-annual basis. The submission of semi-annual environmental monitoring reports to ADB will continue until ADB issues a project completion report for the project.

**Conclusion and Recommendations.** The overall finding of this IEE is that the subproject will result in significant environmental benefits because the current conditions of the Manikganj Khal will be improved and will be much better for local residents, particularly in areas surrounding the drainage canal. Flooding due to clogging at the Manikganj Khal will be avoided or prevented especially during monsoon season. The provision for safety infrastructure such as railings for

walkways alongside the bank of the khal will ensure protection for pedestrians and local people. Ultimately, the subproject will result in significant economic and social benefit to the people and the *pourashava* as a whole.

The subproject will not have diverse, irreversible or unprecedented adverse environmental impacts and the potential significant impacts identified are associated with the construction phase, which can be managed through effective implementation of the EMP. No further environmental assessment is therefore required and the classification of Category B per ADB SPS is confirmed.

However, this IEE has been prepared based only on preliminary designs of the subproject. The PMCU and Manikganj PIU shall update this draft IEE based on final detailed design and submit to ADB for review and disclosure. The following are recommendations that should be included in the final detailed design and updating of this IEE:

- (i) Final detailed design on the construction and rehabilitation of Manikganj Khal, including the details on the provision of safety infrastructures such as railings along the footpaths on the embankment of the canal and areas adjacent to residential and commercial establishments;
- (ii) Final calculations of the volume of soil that will be excavated from the Manikganj Khal; and
- (iii) Footprint of the spoil disposal site identified and approved by Manikganj PIU.

The approved updated IEE shall be treated as the final IEE and shall be attached in the bid and contract documents. No works can commence until (i) the final IEE approved by ADB is provided to the Contractor, and (ii) the SEMP prepared by the Contractor is approved by Manikganj PIU. If circumstances would require, the IEE will be further updated for ADB's review during the implementation period. In the event of unanticipated impact or any design change and/or non-compliance during subproject implementation period, the IEE shall be updated to include (i) assessment of the unanticipated impact and corresponding mitigation measures, or (ii) information on the design change and assessment of associated environmental impacts, if any, and/or (iii) corrective actions, associated cost and schedule.





## I. INTRODUCTION

### A. Background

1. The Second City Region Development Project (the project) will support development in the city regions of Dhaka and Khulna by building upon infrastructure and capacity building initiatives implemented during the first City Region Development Project (CRDP)<sup>1</sup> funded by the Asian Development Bank (ADB). The project will finance additional crucial infrastructure in urban and peri-urban areas needed to stimulate growth and improve livability in Dhaka and Khulna, two densely populated rapidly growing city regions of Bangladesh. The project will also continue strengthening capacity for project development, sustainable service delivery, and community awareness. The project will be implemented over a 5-year period. Specifically, the project will support the (i) construction, upgrade and rehabilitation of selected Dhaka city region roads, bridges and culverts, including drainage; (ii) construction, upgrade and rehabilitation of drainage in Khulna city region; and (iii) development of a Khulna city corporation comprehensive solid waste management plan and small works.

2. The project will be implemented over a 5-year period. The indicative list of subprojects is summarized in the environmental assessment and review framework drafted for the project. The subprojects are largely built around 'integrated area planning' which seeks to enhance economic activity in the city regions and provides opportunities for investment, including (i) transport infrastructure upgrading; and (ii) comprehensive solid waste management planning.

3. The project has been classified as environmental category B per ADB Safeguard Policy Statement (SPS), 2009.<sup>2</sup> Project preparation was supported by (i) a project preparatory technical assistance (TA);<sup>3</sup> and (ii) a project design advance loan of \$5 million to finance preparation, design and supervision consultancy services. Part of the preparatory work was the preparation of the environmental assessment and review framework (EARF) and initial environmental examination (IEE) reports for sample subprojects in accordance with the requirements of ADB SPS, 2009. Further support was provided by ADB in preparing the EARF and IEE reports to meet the requirements for projects proposed under a sector loan modality.

4. This initial environmental examination (IEE) report has been prepared for the subproject covered by package number CRDP-II/LGED/ Manikganj/NCB/2018/W-01, which includes development program for the Manikganj Khal of Manikganj town in the form of (i) re-excavation to remove the silts; (ii) slope rehabilitation and protection, including construction and/or rehabilitation of footpaths along the river banks; and (iii) landscaping of the river banks.

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<sup>1</sup> ADB. 2010. *People's Republic of Bangladesh: City Region Development Project*. Manila.

<sup>2</sup> ADB's Environment and Safeguards Division confirmed the Category B classification of the project on 27 August 2018. A project's category is determined by the category of its most environmentally sensitive component, including direct, indirect, cumulative, and induced impacts in the project's area of influence. Each proposed project is scrutinized as to its type, location, scale, and sensitivity and the magnitude of its potential environmental impacts. Projects are assigned to one of the following four categories: (i) **Category A**. A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment is required. (ii) **Category B**. A proposed project is classified as category B if its potential adverse environmental impacts 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 for category A projects. An initial environmental examination is required. (iii) **Category C**. A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed. (iv) **Category FI**. A proposed project is classified as category FI if it involves investment of ADB funds to or through a financial intermediary.

<sup>3</sup> ADB. *People's Republic of Bangladesh: City Region Development Project II*.

## **B. Purpose of the Initial Environmental Examination**

5. The purpose of this IEE is to describe the assessment of environmental impacts due to the proposed subproject based on the detailed design developed under the project, and to specify measures to address these impacts. This IEE is based on engineering design information, a field visit, and secondary data to characterize the environment within and around the subproject area. It contains the results of interviews and consultations with stakeholders. This IEE includes an environmental management plan (EMP) outlining mitigation measures for the potential environmental impacts of the subproject and describes the monitoring and reporting requirements per ADB Safeguard Policy Statement (SPS), 2009 and applicable government laws and regulations. This IEE will form part of the civil works contract documents of the subproject.

6. Screening using ADB's rapid environmental assessment (REA) checklist for roads and drainage (**Error! Reference source not found.**) was initially conducted, and results of the rapid assessment show that the project is unlikely to cause diverse, irreversible or unprecedented significant impacts, and therefore classified under Category B per ADB SPS, 2009. ADB's Environment and Safeguards Division confirmed this categorization on 27 August 2018. Thus, this IEE has been prepared in accordance with ADB SPS, 2009 requirements for environment category B projects. The location of the subproject is described in Section III.

## **C. Subproject Justification**

7. During monsoon season, stormwater run-off from community areas together with the overflowing river water from the upstream of the Kaliganga River, flow into the low-lying catchment area and enters the Manikganj Khal. Major portion of the stormwater at the Manikganj Khal then flows back to Kaliganga River through an outfall with sluice gate in Beautha Bazar, and the rest through another outfall with sluice gate at the other end in Shonakandor, which drains out to the downstream portion of Kaliganga River. The stormwater run-off from the community and catchment area within the Manikganj Town flows either straight into the Manikganj Khal or through the town's internal canals that eventually drains to Manikganj Khal. This scenario justifies the need to maintain the Manikganj Khal in order for it to serve its purpose as a major flood control infrastructure for Manikganj town. Without this maintenance initiative, the volume capacity of Manikganj Khal may decline through time and flooding in the town becomes an imminent threat in the future.

## **D. Extent of the Study**

8. This IEE has been carried out based on the available subproject details and concept designs developed by the design team of the project. Minor changes may occur in the structural component of the subprojects at the detailed designing stage. The scope of the IEE has been confined to project related activities associated with design, construction (e.g., site clearing, excavation, raw materials and spoils storage and transport, paving, camping, disposal sites) and operation stages. As such, this IEE will be updated based on the final detailed design at a later stage. No civil works will commence unless this IEE is updated based on the final detailed design and approved by both ADB and government of Bangladesh.

## **E. Methodology**

9. This IEE has been carried out using reconnaissance survey, field visits, consultation with stakeholders, review of existing data, assessment to identify adverse impacts and preparation of EMP and monitoring program at all stages of subproject implementation. Physical assessments

were made for entire corridors with respect to terrestrial and aquatic resources, including physical cultural resources and other natural and man-made infrastructures.

## II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

10. ADB will not finance any project if it does not comply with ADB SPS, 2009 nor will it finance any project if it does not comply with its host country's environmental and social safeguard laws. Where discrepancy between ADB and government's policies exist, the stricter policy will prevail. Moreover, ADB SPS, 2009 applies to all ADB-financed and/or ADB-administered sovereign projects, and their components regardless of the source of financing, including investment projects funded by a loan; and/or a grant; and/or other means.

### A. ADB Safeguard Policy Statement

11. ADB SPS, 2009 requires borrowers to meet a set of requirements (Safeguards Requirements 1) when delivering environmental safeguards for projects supported by ADB. The objectives are to ensure the environmental soundness and sustainability of projects, and to support the integration of environmental considerations into the project decision-making process. Hence, the project is required to comply with these requirements. Summary of the step by step process is discussed below in this section. Detailed discussions are provided in the ADB SPS, 2009.<sup>4</sup>

12. **Screening and Categorization.** Subprojects are to be screened for their expected environmental impacts and are assigned to a specific category (footnote 2). Categorization is to be based on the most environmentally sensitive component. However, for subproject(s) with component(s) that can trigger Category A or with potentially significant adverse impacts that are diverse, irreversible, or unprecedented, PMCU shall examine alternatives to the subproject's location, design, technology, and components that would avoid, and, if avoidance is not possible, minimize adverse environmental impacts and risks, and to meet Category B categorization. The rationale for selecting the subproject location, design, technology, and components will be properly documented, including, cost-benefit analysis, taking environmental costs and benefits of the various alternatives considered into account. The "no action" alternative will be also considered. In general, criteria that can trigger subproject's 'Category A' are discussed in Section II of the EARF.

13. **Environmental Assessment.** Environmental assessment shall include description of environmental and social baseline to provide an understanding of current conditions forming the benchmark against which subproject impacts are assessed. Environmental impacts and risks will be analyzed for all relevant stages of the project cycle, including design and planning stage, construction, operations, decommissioning, and post-closure activities such as rehabilitation or restoration. This IEE may be used as model document for other future drainage subprojects.

14. **Environmental Planning and Management.** The PMCU shall prepare environmental management plan (EMP) to be included in the IEE report. The EMP shall describe and address the potential impacts and risks identified by the environmental assessment. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the subproject's impact and risks. The EMP shall include the proposed mitigation measures, environmental monitoring and reporting requirements, emergency response procedures, related institutional or organizational arrangements, capacity development and

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<sup>4</sup> ADB. 2009. *Safeguard Policy Statement*. Manila.

training measures, implementation schedule, cost estimates, and performance indicators.

15. **Public Disclosure.** The LGED, through PMCU, shall submit to ADB for disclosure on ADB website so affected people, other stakeholders, and the public can provide meaningful inputs into the subproject design and implementation.<sup>5</sup>

- (i) final IEE upon receipt;
- (ii) a new or updated IEE and corrective action plan prepared during subproject implementation, if any; and
- (iii) environmental monitoring reports submitted during subproject implementation upon receipt.

16. **Consultation and Participation.** The PMCU and PIUs shall carry out meaningful consultation<sup>6</sup> with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. The consultation process and its results are to be documented and reflected in the environmental assessment report.

17. **Grievance Redress Mechanism.** The LGED, through PMCU, shall establish a mechanism to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the subproject's environmental performance. The grievance mechanism shall be scaled to the risks and adverse impacts of the subproject. As of the ADB loan processing for the project, a grievance redress mechanism (GRM) has been established and discussed in detail in Section VI below.

18. **Monitoring and Reporting.** The PMCU shall monitor, measure and document the progress of implementation of the EMP. If necessary, PMCU will identify the necessary corrective actions, and reflect them in a corrective action plan. PMCU will prepare and submit to ADB semi-annual environmental monitoring reports that describe progress with implementation of the EMP and compliance issues and corrective actions, if any. For subprojects likely to have significant adverse environmental impacts during operation, reporting will continue until ADB issues a project completion report.

19. **Unanticipated Environmental Impacts.** Where unanticipated environmental impacts become apparent during subproject implementation, PMCU shall update the environmental assessment and EMP or prepare a new environmental assessment and EMP to assess the potential impacts, evaluate the alternatives, and outline mitigation measures and resources to address those impacts.

20. **Pollution Prevention and Control Technologies.** During the design, construction, and operation of the subproject the PMCU and Manikganj PIU shall apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and

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<sup>5</sup> Per ADB SPS, 2009, prior to disclosure on ADB website, ADB reviews the "borrower's/client's social and environmental assessment and plans to ensure that safeguard measures are in place to avoid, wherever possible, and minimize, mitigate, and compensate for adverse social and environmental impacts in compliance with ADB's safeguard policy principles and Safeguard Requirements 1-4."

<sup>6</sup> Per ADB SPS, 2009, meaningful consultation means a process that (i) begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle 1; (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

Safety Guidelines. These standards contain performance levels and measures that are normally acceptable and applicable to the subproject. When the government's regulations differ from these levels and measures, the subproject shall achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific subproject circumstances, LGED through PMCU will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS, 2009.

21. **Occupational Health and Safety.** The PMCU<sup>7</sup> shall ensure that workers<sup>8</sup> are provided with a safe and healthy working environment, considering risks inherent to the sector and specific classes of hazards in the subproject work areas, including physical, chemical, biological, and radiological hazards. PMCU shall ensure to take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work by (i) identifying and minimizing, so far as reasonably practicable, the causes of potential hazards to workers; (ii) providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; (iii) providing appropriate equipment to minimize risks and requiring and enforcing its use; (iv) training workers and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment; (v) documenting and reporting occupational accidents, diseases, and incidents; and (vi) having emergency prevention, preparedness, and response arrangements in place.

22. PMCU shall ensure to apply preventive and protective measures consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines.<sup>9</sup>

23. **Community Health and Safety.** The PMCU shall ensure to identify and assess the risks to, and potential impacts on, the safety of affected communities during the design, construction, operation, and decommissioning of the subproject, and will establish preventive measures and plans to address them in a manner commensurate with the identified risks and impacts.

24. **Physical Cultural Resources.** The PMCU is responsible for siting and designing the subproject to avoid significant damage to physical cultural resources. Such resources likely to be affected by the subproject will be identified, and qualified and experienced experts will assess the subproject's potential impacts on these resources using field-based surveys as an integral part of the environmental assessment process. When the proposed location of a subproject component is in areas where physical cultural resources are expected to be found as determined during the environmental assessment process, chance finds procedures shall be included in the EMP.

25. **Environmental Audit.** When the subproject involves existing activities or facilities, PMCU is responsible to ensure that relevant external experts will perform environmental audits to determine the existence of any areas where the subproject may cause or is causing environmental risks or impacts. If the subproject does not foresee any new major expansion, the audit constitutes the environmental assessment for the subproject.

26. **Bidding and Contract Documents.** IEEs and EMPs are to be included in bidding and contract documents and verified by Manikganj PIU. The PMCU and Manikganj PIU shall also

<sup>7</sup> In case where responsibility is delegated to subproject contractors during construction phase, PMCU shall ensure that the responsibilities on occupational health and safety as described herein are included in the contract documents.

<sup>8</sup> Including nonemployee workers engaged by LGED through contractors or other intermediaries to work on project sites or perform work directly related to the project's core functions.

<sup>9</sup> World Bank Group, 2007. *Environmental, Health, and Safety General Guidelines*. Washington, D.C.

ensure that bidding and contract documents include specific provisions requiring contractors to (i) comply with all other conditions required by ADB,<sup>10</sup> and (ii) to submit to Manikganj PIU, for review and approval, a site-specific environmental management plan (SEMP), including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per SEMP; and (iv) budget for SEMP implementation, among other as may be required. No works can commence prior to approval of SEMP. A copy of the EMP and/or approved SEMP will be kept on site during the construction period at all times. Non-compliance with, or any deviation from, the conditions set out in the EMP and/or SEMP constitutes a failure in compliance and shall require corrective actions.

**27. Conditions for Award of Contract and Commencement of Work.** PMCU shall not award any works contract under the subproject until (i) relevant provisions from the EMP are incorporated into the works contract; (ii) this IEE is updated to reflect subproject's detailed design and PMCU has obtained ADB's clearance of such updated IEE; and (iii) IEE (i.e., IEE in compliance with Environmental Conservation Rules [ECR], 1997) approved by the Department of Environment (DOE) and other necessary permits from relevant government agencies have been obtained. For "design, build, and operate" type contracts, PMCU shall ensure no works under the subproject which involves environmental impacts shall commence until (i) relevant provisions from the EMP are incorporated into the works contract; and (ii) this IEE is updated to reflect subproject's detailed design and PMCU has obtained ADB's clearance for such updated IEE.

## **B. National Environmental Impact Assessment Law**

**28. Environmental Conservation Act, 1995.** Provides for the conservation of environment, improvement of environmental standards and control and mitigation of environmental pollution. In line with these provisions of the Act, the Environmental Conservation Rules, 1997 have been framed. This act provides for (i) remedial measures for injury to ecosystem; (ii) provides for any affected person due to environmental pollution to apply to DOE for remediation of the damage; (iii) discharge of excessive environmental pollutants; (iv) inspection of any activity for testing any equipment or plant for compliance to the environment act, including power to take samples for compliance; (v) power to make rules and standards with reference to environment; and (vi) penalty for non-conformance to environment act under the various sections.

**29. Environmental Conservation Rules, 1997.** The Rules outline the processes and requirements of environmental clearances for specific type of projects indicated therein, and stipulates that "no industrial unit or project shall be established or undertaken without obtaining, in the manner prescribed by rules, an Environmental Clearance Certificate (ECC) from the Director General" of the DOE. Schedule 1 of the Rules classifies industrial units and projects into four categories according to their site and impact on the environment, namely (i) green, (ii) orange-A, (iii) orange-B, and (iv) red. The rules specify the procedures for issuing ECC for the various categories of projects. Table 1 summarizes the requirements for environmental clearance application for each category.

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<sup>10</sup> Contractors to comply with (i) all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; and (c) elimination of forced labor; and with (ii) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the project sites.

**Table 1: Summary Environmental Clearance Application Requirements Per Category<sup>a</sup>**

<b>Category</b>	<b>Requirements</b>
Green	(i) Completed Application for Environmental Clearance Certificate (ECC); (ii) Payment of the appropriate fee based on Schedule 3 of ECR, 1997; (iii) General information about the project; (iv) Exact description of the raw materials to be used and the product to be manufactured (where relevant); and (v) No objection certificate from the local authority.
Orange-A	(i) Completed Application for ECC; (ii) Payment of the appropriate fee based on Schedule 3 of ECR, 1997; (iii) General information about the project; (iv) Exact description of the raw materials to be used and the product to be manufactured (where relevant); (v) No objection certificate from the local authority; (vi) Prior issued location clearance certificate (LCC) from DOE; (vii) Process flow diagram; (viii) Layout plan (showing location of Effluent Treatment Plant (ETP)); (ix) Effluent discharge arrangement; and (x) Outlines of the plan for relocation and rehabilitation (if applicable).
Orange-B	(i) Completed Application for ECC; (ii) Payment of the appropriate fee based on Schedule 3 of ECR, 1997; (iii) Report on the feasibility of the project (if still being proposed); (iv) Report on the initial environmental examination (IEE) of the project, including process flow diagram, layout plan (showing ETP), design of ETP of the project (if still being proposed); (v) Report on the EMP; (vi) No objection certificate from the local authority; (vii) Prior issued LCC from DOE; (viii) Emergency plan relating to adverse environmental impact and plan for mitigation of the effect of pollution; (ix) Outline of the relocation and rehabilitation plan (where applicable); and (x) Other necessary information as may be required.
Red	(i) Completed Application for ECC; (ii) Payment of the appropriate fee based on Schedule 3 of ECR, 1997; (iii) Report on the feasibility of the project (if still being proposed); (iv) Report on the IEE of the project and the terms of reference (TOR) for environmental impact assessment of the project; or EIA report on the basis of the TOR previously approved by DOE, including process flow diagram, layout plan (showing ETP), design of ETP of the project (if still being proposed); (v) Report on the EMP; (vi) No objection certificate from the local authority; (vii) Prior issued LCC from DOE; (viii) Emergency plan relating to adverse environmental impact and plan for mitigation of the effect of pollution; (ix) Outline of the relocation and rehabilitation plan (where applicable); and (x) Other necessary information as may be required.

<sup>a</sup> A Guide to Environmental Clearance Procedure, DOE, Bangladesh Ministry of Environment and Forests, August 2010.

30. Schedule 1 of ECR, 1997 provides the classification for industrial projects and types of development that are common in Bangladesh. Table 2 indicates the subproject's category and its likely classifications based on this schedule.

**Table 2: Government of Bangladesh Classification of the Subproject**

Subproject	Component	Equivalent in Schedule I of Environmental Conservation Rules	Department of Environment Classification
Drainage	Drainage	Construction/reconstruction/expansion of flood control embankment, polder, dike, etc.	Orange – B <sup>a</sup>

<sup>a</sup> The equivalent in the schedule is too broad. The Orange – B classification is adopted based on all similar infrastructure projects of ADB and other multilateral lenders in Bangladesh.

### **C. Application for Environmental Clearance**

31. The application and requirement for issuance of ECC are described in the ECR, 1997 and summarized in Table 1 above. This involves the completion and submission of an application using a form available from the DOE website,<sup>11</sup> which is revised from time to time. See **Error! Reference source not found.** for template being used of this date. The accomplished application form is submitted to DOE together with requirements as enumerated in Table 1 above. The proponent is also required to pay equivalent application fee prescribed in Schedule 13 of ECR, 1997.

32. The ECC is issued within 30 days from receipt of the application by DOE. Such ECC is required to be renewed every year from the date of its effectivity. For the project, PMCU is responsible for application for ECC. This ECC will cover all subprojects identified under the project. Application for said ECC is ongoing.<sup>12</sup>

33.

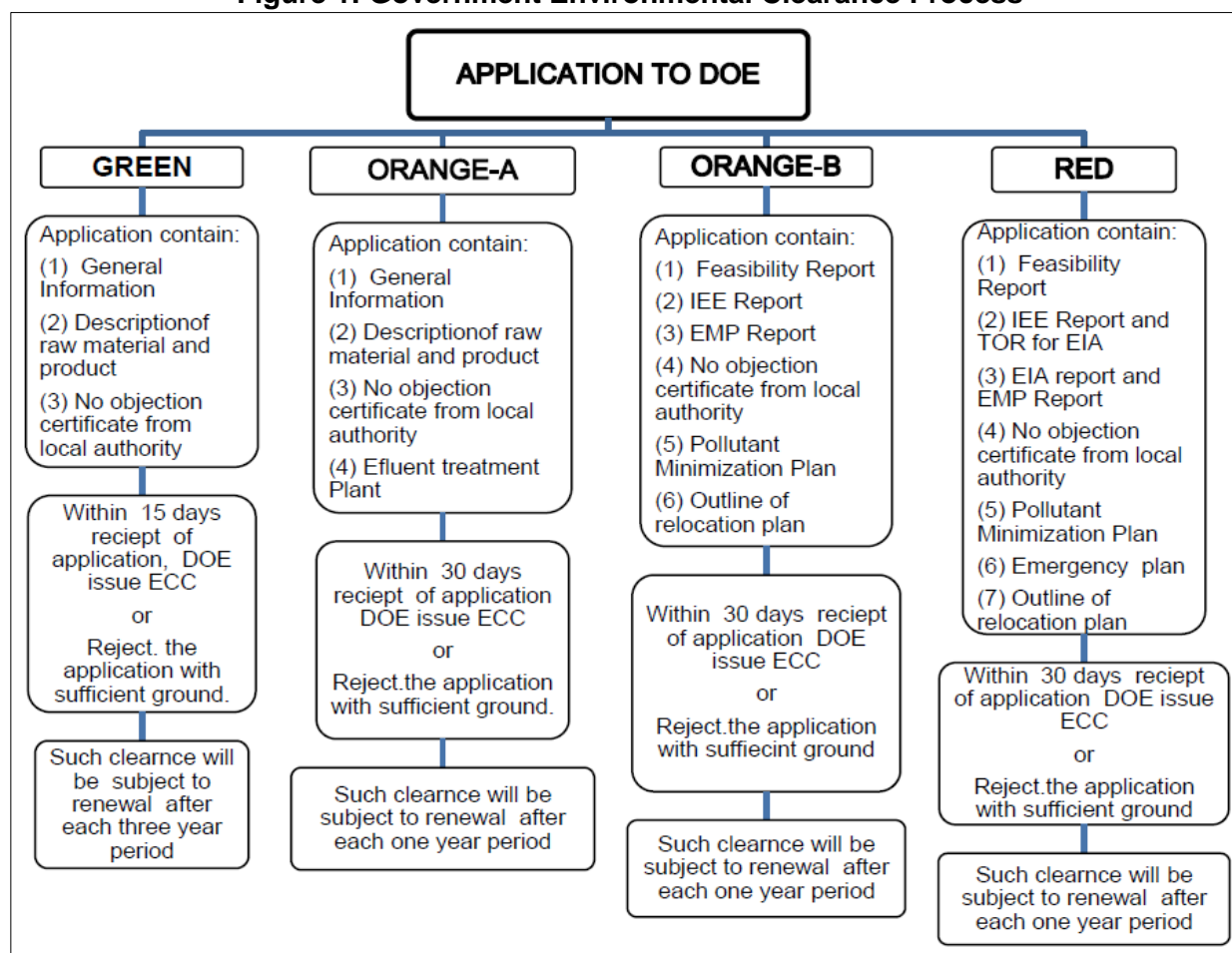
<sup>11</sup> Government of Bangladesh. *Department of Environment*.

<sup>12</sup> Per information from PMCU, the required fee for ECC application and other necessary documents have been submitted to DOE as of July 2018. Once approved for ADB project processing, this IEE will be used in the ECC application with DOE.



34. Figure 1 shows the summary of review process and timelines set under ECR, 1997, leading to the issuance of ECC by DOE.

**Figure 1: Government Environmental Clearance Process**



DOE = Department of Environment, ECC = Environmental Compliance Certificate, EMP = environmental management plan, IEE = initial environmental examination, TOR = term of reference.

#### **D. Applicable Environmental Standards**

35. The ECR, 1997 also provides the environmental standards applicable to the project. Schedule 2 of the ECR presents the national standards for ambient air quality and Schedule 4 of the ECR presents the national standards for ambient noise. Following requirements of ADB SPS, 2009, the subproject shall apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in Environmental Health and Safety (EHS) Guidelines. When the government regulations differ from these levels and measures, the subproject shall achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific subproject circumstances, LGED through PMCU will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS, 2009. In view of this,

36. Table **3** and Table 4 show the ambient air quality standards and noise level standards to be followed by the subproject.

**Table 3: Ambient Air Quality Standards**

Parameter	Location	Bangladesh Ambient Air Quality Standard ( $\mu\text{g}/\text{m}^3$ ) <sup>a</sup>	WHO Air Quality Guidelines ( $\mu\text{g}/\text{m}^3$ )		Applicable to Subproject Per ADB Safeguard Policy Statement <sup>d</sup> ( $\mu\text{g}/\text{m}^3$ )
			Global Update <sup>b</sup> 2005	Second Edition <sup>c</sup> 2000	
TSP	Industrial and Mixed	500	-	-	500
	Commercial and Mixed	400			400
	Residential and Rural	200			200
	Sensitive	100	-	-	100
PM <sub>10</sub>	Industrial and Mixed	-	50 (24-h)	-	50 (24-h)
	Commercial and Mixed	-	50 (24-h)		50 (24-h)
	Residential and Rural	-	50 (24-h)		50 (24-h)
	Sensitive	-	50 (24-h)	-	50 (24-h)
PM <sub>2.5</sub>	Industrial and Mixed	-	25 (24-h)	-	25 (24-h)
	Commercial and Mixed	-	25 (24-h)		25 (24-h)
	Residential and Rural	-	25 (24-h)		25 (24-h)
	Sensitive	-	25 (24-h)	-	25 (24-h)
SO <sub>2</sub>	Industrial and Mixed	120	20 (24-h)	-	20 (24-h)
	Commercial and Mixed	100	20 (24-h)	-	20 (24-h)
	Residential and Rural	80	20 (24-h)		20 (24-h)
	Sensitive	30	20 (24-h)	-	20 (24-h)
NO <sub>2</sub>	Industrial and Mixed	100	200 (1-h)	-	100
	Commercial and Mixed	100	200 (1-h)	-	100
	Residential and Rural	80	200 (1-h)		80
	Sensitive	30	200 (1-h)	-	30
CO	Industrial and Mixed	5,000	-	10,000 (8-h) 100,000 (15-min)	5,000
	Commercial and Mixed	5,000	-	10,000 (8-h) 100,000 (15-min)	5,000
	Residential and Rural	2,000	-	10,000 (8-h) 100,000 (15-min)	2,000
	Sensitive	1,000	-	10,000 (8-h) 100,000 (15-min)	1,000

ADB = Asian Development Bank, CO = carbon oxide, h = hour,  $\mu\text{g}/\text{m}^3$  = microgram per cubic meter, min = minute, NO<sub>2</sub> = nitrogen dioxide, PM<sub>2.5</sub> = particulate matter 2.5, PM<sub>10</sub> = particulate matter 10, SO<sub>2</sub> = sulfur dioxide, TSP = total suspended particle, WHO = World Health Organization.

<sup>a</sup> Schedule 2 of ECR, 1997.

<sup>b</sup> World Bank Group. 2007. Environmental, Health and Safety General Guidelines. Washington, D.C.

<sup>c</sup> WHO Regional Office for Europe. 2000. Air Quality Guidelines for Europe, Second Edition. Copenhagen.

<sup>d</sup> If less stringent levels or measures are appropriate in view of specific project circumstances, PMCU will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

**Table 4: Ambient Noise Quality Standards**

Receptor/ Source	National Noise Standard Guidelines, 1997 <sup>a</sup> (dB)		WHO Guidelines Value For Noise Levels Measured Out of Doors <sup>b</sup> (One Hour LA <sub>9</sub> in dBA)		Applicable to Subproject Per ADB Safeguard Policy Statement <sup>c</sup> (dBA)	
	Day	Night	07:00 – 22:00	22:00 – 07:00	Day time	Night time
Industrial area	75	70	70	70	70	70
Commercial area	70	60	70	70	70	60
Mixed Area	60	50	55	45	55	45
Residential Area	50	40	55	45	50	40

Receptor/ Source	National Noise Standard Guidelines, 1997 <sup>a</sup> (dB)		WHO Guidelines Value For Noise Levels Measured Out of Doors <sup>b</sup> (One Hour LA <sub>q</sub> in dBA)		Applicable to Subproject Per ADB Safeguard Policy Statement <sup>c</sup> (dBA)	
	Day	Night	07:00 – 22:00	22:00 – 07:00	Day time	Night time
Silent Zone	45	35	55	45	45	35

<sup>a</sup> Schedule 4 of ECR, 1997.

<sup>b</sup> WHO. 1999. Guidelines for Community Noise; World Bank Group. 2007. Environmental, Health and Safety General Guidelines.

<sup>c</sup> If less stringent levels or measures are appropriate in view of specific project circumstances, PMCU will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS, 2009.

## E. Other Relevant National Laws

37. The implementation of subprojects proposed under the project will be governed by government Environmental Acts, Rules, Policies, and Regulations. Table 5 summarizes the applicable national and local laws, regulations, and standards for environmental assessment and management.

**Table 5: Summary of Relevant Government Laws, Regulations, and Environmental Standards**

Laws, Regulations, and Standards	Details	Relevance to the subproject
Environmental Court Act, 2000	Enacted to establish environment courts and make rules for protection of environmental pollution. Environment Courts are situated at the District level but government may by notification in the official Gazette, establish such courts outside the districts. Environment Courts were given power to directly take into cognizance of any offence relating to environmental pollution. Proceeding of this Court will be similar to criminal courts. One important feature of this Act is that it has been given retrospective effect of any crime committed under environment laws and thus any crime previously committed but is not taken before any court can be taken before the Environment Court or any special Magistrate.	Environmental court has been established in Dhaka city region where the subproject is located. This court has jurisdiction over any subproject-related environmental cases or litigations or complaints elevated to it.
The <i>Pourashava</i> (Municipality) Ordinance of 1977, the City Corporation Ordinances of 1983 and the recently revised unified ordinance for all City Corporations of 14 May 2008 (Local Government Ordinances 16, and 17 of 2008); City Corporation Act 2009, 15 Oct 2009, and; <i>Pourashava</i> Act 2009, 6 October 2009.	These ordinances have clearly assigned responsibilities to the LGIs to ensure the provision of a wide range of primary and public health services including primary health care, sanitation, water supply, drainage, food and drink, birth and death registration, vector and infectious disease control, etc. for the residents. LGIs have the authority to address all related issues within their legal and administrative mandate.	The subproject aims to help Manikganj <i>pourashava</i> (as the LGI) achieve or fulfill these mandates.
National Forestry Policy, 2016	This policy specifically states the following relevant objectives (among many other objectives): (i) to	The subproject will have potential tree

<b>Laws, Regulations, and Standards</b>	<b>Details</b>	<b>Relevance to the subproject</b>
	arrest deforestation, and degradation of forest resources, enrich and extend areas under tree cover, through appropriate programs and projects, to ensure that at least 20% of the country comes under tree cover by 2035, with at least a canopy density of 50%; and (ii) to significantly increase tree cover outside state forest, through appropriate mechanisms, in both public and private land including urban areas.	cutting activities during construction or rehabilitation works. However, the subproject EMP will ensure to implement measures to comply with and support the policy objectives.
Bangladesh Labor Act, 2006	The Bangladesh Labor Act, 2006 provides the guidance of employer's extent of responsibility and workmen's extent of right to get compensation in case of injury by accident while working.	Provides for security and safety of work force during construction period. Compliance with this law is included in the responsibility of the Contractor.

EMP = environmental management plan, LGI = local government institutions.

## **F. International Environmental Agreements**

38.

39. Table 6 below lists the relevant international environmental agreements that government is party to, and their relevance to the subproject.

**Table 6: International Environmental Agreements Relevant to the Project**

<b>International Environmental Agreement</b>	<b>Year Ratified</b>	<b>Details</b>	<b>Relevance to the subproject</b>
United Nations Framework Convention on Climate Change (UNFCCC)	1997	Parties to take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects.	The subproject is subject to impact of climate change. Engineering designs of the subproject consider climate change impacts, such as flooding and river water level rise. A climate change vulnerability assessment has been conducted for the geographic coverage of the entire Second City Region Development Project, which covers the location of the subproject.
Paris Convention on Protection of the World Cultural and Natural Heritage, 1972	1983	Parties to ensure the protection and conservation of the cultural and natural heritage situated on territory of, and primarily belonging to, the State	There is no World Heritage Site within or near the drainage alignment. However, the drainage construction and rehabilitation works may impact undiscovered underground cultural and natural heritage relics during construction phase. The subproject environmental

<b>International Environmental Agreement</b>	<b>Year Ratified</b>	<b>Details</b>	<b>Relevance to the subproject</b>
			management plan (EMP) ensures measures for chance finds.

### **III. DESCRIPTION OF THE SUBPROJECT**

#### **A. Subproject Scope and Components**

40. The proposed Manikganj Khal Development subproject is composed of three schemes, namely: (i) re-excavation of the entire stretch of the khal to remove the silts, (ii) slope rehabilitation and protection, including construction and/or rehabilitation of footpaths along the khal banks, and (iii) landscaping of the khal banks. Details of the development schemes are presented in Table 7. The total length of the khal to be re-excavated is 6.15 kilometers (km) and its slope protection including walkway construction is 6.0 km. All construction, rehabilitation and improvement works will be undertaken within existing right of ways. The location of the subproject is shown in

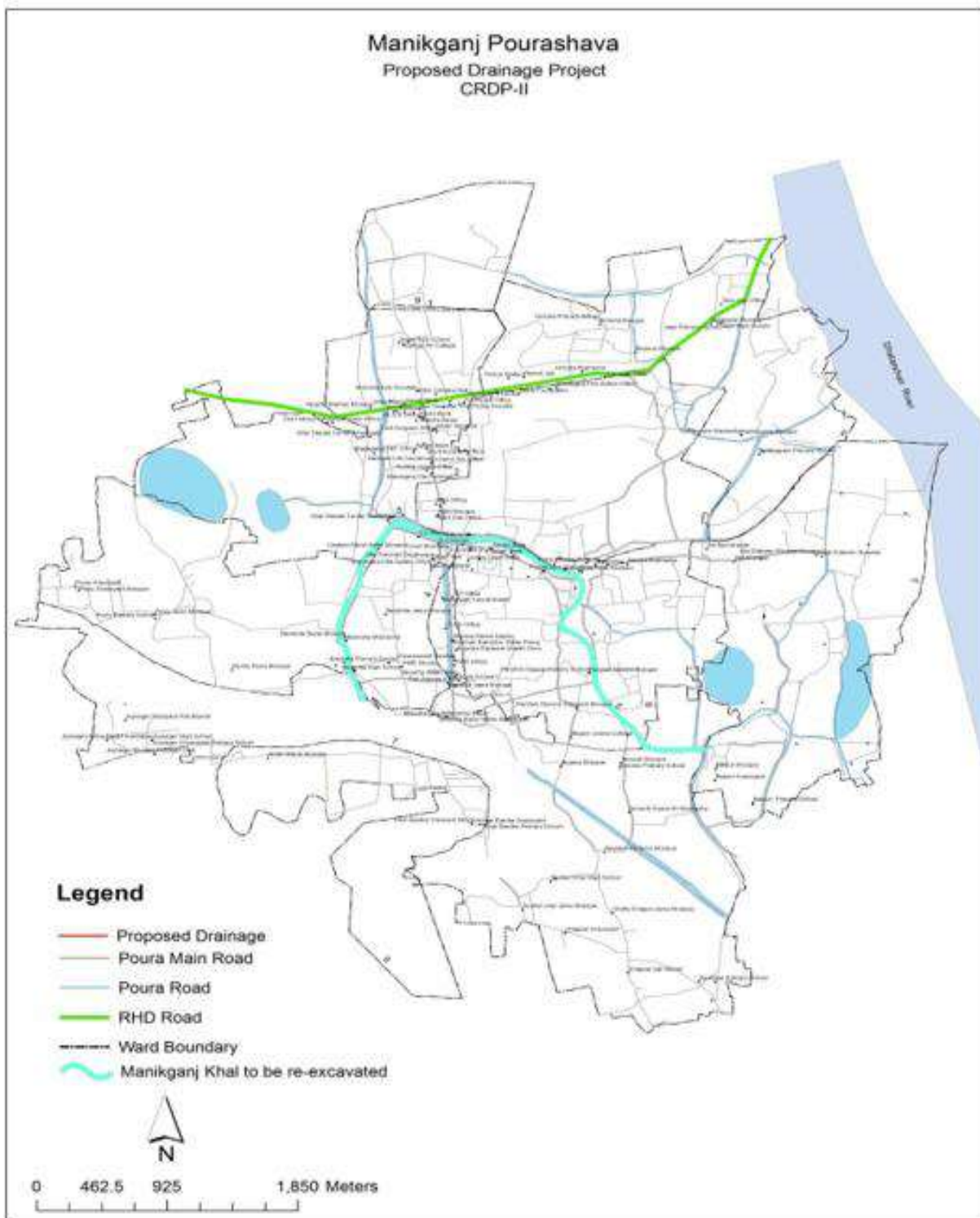
41. *Figure 2* and *Figure 3*.

**Table 7: Details of Manikganj Khal Development Schemes**

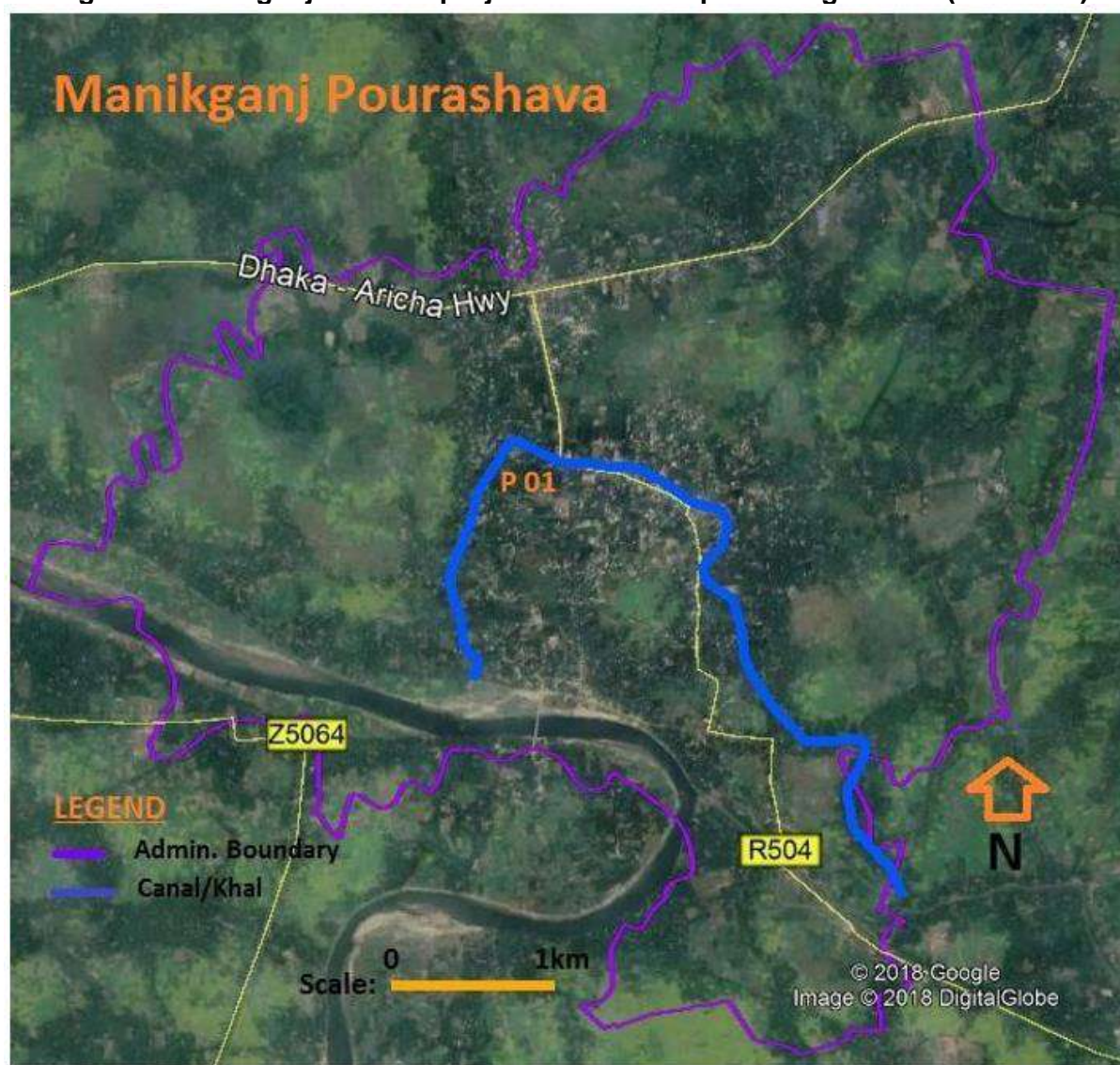
<b>Sl. No.</b>	<b>Name of Schemes</b>	<b>Outfall of Khal (km)</b>	<b>Length of Khal/Slope Protection/Walkway (km)</b>	<b>Remarks</b>
1	Re-excavation of Manikgonj Khal starting from Beautha Sluice Gate to Shonakandor Sluice Gate	Kaliganga River	6.15	To allow uninterrupted flow of and accommodate stormwater runoff from the different areas of Manikganj town, the Manikganj Khal will need to be desilted and excavated to its original depth. Apart from siltation brought by stormwater runoff, landslides at various sections also contributed to the increase of silt level.
	Slope protection including Walkway of Manikgonj Khal starting from Beautha Sluice Gate to Shonakandor Sluice Gate	Not applicable	6.00	To stabilize the eroding concrete cement protection and soil slopes, the following have been proposed: (i) rehabilitation of existing but eroding concrete cement protection at some sections, (ii) construction of slope protection for the remaining sections of the canal, and (iii) walkways or foot bridges as selected sections.
3	Landscaping	Not applicable		To provide the recreation along the banks of the existing khal within the town center, walk way or footpath has been proposed on either or both banks of the khal. This scheme will also avoid illegal encroachment of the khal lands by the local people



Figure 2: Location of the Manikganj Khal Development Subproject



**Figure 3: Manikganj Khal Subproject Location Map on Google Earth (Blue Line)**



Source: Google Earth.

42. **Khal Existing Location.** The subproject is 6.15 km long drainage canal, which is one of the main drainage canal of Manikganj Town. This drainage canal passes through the middle of the Manikganj Town. It starts from Beautha Sluice Gate at Ch. 0+000 km (start coordinate: N 23° 50' 56.18", E 89° 59' 41.97") and ends at Shonakandor Sluice Gate at Ch. 6+150 km (end coordinate: N 23° 50' 13.12", E 90° 01' 15.61"). Both ends of the Manikganj Khal is connected to the Kaliganga River. One end of Manikganj Khal meets directly with the upstream portion of Kaliganga River while the other end merges to a branch khal that flows to the downstream of the Kaliganga River. There is a 3-vent sluice gate at the start point (Ch. 0+000 m) near Beautha Bazar, known as Beautha sluice gate, and another 2-vent sluice gate near Sonakandor at the downstream end point (Ch.6+150 m), known as Sokandor/Nayakandi sluice gate. There are also two inlet channels which meets the Manikganj Khal at Ch.1+600 meters (m) near Eidgah Area and at Ch.5+100 m near Bokjuri area.

43. **Khal Existing Condition.** Major parts of the canal traverse through residential lots, and



trade and commercial areas. This khal is currently in poor condition, and in many locations are silted up thus hindering drainage flow of storm water run-off. Sometimes, it is being used as a garbage dumping site by some of the unconscious town dwellers and some sections of the embankment are illegally encroached by local people, either as settlement or as area for business activities. Photos of existing condition of the subproject khal are shown in Figure 4.

44. While this canal is full of storm water during monsoon season, it almost dries up during summer season. Growth of grasses is observed during the dry season. Some trees are also observed to have grown on the banks of the canal and deemed to help stabilize and protect the embankments from being eroded. As such, these trees will be preserved during the slope rehabilitation and construction activities. Majority of the vegetations along the stretch of this canal are the naturally grown bamboo grasses and other perennial grasses found in the area.

45. The municipality envisions to make a section of the canal (about 1.5 km section that is located within the town center) as a recreational area in the future. The design will ensure that the canal will not totally dry up during summer season and that flow of water will be maintained. Hence, the excavation and desiltation of the canal is necessary.

**Figure 4: Actual Photos of Existing Condition of the Manikganj Khal**



**Town Center Area**



**Typical Outlet from Community Canals to the Manikganj Khal**

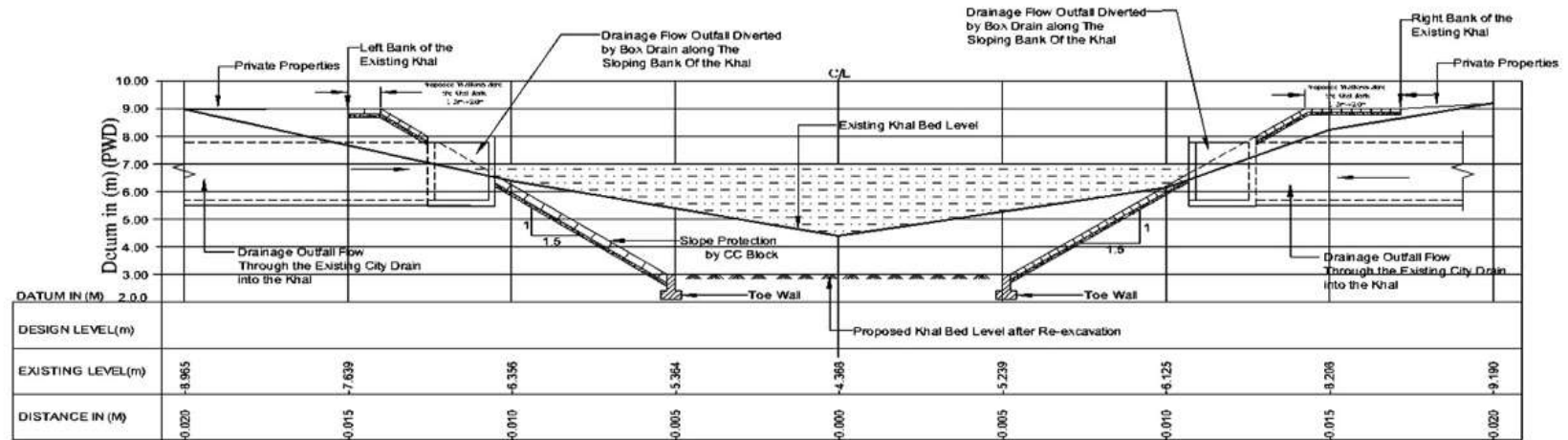


**Outfalls at both ends of Manikganj Khal Leading to Kaliganga River**



46. The proposed interventions for the development of the subproject are displayed in 2 cross sections as shown in Figure 5 and Figure 6 below:

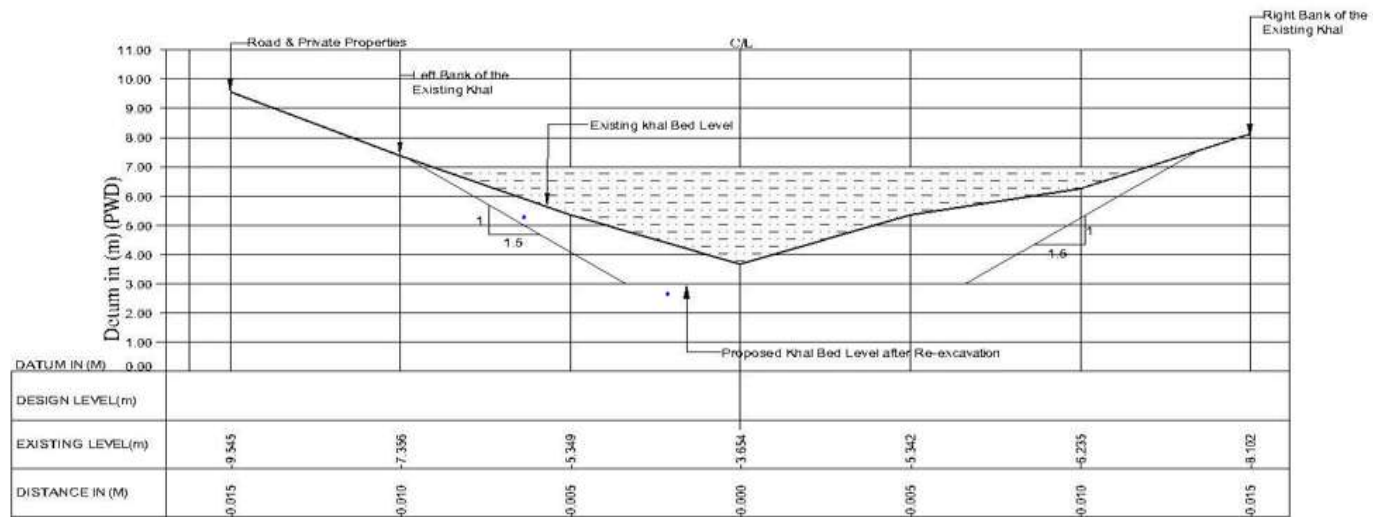
**Figure 5: Cross section of Khal Re-excavation with Slope Protection and Land Scaping Beautification  
(inside the Town Area)**



**Crossing Section of the Manikgonj Khal Re-excavation and Slope Protection within the City Area under Land Scaping and beautification**



**Figure 6: Cross Section of Khal Re-excavation with Slope Protection and Land Scaping Beautification (outside the Town Area)**



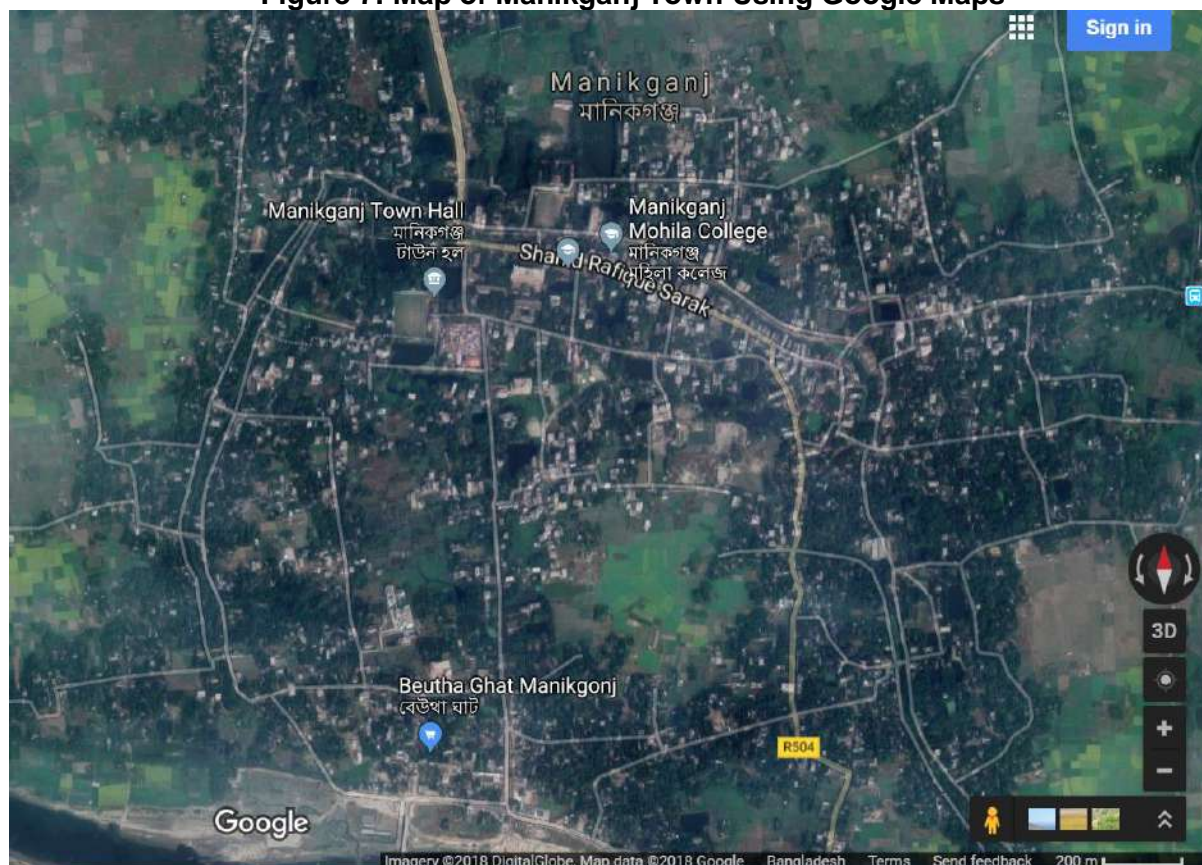
**Crossing Section of the Manikgonj Khal Re-excavation and Slope Protection Beyond the City Area**

## IV. DESCRIPTION OF THE ENVIRONMENT

### A. Physical Resources

47. **Location and Extent.** The subproject is located in Manikganj *pourashava*, which is in Manikganj District as shown in Figure 7 below. Manikganj Municipality was established in 1972 and consists of nine wards and 49 mahallas. The area of the town is 20.59 square kilometers (km<sup>2</sup>).

**Figure 7: Map of Manikganj Town Using Google Maps**



Source: Google Earth.

48. **Topography, Soil and Geology.** The area is flat and poorly drained with elevations ranging from 9-15 m above sea level. Soils are somewhat porous allowing for some seepage of surface water into the soil. The district is subject to seasonal flooding. Channelized drainage covers most of the land, through which storm water runoff flow to local rivers, including Kaligonga River. Conversely, those rivers are part of a regional network that, once flooded, will also cause flooding in the locality. Manikganj is one of the most flood-vulnerable districts of Bangladesh, and Manikganj town is more vulnerable to flood than other places in the district.

49. **Climate.** The temperature at Manikganj ranges from 12 to 32 degrees Celsius (°C), and the monthly rainfall averages at 430 millimeters (mm) during monsoon and 10 mm during the winter dry season.

50. **Air Quality.** No information is available on local air quality. Since there are few commercial activities in the area and vehicle usage is slight, the area is expected to have no

significant issue on ambient air quality. Nonetheless, through the subproject, baseline information on ambient air quality at the subproject sites will be conducted prior to start of any civil works.

51. **Noise Level.** No information is available on local noise level. Prior to construction activities, subproject contractors will conduct noise level measurements as baseline. During construction, contractors will be required to conduct noise level measurements and ensure that the subproject does not cause deterioration of noise level beyond the standards. This is included in the environmental management plan hereof.

52. **Surface Water.** There are two main river channels that drain the area. One is the Dhaleswari River that flows from north to south along a channel that is located east of Manikganj Municipality. Another one is the Kaliganga River that is located to the south and west. The subproject drainage system converges directly with the Kaliganga River.

53. **Groundwater.** Groundwater is abundant in Bangladesh. Water tables are generally shallow and aquifers are productive. The main aquifer that provides water supply is found at a depth of greater than 50 m.

## **B. Ecological Resources**

54. **Flora Resources.** The ecological setting is mostly a settled countryside with typical homestead and roadside vegetation. There are no extensive forested areas within or near the vicinity. Tree cover in the area are mostly from cultivated species which could be as high as 30% of the land area. Trees growing at homesteads also provide easy access to fuel wood, fodder and other products. A large number of multipurpose trees (fruit, timber, fodder, medicine) are also grown in the area.

55. The Genetic alluvium occupies the greater part of Manikganj District where Manikganj town is located. The soils of the district are mainly loamy on ridges and clay in basins. The cropping pattern is largely similar to that of adjoining districts. The major agricultural crops are rice, jute, wheat, pulses, oil seeds, vegetables, spices, potato, sweet potato, cheena and kaun. Among rice crops, aman covers the largest area followed by aus and boro.<sup>13</sup>

56. The village homestead of the district is usually concealed by the dense and lush green foliage of a wide variety of trees, shrubs, and thickets of bamboos and bananas. Main feature of the landscape is the palm. The most common is the date palm then followed by the Palmyra palm, betel nut palm and the coconut palm. These are commonly found in the vicinity of the village dwellings (footnote 13).

57. The homestead flora is an important asset for the rural poor and plays a vital role in the household economy as it is the source of food, fuel and fodder. Homesteads are protected by shrubby plants like kata mehedi (*Lawsonia inermis*), fonimonasha (*Opuntia dillenii*), arhar (*Cajanas cajan*), dhoincha (*Sesbania spp.*) etc. Besides, the floating macrophytes which are commonly seen in the ponds include kachuripana (*Telanthra philoxeroides*), topa pana (*Pistiastratiotes lemnae*), khudi pana (*Lemnapaucicos tata*), panifall (*Trapa bispinosa*), the floating ferns like azolla pinnata, salvinia cucullata etc. In the shallower ponds are found species of panchuli (*Nymphoides*), padma (*Nelumbo nucifera*), the water lilies, shapla (*Nymphaea pubescens*), kalmi (*Polygonum*), helencha (*Tilanthra philoxeroides*) etc. (footnote 13).

<sup>13</sup> Bangladesh Bureau of Statistics. December 2013. District Statistics 2011 for Manikganj.



58. Moreover, some climbers and twiners like shim or pea, satamuli, pui, gulancha, kumarilata etc., grow with the support of homestead thickets, shrubberies and backyard trees. Also, a variety of epiphytic such as orchids and epiphytic ferns grow on large trees. In addition, many plants are grown at the homesteads mainly for aesthetic purposes. Such plants are hasnahena (*Cestrum nocturnum*), patabahar, gandhoraj (*Gardenia augusta*), dolon champa, kamini, jaba (*hibiscus rosa sinnunsis*), madhumalaati, halde karabi (*Theveti peruviana*), togor (*Tabernaemontona coronaria*), shefali (*Nyctanthes arbor tristis*), beli (*Jasminun scandens*), aparajaya, sandhya malati etc. (footnote 13).

59. Other common trees found in the District include sheel koroy (*Albizzia procera*), khari koroy (*Albizzia lucidior*), pitraj (*Aphanamixis polystachia*), chatim (*Alstonia scholarsis*), sil bhadi (*Garuga pinnata*), kadam (*Anthocephalus cadamba*), palash (*Butea monosperma*), hijol (*Barringtonia acutangula*), shimul (*Bombax ceiba*), sonalu (*Cassia fistula*), neem (*Azadirachta indica*), gamar (*Gmelina arborea*), sajna (*Moringa obifera*), tetul (*Tamariandus indica*), arjun (*Terminalia arjuna*), sheora (*Streblus asper*), raintree (*Samanca saman*), jarul (*Lagerstroemia speciosa*), mandar (*Erythrina variegata*), sisoo (*Dalbergia sissoo*) etc. (footnote 13).

60. Fruit trees are also abundant, which include amlaki (*Phyllanthus emblica*), ata (*Anona squamosa*), lotkan (*Baccaurea ramiflora*), bel (*Aegle marmelos*), mango (*Mangifera indica*), jack-fruit (*Artocarpus heterophyllus*), papaya (*Carica papaya*), kamranga (*Averrho karambola*), chalta (*Dillenia indica*), guava (*Psidium guajava*), dalim (*Punica granatum*), dumur (*Ficus sp*), amra (*Spondias pinnata*), black-berry (*Syzygium cumini*), kat badam (*Terminalia catappa*), boroi (*Zizyphus mauritiana*), olive (*Elaeocarpus tectorius*), gab (*Diospyros precatorius*) etc. are also found in the area. Common wayside trees are banyan, (*Ficus benghalensis*), ashatha (*Ficus religiosa*), debdaru (*Polyalthia longifolia*), akashmoni (*Areica auriculiformis*), mehogani (*Swietenia macrophylla*) (footnote 13).

61. **Fauna Resources (Mammals).** The mammalian fauna that are commonly seen in Manikganj District are Bengal fox (*Vulpes bengalensis*), common mongoose (*Herpestes edwardsi*), five striped palm squirrel (*Funambulus pennanti*), common otter (*Lutra perspicillata*), common house rat (*Rattus rattus*), house mouse (*Mus musculus*), Indian porcupine (*Hystrix indica*), rhesus monkey (*Macaca mullata*), and a few species of bat. Some of the mammals that were once usually seen in this area have now become rare. These are jungle cat (*Felis chaus*), small Indian civet (*Viverricula indica*), large bandicoot (*Bandicota indica*), jackal (*Canis aureus*) etc. (footnote 13).

62. **Fauna Resources (Avian).** Few birds are commonly found in both rural and urban areas. These are the crow (*Corvus splendens*), sparrow (*Passer domesticus*), bhat shalik (*Acridotheres tristis*), black drongo (*Dicurus macrocercus*), and reudinted bulbul (*Picnonotus cafer*), other common birds include magpie (*Copsychus saularis*), babui (*Ploceus philippinus*), common kingfisher (*Alcedo atthis*), lesser golden backed woodpecker (*Picus myrmecophoneus*), spotted dove (*Streptopelia chinensis*), brahminy kite (*Haliastur Indus*), pond heron (*Ardeola grayii*), little cormorant (*Phalacrocorac niger*), white breasted water hen (*Amaurornis phoenicurus*), common hawk cuckoo (*Cuculus varies*) and barn owl (*Tyto alba*). The song birds like bush lark, halde pakhi, warblers, purple sun bird etc. are also found (footnote 13).

63. Various species of migratory birds also enter into Bangladesh mainly during the winter season. These are fantail snipe (*Gallinago gallinago*), pintail snipe (*Gallinago stenura*), common teal (*Anas crecca*), common slelduck (*Tadorna ferruginea*), grey leg goose (*Anser anser*), common sandpiper (*Tringa hypoleucos*), grey wagtail (*Motacilla cinerea*) pied harrier (*Circus melenoleucos*), brown headed gull (*Larus brunicephalus*), common pochard (*Aythya ferina*), little

ringed plover (*Charadrius dubius*), common tern (*Sterna hirusdo*), large pariah kite (*Milvus migrant*) etc. (footnote 13).

64. **Fauna Resources (Amphibians and Reptiles).** Among the reptilia, there are many species of lizards, of which the house geckoes or tik-tiki (*Hemidactylus brooki*.) are definitely the most common and best known. The larger tokay gecko (*Gekko gekko*) is also common. Other species of lizards are yellow water monitor, stripped skink, grey land monitor etc. Few species of snakes that are found here are ghargini shap (*Lycodon jara*), dhora shap (*Xenocrophis piscator*), paina shap (*Enhydris enhydris*), gokhra (*Naja naja*), rat snake (*Ptyas nigromarginatus*), banded krait (*Bungarus fasciatus*). A few species of turtles tortoises such as pond tortoise, common roof turtle, Peacock (*Pavo cristatus*) Soft Shell turtle etc. are also found. Most common amphibians include kuno bang (*Bufo melanostictus*), bhawa bang (*Rana tigerina*), kotkoti bang (*Rana cyanophlyctis*) etc.

65. **Fauna Resources (Fishes).** Various types of water bodies like ponds, big tanks, bezels, rivers etc, are the habitats for fish population. The principal types of fish that are available in this District are ruhi (*Labeo rohita*), katla (*Catla catla*), mrigel (*Cirrhinus mrigala*), airh (*Mystus aor*), kalboush (*Labeo calbasu*), magur (*Clarias-batrachus*), koi (*Anabas testudineus*) shoil (*Channa striatus*), hilsa (Hilsa ilisa), sorputi (*Puntius sarana*), chitol (*Notopterus chitala*), pabda or butter (*Ompok pabda*), bacha (*Eutropichthys vacha*), pangas (*Pangasius pangasius*), bele (*Glossogobius giuris*), tengra (*Mystus vittatus*), etc. (footnote 13).

66. Some exotic varieties of fishes like grass carp (*Cteopharyngodon idella*), silver carp (*Hypophthalmicthys molitrix*), telapia (*Oreochromis mossambicus*), nilotica (*Oreochromis niloticus*), etc. have also been introduced for commercial pisciculture in ponds and tanks.

67. From these flora and fauna resources, none is considered endangered or critical per list from IUCN Red List. The subproject area is considered a developed and modified urban setting. From various field visits conducted by the PMCU in 2018, it was confirmed that no critical habitats within and around the subproject area.

### C. Economic Development

68. **Land Use.** Total cultivable land 16,700 hectares (ha) with about 48% under irrigation. Some 9% of agricultural land is under single cropping; 61% is double cropped and 28% triple cropped. About 21% of peasant farmers are landless, and 65% are considered marginal in terms of land holdings. The market value of the land of the first grade is Tk8,500 per 0.01 ha. There are 21 hats and bazaars.

69. **Industry and Agriculture.** There are few large industries in the area and those present are of the traditional type, such as jute, textile and tobacco. The town has a good range of small scale manufacturing and service enterprises such as repairing shops for rickshaw, construction industry, furniture and metal work units, and electrical and mechanical repair workshops. The major agricultural and horticultural products include rice, potato, wheat, lentils, maize, jackfruits, papaya, chilly, sweet potato, spinach, sweet gourd, gourd, bitter gourd, bean, eggplant, cucumber, banana and wax apple. Moreover, good quality milk and milk products including ghee (clarified butter) and sweetmeats are produced in the locality.

70. **Infrastructure, Transport and Communications.** Existing infrastructure in Manikganj Upazila includes roads of varying degrees of maintenance. Some are degraded in condition and often impassable except at very slow speeds. Roads inventoried based on one source include

92 km of pucca, 15 semi-pucca and 498 km of mud roads.

#### **D. Social and Cultural Resources**

71. **Demography.** The present Population is around 238,000 of which 50.23% are males. Religious affiliation is as follows: Muslim 85.65%, Hindu 14.2% and Christian 0.02%. Local Market and Bazar: There are 28 hats and bazaars, 12 fairs, most noted of which are Joyra Cattle market, Tora Biltu Smriti Hat, Manikganj Bazar, Bus-stand Bazar, Beutha Bazar, Betila Rash Mela, Sivabari Mela, Garpara Imambari Maharram Mela etc.

72. **Health and Educational Facilities.** There are numerous health facilities like hospital 1, Upazila health complex 1, maternity and child care center1, eye hospital 1, clinic 7, satellite clinic 1 and family planning center 10 etc. There are numerous educational facilities within the Upazila like college 9, law college 1, B Ed college 1, PTI 1, vocational institute 1, secondary school 43, primary school 107, kindergarten 30, madrasa 13.

73. **Water Supply and Sanitation.** There is no piped water supply system in the Upazila. The sources of drinking area include tube-well (87.50%), tap (8.64%), pond (0.29%) and others 3.57%.; and the sanitation facilities are available in the form improved sanitary latrine in 53.44% (rural 45.94% and urban 83.36%) dwelling households of the upazila and 43.31% (rural 50.38% and 15.09%) of dwelling households use nonsanitary latrines; 3.25% of households do not have latrine facilities.

74. **Access to Electricity.** All the unions of the upazila are under rural electrification network. However, 37.79% of the dwelling households have access to electricity.

#### **E. History, Culture and Tourism**

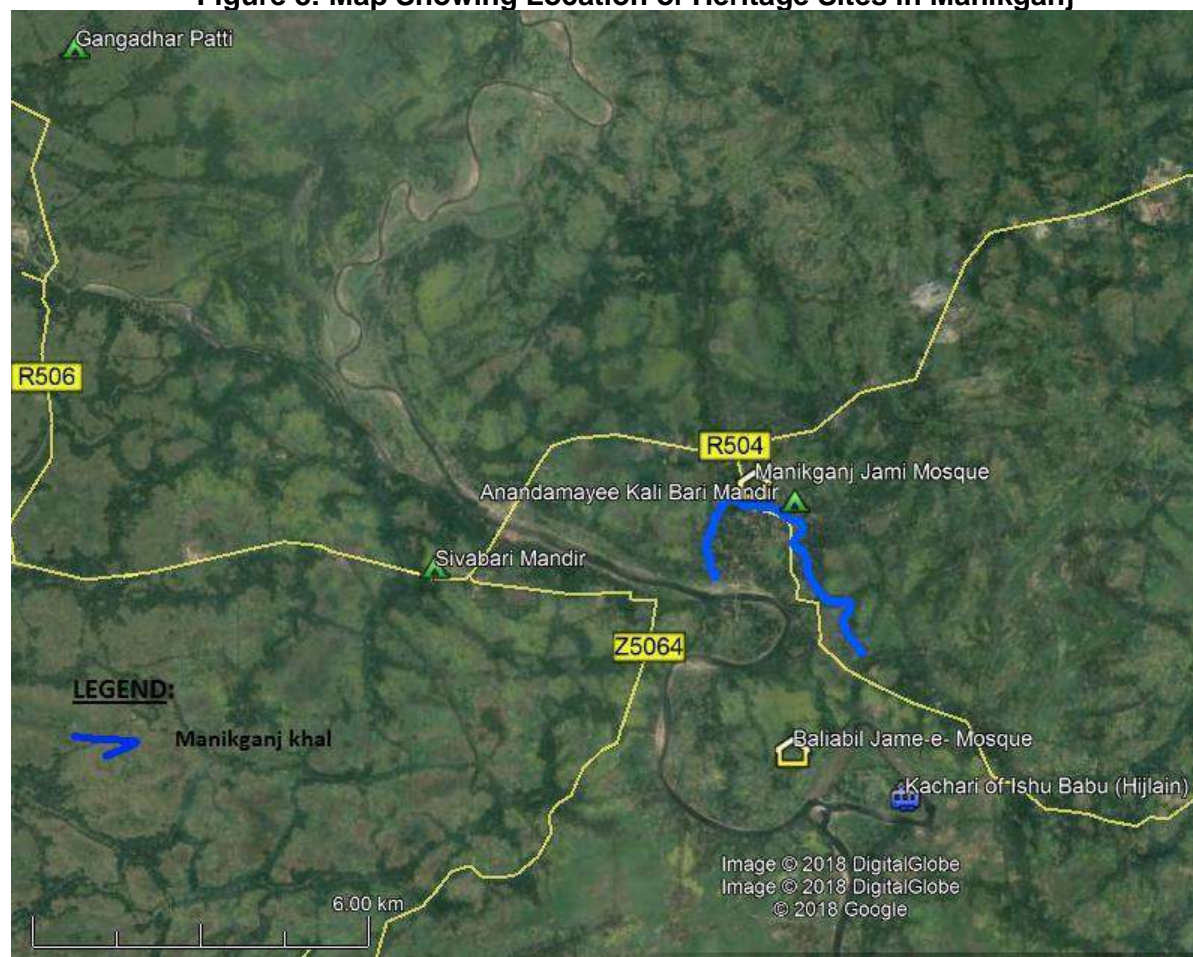
75. Heritage sites are generally of local interest only. Also, there are numerous religious institutions in the Upazila. List of these archaeological heritage and relics<sup>14</sup> include Manikganj Jami Mosque, Sree Sree Anandamayee Kalibari (1895), Rajani Bhaban and Jhovat Bhaban (Gangadhar Patti), Matta Math (1894), Narayan Sadhu Asram (1348 BS), Kachari (revenue office) of Ishu Babu (Hijlain), Sivabari Mandir, and Neel Kuthi at Baimail. None of these are located adjacent the subproject sites and will not be affected by the civil works. A map showing the locations of these points of interest are in

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<sup>14</sup> Banglapedia. National Encyclopedia of Bangladesh. *Manikganj Sadar Upazila*.

76. Figure **8** below.

**Figure 8: Map Showing Location of Heritage Sites in Manikganj**



Source: Google Earth.

## **F. Baseline and Climate Change Status**

77. A climate change vulnerability and disaster risk assessment was conducted for the various subprojects under the project.<sup>15</sup> Results of this assessment have been used to design the various subprojects, including the Manikganj Khal Development Subproject. The current climatic status of rainfall and temperature has been produced based on the historical data available in the MARCSIM DSSAT Weather File Generator Portal and future climate change projections are generated using average median values of the following IPCC AR5 (CMIP5) models for 2050. The base line generated from the historical data refers to 1985. The following models results are used for RCP 6.0 which represents medium representation concentration pathway characterizing GHG emission. It shows that temperature is projected to rise by around 1°C for maximum temperature (Tmax) and around 1.5 °C for minimum temperature (Tmin). Rainfall shows increase in all months except December. Increase is relatively high in July, August and September depicting higher probability of monsoon floods (footnote 15).

<sup>15</sup> LGED. 2017. Climate Change Vulnerability and Disaster Risk Assessment: Design Options for Dhaka Region Roads Subprojects. CRDP-II.

**Figure 9: IPCC AR5 (AMIP-5) Models Used for the Climate Change Assessment**

Models	Models
BCC-CSM1-1	HadGEM2-ES
BCC-CSM1-1-M	IPSL-CM5A-LR
CSIRO-Mk3-6-0	IPSL-CM5A-MR
FIO-ESM	MIROC-ESM
GFDL-CM3	MIROC-ESM-CHEM
GFDL-ESM2G	MIROC5
GFDL-ESM2M	MRI-CGCM3
GISS-E2-H	NorESM1-M
GISS-E2-R	

78. The following tables show annual progression of baseline and projected for 2050 Minimum and maximum temperature (Tmin and Tmax) and rainfall and projected changes in these parameters (footnote 15).

**Table 8: Baseline and Projected for 2050 Maximum Temperature**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Baseline Tmax (°C)	25	27.9	32.3	34.4	33.4	31.6	31.1	31.2	31.5	31	28.6	25.8
Baseline Tmin (°C)	12	13.9	18.7	22.8	24.3	25.3	25.7	26	25.8	23.5	18.1	13.5
Tmax-50 (°C)	26.1	29.1	33.6	35.6	34.5	32.7	32	32.2	32.6	32.2	29.5	26.8
Tmin-50 (°C)	13.6	15.5	20.3	24.3	25.7	26.6	27	27.2	27.1	25	19.7	15.1
Baseline Rainfall (mm)	8.5	18.9	46.5	113.8	241.6	353.9	350.3	303.8	261.9	161.9	28.3	4.6
Rainfall-50 (mm)	10.1	20.1	48.2	114.4	248.8	356.3	373.5	323.6	267.5	165	29.2	4.3

°C = degree Celsius, mm = millimeter, Tmax = maximum temperature, Tmin = minimum temperature.

**Table 9: Baseline and Projected change of Tmax, Tmin and Rainfall by 2050 relative to Baseline on Monthly Basis**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Tmax (°C)	1.1	1.2	1.3	1.2	1.1	1.1	0.9	1	1.1	1.2	0.9	1
Tmin (°C)	1.6	1.6	1.6	1.5	1.4	1.3	1.3	1.2	1.3	1.5	1.6	1.6
Rainfall (mm)	1.6	1.2	1.7	0.6	7.2	2.4	23.2	19.8	5.6	3.1	0.9	-0.3
Rainfall (%)	18.8	6.3	3.7	0.5	3.0	0.7	6.6	6.5	2.1	1.9	3.2	-6.5

°C = degree Celsius, mm = millimeter, % = percent, Tmax = maximum temperature, Tmin = minimum temperature.

**Table 10: Baseline and Projected Change of Tmax, Tmin and Rainfall by 2050 Relative to Baseline on Seasonal Basis**

Seasonal	Dec, Jan, Feb	Mar, Apr, May	Jun, Jul, Aug	Sept, Oct, Nov	Annual
Change of Tmin	1.6	1.5	1.4	1.3	1.5

Seasonal	Dec, Jan, Feb	Mar, Apr, May	Jun, Jul, Aug	Sept, Oct, Nov	Annual
Change of Tmax	1.1	1.2	1.1	1.0	1.1
Rainfall Change (mm) by 2050	2.5	9.5	45.4	9.6	67
Change (%)	7.8	2.4	4.5	2.1	3.5

Tmax = maximum temperature, Tmin = minimum temperature.

79. For river hydrology, the critical climate parameter is precipitation in terms of volume and intensity, and their impact on occurrences of flooding depending on location. In combination with geology and geography, a related variable is soil moisture as it affects foundation stability of river bank and submersible dam (footnote 15).

80. Hot days temperature is also an important walkway or footpath design consideration, particularly for walkway of asphalt or uniblocks, due to its effect on stiffness of the walkway. The stiffness modulus of asphalt is affected by temperature. Migration or bleeding of liquid asphalt is a concern at sustained air temperatures above 32°C (footnote 15).

## V. ASSESSMENT OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

### A. Compliance with Subproject Selection Criteria

81. The subproject was selected based on the selection criteria in the EARF of the project. Table 11 below is a summary of the assessment of compliance with the subproject selection criteria under the project.

**Table 11: Compliance matrix with subproject selection criteria**

Criteria	Remarks
1. Complies with all requirements of relevant national, state and local laws, rules and regulations.	Being complied on ongoing basis.
2. Complies with all requirements of ADB Safeguards Policy Statement (SPS) 2009, and follow procedures set down in the environmental assessment and review framework (EARF).	Being complied on ongoing basis.
3. Does not trigger environmental category A per ADB SPS. In particular, does not encroach any sensitive areas and/or critical habitats per definition of ADB SPS, and does not cause significant adverse environmental impacts that are irreversible, diverse, or unprecedented, which may affect an area larger than the sites or facilities subject to physical works.	Complied.
4. Does not include and/or involve any activities listed in ADB's Prohibited Investment Activities List (Appendix 5 of ADB SPS, 2009). These activities do not qualify for ADB's financing.	Complied.
5. Avoids any work in or near environmentally sensitive locations, including sites with national or international designation for nature conservation, cultural heritage, or any other reason.	Complied.
6. Does not result in destruction of or encroachment onto physical cultural resources such as archaeological monuments; heritage sites; and 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.	Complied.
7. Alignments or project locations avoid or minimize, when avoidance is not possible, the cutting of trees. Include provisions for compensatory plantation at ten trees per every tree to be cut.	Complied. Included in the environmental

Criteria	Remarks
	management plan (EMP).
8. Reflects inputs from public consultation and disclosure for site selection.	Complied. Also, to be complied in future consultations. The initial environmental examination (IEE) provides for this criterion.
9. All the road works shall be designed to blend in with the environment.	Complied.
10. Does not lead to alteration of surface water hydrology of streams/waterways that may result in increased sediment load due to erosion from construction sites.	Complied. Included in the EMP.
11. Provides for appropriate protection/mitigation measures to address noise impacts on adjoining communities, especially sensitive receptors as schools/hospitals along the roads.	Complied. Included in the EMP.
12. Ensure requirements for drainage maintenance measures are incorporated into the operations and maintenance manual and suitable budget allowed for to ensure ongoing performance of measures.	Complied. Included in the EMP.
13. For subproject components that may affect natural streams or rivers, all comments and advice received from project management and coordination unit (PMCU), project implementation unit (PIU), design engineers, and appropriate departments are incorporated into the planning, design and construction of the subprojects as far as practicable.	Being complied on ongoing basis.
14. Provides for appropriate protection/mitigation measures to address noise impacts on adjoining communities, especially sensitive receptors as schools/hospitals along the roads.	Complied. Included in the EMP.
15. Ensure requirements for drainage maintenance measures are incorporated into the operations and maintenance manual and suitable budget allowed for to ensure ongoing performance of measures.	Complied. Included in the EMP.
16. Ensures detailed designs and environmental safeguards conditions are included in the planning.	Complied. Included in the EMP.
17. Provides for (i) capacity building of PIU staff composting plant operation and maintenance, and (ii) market study on the users of compost to assess sustainability of the demand for such compost.	Complied. Included in the EMP.

EARF = environmental assessment and review framework, EMP = environmental management plan, IEE = initial environmental examination, PIU = project implementation unit, PMCU = project management and coordination unit, and SPS = Safeguards Policy Statement.

## **B. Assessment of Environmental Impacts and Mitigation Measures – Planning, Location and Design**

82. **Impacts Due to Location.** The subproject does not involve any special considerations regarding planning and location, since all of the components involve khal re-excavation and reconstruction of submersible dam or spar within the existing khal section. and occupy existing right of way that is generally clear, and for which no acquisition or easement for land is required. There is a high degree of certainty that the improvements can be made without affecting permanent structures.

83. In this drainage subproject, there are minor impacts that result from the planning, design or location, because:

- (i) The khal and drain improvements are confined within the existing khal boundary;



- (ii) No additional acquisition of land will be required;
- (iii) If cutting of trees will be needed, compensatory plantation for trees lost will be implemented;
- (iv) There is no impact on permanent and temporary structures. Concrete bridges and their foundations will not be touched during the construction and rehabilitation works for the khal;
- (v) Khal alignment is neither passing through nor near any ecological sensitive area like forests, reserve forest, National Park or wildlife sanctuary;
- (vi) There is no negative impact on water body;
- (vii) There is no negative impact on any water supply source like tube wells/hand pumps, wells, etc.;
- (viii) There is no negative impact on any community structure;
- (ix) There is no negative impact on irrigation structures;
- (x) There is no negative impact on religious structures;
- (xi) There are no historical/archaeological sites along the khal alignment;
- (xii) The subproject involves straightforward construction and rehabilitation activities, so impacts will be mainly localized and not significant; and
- (xiii) Construction and rehabilitation activities will be undertaken within public rights-of-way, and no land acquisition and encroachment on private property will arise.

84. **Impact due to Climate Change.** The impact of climate change is significant for the drainage subproject. The design of the drainage and other associated infrastructures should consider future changes in climate patterns such as flooding due to extended monsoon seasons and increased level of precipitation, droughts, and increased global temperature, among others. More particularly for the subproject, the planning and design of the subprojects should consider the following:

- (i) Likely changes in the climatic conditions with respect to temperature, flooding, and rainwater salinity and acidity; and
- (ii) Likely impacts on the drainage system climate change-induced heavier and more erratic rainfall.

85. According to the 4th Intergovernmental Panel on Climate Change Assessment Report,<sup>16</sup> continued greenhouse gas (GHG) emission at or above current rates would cause further warming and induce many significant changes in the values of global climatic parameters, mainly temperature, rainfall and mean sea level rise which should strictly be translated and addressed in the planning and design of the subproject.

86. **Mitigation Measures.** The impacts of climate change will be mitigated upfront during the design and planning stage for the infrastructures. Among these measures are the following:

- (i) Due to climate change, the river water level will rise and as a result may overflow causing flooding of roads and establishments. Therefore, the appropriate base depth level of the canal for desilting and excavation should be determined;
- (ii) The differences in water level between base and future time should be computed as it is needed to estimate the additional drainage embankment height required. This is in addition to the resulting depth of the canal after excavation or desilting;
- (iii) The drainage canal is expected to drain a significant additional discharge due to climate change-induced higher rainfall during monsoon seasons. Therefore, widening of some sections of the drainage should be considered. However, any

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<sup>16</sup> IPCC. 2007: Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.

- (iv) widening activities should also consider any social safeguard implications; and Maximum possible efforts have to be made for minimizing cutting of trees while designing the rehabilitation and protection of the drainage canal walls and embankments.

87. Apart from the above climate change considerations in the design of the subproject, the other impacts, issues, concerns and mitigation measures during the design phase are illustrated in Table 12 below.

**Table 12: Issues, Concerns and Mitigation Measures During Design Phase**

<b>Project Activity</b>	<b>Potential Environmental Impacts</b>	<b>Proposed Mitigation Measures</b>	<b>Responsibility</b>
<b>Detailed design</b>			
Consideration of sloped areas in subproject design	Soil erosion and slope instability	Incorporate measures and sites for handling excessive spoil materials	Project management and coordination unit (PMCU) and preparation, design and supervision consultant (PDSC)
Community canal outlets along the Manikganj Khal	<p>Not properly designed outlets will wash down silts and solid wastes, from community canals straight to the Manikganj Khal. This will cause heavy accumulation of silts and solid wastes in the Manikganj Khal in the medium to long term.</p> <p>Not properly monitored household connections to the community drains may cause direct discharge of domestic wastewater and septic effluent to these canals and lead to the Manikganj Khal. This will eventually pollute the Kaliganga River.</p>	<p>Integrate in the design provision for sedimentation or siltation chamber (or similar structure) at each outlet of community canals along the Manikganj Khal. Ensure that the design will provide space for maintaining these chambers during the operation and maintenance (O&amp;M) phase.</p> <p>Ensure that appropriate ordinances are in place and implemented that prohibit the discharge of domestic wastewater and septic tank effluents to the community canals.</p>	PMCU, PDSC, Manikganj project implementation unit (PIU)
Incorporation of community health and safety measures in the design	Impacts to community health and safety, including incidents of accidental fall of people or vehicles into the canal	<p>Incorporate in the design safety protection along the drainage canals, especially at sections located in the town center and residential or commercial areas.</p> <p>Ensure to include in the design the following: (i) signages in critical areas of the drainage canal; (ii) barricades or similar structures in</p>	PMCU, PDSC

<b>Project Activity</b>	<b>Potential Environmental Impacts</b>	<b>Proposed Mitigation Measures</b>	<b>Responsibility</b>
		accident-prone areas; and (iii) railings, among others.	
Location of trees, utilities and other infrastructures before construction.	<p>Disruption of utility services;</p> <p>False claims from people;</p> <p>Water quality changes due to construction.</p> <p>Interference with other utilities and other infrastructures, including heritage areas, if any, during construction</p>	<p>Design the drainage canal wall and embankment protection works to not cut any trees. In any concreting works around a grown tree, include provision of space around the basal portion of the tree to avoid cracking of the concrete protection in the future as the tree grows.</p> <p>Innovate and design footpaths that will avoid cutting of trees.</p> <p>All utilities such as electric poles, etc. should not be dislocated or moved. If transfer of utilities is necessary, coordinate with the appropriate authorities.</p> <p>Provide budget for restoration/replacement of damaged utilities</p> <p>Provide budget for tree planting as replacement activity for cut trees, if any.</p> <p>Photograph all sites within subproject areas to enable before and after comparison (note: all roads or footpaths are to be reinstated to original character).</p> <p>If deemed required, consult structural engineers to determine the impact of vibration to all kinds of infrastructures adjacent the drainage alignment.</p>	PMCU, PDSC
Construction in the vicinity of residential areas	<p>Nuisance to nearby receptors.</p> <p>Impacts to qualities of ambient air, surface water, groundwater, and land.</p> <p>Impacts to health and safety of community and workers.</p>	<p>Ensure compliance with national or international standards on noise, ambient air and effluent, whichever are more stringent.</p> <p>Ensure all bid and contract documents prepared and finalized have copy of the initial environmental examination (IEE) as attachment.</p>	PMCU, PDSC
O&M Manual preparation	Impacts to health and safety of community.	Prepare a comprehensive O&M manual to include periodic	PMCU, PDSC

<b>Project Activity</b>	<b>Potential Environmental Impacts</b>	<b>Proposed Mitigation Measures</b>	<b>Responsibility</b>
		inspection and maintenance of the drainage canal, conduct of repairs, etc.	
Site selection of sources of construction materials such as sand and gravels.	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion; Disturbance in natural drainage patterns, ponding and water logging, and water pollution.	Procure construction materials such as sand, gravels, or aggregates from government-authorized dealers only. If quarrying is to be the source, ensure to conduct at sites authorized by the government such as the Bangladesh Water Resources Development Board for sand quarrying.	PMCU, PDSC
Spoil management and disposal	Inappropriate disposal of spoils will cause nuisances to affected properties, including siltation of canals.	Identify designated disposal sites approved by the upazila. A spoil management plan will be developed.	PMCU, PDSC
Construction camps	Inappropriate location for construction camps will impact the general welfare and health and safety of the workers.	Identify construction camp sites that are strategically located relative to the work sites. Ensure these camp sites can be easily provided with the basic amenities for the workers.	PMCU, PDSC

IEE = initial environmental examination, O&M = operation and maintenance, PDSC = preparation, design and supervision consultant, PMCU = Project management and coordination unit, PIU = project implementation unit.

### **C. Assessment of Environmental Impacts and Mitigation Measures – Construction Phase**

88. In the case of this subproject, environmental impacts during construction phase will not be severe because: (i) most of the component works are relatively small and involve straightforward construction, so impacts will be mainly localized and not greatly significant; (ii) most of the predicted impacts are associated with the construction process, and are produced because of the invasive nature of excavation activities and earth movements; and (iii) being located in the built-up area of the rural and urban areas, will not cause direct impact on biodiversity values.

#### **1. Construction Method**

89. The civil works for drainage construction and/or rehabilitation include earth work excavation. Earth work excavation will be undertaken using various heavy equipment such as bulldozers, backhoes, dump trucks, compactors, etc. Excavation and construction activities will be done through a segmentation or chainage-wise planning with around 100 m – 200 m per segment or stretch along the drainage alignment. This will ensure that impacts can be easily managed by the contractor.

90. **Non-Compliance with Environmental Legislation.** This issue will arise when there is a lack of awareness among subproject staff and management of environmental safeguard requirements, compliance with the requirements, conditions specified in the IEE report, approval status, and consent.

91. Mitigation measures include (i) capacity strengthening of the PMCU Environmental Officer and the counterpart PIU focal persons on environmental safeguards; and (ii) ensuring that necessary permits are obtained.

## 2. Impact on Physical Resources

92. **Topography, Soils and Geology.** Subproject activities are not large enough to affect these features; so, there will be no impacts.

93. **Sources of Materials.** Significant amount of gravel, sand and aggregate, will be required for this subproject. The contractor will be required to:

- (i) Prepare aggregates management plan as part of the SEMP;
- (ii) Source aggregates only from entities with environmental clearances and license;
- (iii) Use quarry sites and sources permitted by relevant government agencies only, such as the Bangladesh Water Resources Development Board for sand quarrying;
- (iv) No new quarry sites shall be used for the subproject;
- (v) Verify suitability of all material sources and obtain approval of implementing agency; and
- (vi) Document all sources of materials and include in the monthly reporting to the PIU.

94. **Surface Water Quality.** The civil works will have direct impact to surface water quality of Kaliganga River since these are location in the Manikganj canal. The construction works will expose the Kaliganga river to risks of pollution caused by: (i) poorly managed construction sediments, and waste materials; (ii) poor sanitation practices of construction workers; and (iii) improper storage of petroleum products or chemicals used during construction such as fuel, oil and lubricants. Although construction works will be scheduled during dry season, any unavoidable excavation or construction works during monsoon season will wash down these pollutants to the Kaliganga river.

95. To mitigate these impacts, the contractor will be required to:

- (i) follow World Bank's Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities;<sup>17</sup>
- (ii) dispose excess spoils per the Spoil Management Plan attached in **Error! Reference source not found.**;
- (iii) locate temporary storage areas on flat grounds and away from any surface drainage routes (ideally at least 100 m from surface water);
- (iv) shield temporary storage areas with sandbags;
- (v) provide adequate water supply and sanitation facilities at work sites;
- (vi) provide impervious bunded areas with 110% volume for storage of petroleum products used during construction, such as fuel, oils, and lubricants;
- (vii) provide orientation and training to assigned workers on the correct handling of petroleum-based products, clean-up of equipment, and response measures in case spills or emergencies using a well prepared emergency response plan; and
- (viii) ensure no refueling within 100 m from surface water.

96. For management and final disposal of solid wastes following mitigation, contractors will be required to apply the follow-up measures such as:

- (i) follow World Bank's EHS Guidelines on Construction and Decommissioning

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<sup>17</sup> IFC World Bank Group. 2007. *Environmental, Health, and Safety (EHS) Guidelines – General EHS Guidelines: Construction and Decommissioning*.

- Activities (footnote 17);
- (ii) collection of recyclable solid wastes and supply to scrap vendors;
- (iii) ensure all the camp wastes and construction wastes are placed in the designated waste collection pits (lined to ensure no seepage of leachate) away from receiving water;
- (iv) establishment of separate bunded and lined areas with 110% volume for the storage of all the toxic material wastes, including batteries, oil filters, mobil, burnt oils, etc. at the construction site; and
- (v) consultation with PIU on the proper disposal of all residual wastes.

97. **Groundwater.** Subproject activities do not interfere with groundwater regime. No groundwater abstraction is proposed, and all activities are limited on land surface activities. Groundwater quality may not be impacted by the subproject.

98. However, as a precautionary measure, the mitigation measures for avoiding seepage of pollutants to the groundwater will be in place. Contractors will be required to:

- (i) follow World Bank's EHS Guidelines on Construction and Decommissioning Activities (footnote 17);
- (ii) provide impervious bunded areas with 110% volume for storage of petroleum products used during construction, such as fuel, oils, and lubricants. This will ensure these chemicals will not seep into the ground and eventually affecting groundwater quality. Contractors will provide construction camps with portable toilets for use of the workers and will ensure that handling of the septic wastes generated will be done by authorized handlers and transporters only; and
- (iii) no toilets shall be put up within 500 m from groundwater wells, if any.

99. **Air Quality.** While most construction works will be conducted during the dry season, there is potential for creating dust from (i) excavation of dry soil and backfilling, (ii) transport, loading and unloading of natural aggregates; (iii) movement of construction-associated vehicles; (iv) on-site rock crushing and concrete mixing, if any; (v) emissions from construction vehicles, equipment, and machinery used for excavation and construction, which may contain pollutants such as carbon monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons, and (vi) burning of firewood for cooking and heating in work and labor camps.

100. To mitigate the impacts, contractors will be required to:

- (i) follow World Bank's Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities (footnote 17);
- (ii) confine earthworks according to excavation segmentation plan that should be part of site-specific environmental management plan (SEMP);
- (iii) prepare and implement a dust management plan that should be part of the SEMP;
- (iv) consult with PIU on the designated areas for stockpiling of sand, gravel, and other construction materials (ideally about 500 m from residential areas);
- (v) bring construction materials (aggregates, sand, etc.) to the construction site as and when required to avoid heavy stockpiling at the sites;
- (vi) damp down with water dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary;
- (vii) if re-surfacing of disturbed roads cannot be done immediately, spread crushed gravel over backfilled surfaces;
- (viii) during demolition, water exterior surfaces, unpaved ground in the immediate vicinity and demolition debris;
- (ix) place signage at active work sites in populated areas;

- (x) require trucks delivering aggregates and cement to have tarpaulin cover;
- (xi) clean wheels and undercarriage of vehicles prior to leaving construction sites;
- (xii) limit speed of construction vehicles on access roads and work sites to a maximum of 30 km per hour;
- (xiii) prohibit burning firewood in work and labor camps (promote liquified petroleum gas for cooking purposes and electric heater for heating purposes);
- (xiv) use vehicles that have government-issued permits and registrations; and
- (xv) prohibit open burning of solid waste.

101. **Noise Levels.** Noise-emitting construction activities include earthworks, concrete mixing, demolition works, movement and operation of construction vehicles and equipment, and loading and unloading of coarse aggregates. The significance of noise impact will be higher in areas where noise-sensitive institutions such as health care and educational facilities are situated. Noise levels should not exceed the national standards for noise or WHO noise level guidelines, whichever is more stringent, or result in increase in background noise level of 3 decibels at the nearest receptor location off-site.<sup>18</sup> The comparative illustration of national standards versus WHO guidelines is in Table 4 in Section II hereof.

102. To mitigate the impacts, contractors will be required to:
- (i) follow World Bank's EHS Guidelines on Construction and Decommissioning Activities (footnote 17);
  - (ii) if applicable to subproject alignment, prepare and implement a noise and vibration management plan that should be part of the SEMP;
  - (iii) provide prior information to the local public, including institutions such as schools and hospitals, about the work schedule;
  - (iv) use equipment that emits the least noise, well-maintained and with efficient mufflers. Install silencers if necessary and practical;
  - (v) restrict noisy activities to day time;
  - (vi) avoid use of noisy equipment or doing noisy works at night time;
  - (vii) limit engine idling to a maximum of one minute;
  - (viii) spread out the schedule of material, spoil and waste transport;
  - (ix) minimize drop heights when loading and unloading coarse aggregates; and
  - (x) not use horns unless it is necessary to warn other road users or animals of a vehicle's approach.

103. **Landscape and Aesthetics.** The construction work is likely to generate considerable quantities of waste soil. Indiscriminate disposal of the soil and waste, excess construction material, concrete, packing materials, containers, lubricants and oils may affect the landscape and aesthetics of local environment.

104. These impacts are negative but short-term and reversible by mitigation measures. As mitigation measures, contractors will be required to:

- (i) dispose excess spoils per the Spoil Management Plan attached in **Error! Reference source not found.**;
- (ii) avoid stockpiling of excess excavated soils as far as possible;
- (iii) avoid disposal of any debris and waste soils in or near water bodies/rivers;
- (iv) coordinate with PIU for beneficial uses of excess excavated soils or immediately dispose to designated areas;

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<sup>18</sup> World Bank Group. 2007. *Environmental, Health, and Safety (EHS) Guidelines. General EHS Guidelines: Environmental – Noise Management*. Washington, D.C.

- (v) recover used oil and lubricants and reuse or remove from the sites;
- (vi) manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; and
- (vii) remove all wreckage, rubbish, or temporary structures which are no longer required.

105. **Disposal of spoils and debris.** Consistent with the Spoil Management Plan, all dredged or excavated silts and soil from the Manikganj drainage, including any demolished concrete from rehabilitation of existing drainage walls will be disposed to appropriate disposal site approved by the local government or *pourashava*. Expectedly, dredged materials from the drainage canal will be ordinary soil and uprooted grasses or shrubs with some amount of non-biodegradable wastes that have accumulated in the drains for years. For proper handling of the spoils, the following actions will be followed by the contractor:

- (i) Recover or collect the non-biodegradable waste materials from the mixture of excavated materials. This includes broken glasses and any other hazardous materials found in the dredged mixture, if any;
- (ii) Handle and haul the non-biodegradable wastes and hazardous materials separately from the excavated soil;
- (iii) Dispose spoils immediately and avoid stocking for longer period to prevent potential nuisance and complaints;
- (iv) Haul all wastes using transport equipment such as dump trucks with proper cover (e.g., tarpaulin) to avoid accidental release along the route to the disposal site; and
- (v) Utilize haulers that are authorized to handle and transport these kinds of wastes.

106. The disposal site is located at Gazaria Chak, Dighulia Union, and 1.50 km west of Manikganj town and 150 m south of Muljan Bus stand on Dhaka-Aricha Highway. This site is approximately 1 ha and owned by the Manikganj *pourashava*. This site has been approved as the designated disposal area for the subproject. Figure 10 shows the actual photograph of the location of the disposal site.

107. The disposal site is currently being used as disposal site for solid wastes by the Pourashava. This is also the only site available for the subproject construction spoils and debris. In order to manage these spoils and debris separately, a specific location within the disposal site will be designated for these spoils and debris and prevent from mixing with the municipal solid wastes. The PIU will monitor this specific location at the disposal site during the project implementation period. While approximation by PMCU design engineers reveal that the amount of spoils and debris expected to be generated by the subproject will not be significant, the actual volume of spoils will be calculated during the final detailed design stage and included in the updating of this IEE.



**Figure 10: Location of Disposal Site**



### 3. Impacts on Ecological Resources

108. Subproject sites are located within the town area. While various flora and fauna resources are found in the municipality, there are no biodiversity sites, protected forests, natural or critical habitats per ADB SPS, 2009 definitions are found in the area. As such, no impacts on sensitive ecological resources is envisaged.

109. **Terrestrial Ecology.** Haphazard site clearing, parking, and movement of construction vehicles and equipment stockpiling, will result in disturbance to the land in the subproject area. Although the town has numerous flora and fauna resources, none of these will be impacted because activities will only be undertaken within the existing drainage canals. Only perennial shrubs and grasses grow in this canal during dry season and these are common local plants in Bangladesh and not protected species. For trees found along the drainage canal embankments that will be used for footpaths or drains, the design will ensure that these trees will not be cut.

110. To mitigate the impact of tree cutting, contractors will be required to:
- (i) avoid, or minimize when avoidance is not possible, tree cutting;
  - (ii) for any tree cut, conduct replacement planting at a ratio of 1:10 consistent with the approved EARF for the project and social forestry program of LGED (see **Error! Reference source not found.** for LGED Tree Plantation Program);
  - (iii) protect giant trees and locally-important trees (for religious reasons), if any, during implementation;
  - (iv) prevent workers or any other person from removing and damaging any flora and fauna found in the subproject sites; and
  - (v) prohibit employees and workers from poaching animals and cutting of trees for firewood at the subproject sites or their vicinities.

111. **Aquatic Ecology.** The subproject site is the Manikganj canal, which is connected to the Kaliganga river. This river is used by many locals for fishing, either for domestic consumption or livelihood. All aquatic species found at the Kaliganga river are not protected species. Nevertheless, the construction of the subproject may affect Kaliganga river due to siltation and therefore may impact the quality of the water and eventually the productivity and harvest of these aquatic resources.

112. To mitigate this impact, contractors will be required to:
- (i) avoid excavation and other civil works during monsoon season;
  - (ii) store spoils away from the canal to avoid being washed down back to the canal (ideally at least 100 m from the surface water); and
  - (iii) not undertake construction works near these sites during the spawning and breeding period between June and September.

#### **4. Impacts on Physical Cultural Resources**

113. The subproject will not encroach or run over into any physical, and cultural resources. As well, the subproject area is not a potential archaeological area and therefore no impact is envisaged. However, as a precautionary approach, the contractor will be required to:

- (i) strictly follow the protocol by coordinating immediately with Manikganj PIU and Bangladesh Department of Archaeology for any suspicion of chance finds during excavation works;
- (ii) stop work immediately to allow further investigation if any finds are suspected; and
- (iii) request authorized person from the Bangladesh Department of Archaeology to observe when excavation resumes for the identification of the potential chance find and comply with further instructions.

114. As for religious establishments in the area, there is one identified mosque (an Eidgah Mosque) along the alignment of the khal as shown in the strip map in

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117. **Figure 11** below. However, the mosque will not be impacted as the rehabilitation works will be confined at the existing canal only. The contractor will ensure that the site-specific EMP will include safety measures when working at this section where the mosque is located. Likewise, consultation activities will ensure to include representatives from this particular religious establishment.

**Figure 11: Strip Map Showing Location of Mosque Along the Manikganj Khal**



## 5. Impacts on Socioeconomic Activities

118. **Traffic and disturbance to community.** The impacts will result from excavation works near roads, stockpiling, the operation of construction vehicles and equipment, and accidental damage to utilities (e.g., power supply poles, open drains, and water taps or hoses).

119. To mitigate these impacts, the contractor will be required to:
- (i) prepare and implement a traffic management plan in collaboration with local authorities;
  - (ii) where traffic congestion will likely occur, place traffic flagmen during working hours;
  - (iii) provide compensation to affected people;
  - (iv) manage stockpile;
  - (v) manage pumped water from excavations either to drains or drums for later use;
  - (vi) relocate the affected power supply poles; and
  - (vii) advise the concerned authority during accidental damage to utilities.

120. **Community health and safety hazards.** Communities will be moderately exposed to threats due to impacts on air and water quality, ambient noise level; mobility of people, goods, and services; accesses to properties, economic activities, and social services; service disruptions, etc. Construction workers may potentially bring communicable diseases in the community.

121. To mitigate these impacts, the contractor will be required to implement its approved SEMP, which should include a community health and safety plan following international best practices on community health and safety such as those in Section 4.3 of World Bank

Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities (footnote 17). As a minimum and whichever is applicable, the community health and safety plan shall ensure the following:

- (i) implement risk management strategies to protect the community and structures like bridges along the Manikganj Khal (including institutional establishments such as schools, hospitals and mosques) from physical, chemical, or other hazards associated with sites under construction and decommissioning;
- (ii) restricting access to the site, through a combination of institutional and administrative controls, with a focus on high risk structures or areas depending on site-specific situations, including fencing, signage, and communication of risks to the local community;
- (iii) removing hazardous conditions on construction sites that cannot be controlled affectively with site access restrictions, such as covering openings to small confined spaces, ensuring means of escape for larger openings such as trenches or excavations, or locked storage of hazardous materials; and
- (iv) implement measure to prevent proliferation of vectors of diseases at work sites;
- (v) adequate space and lighting, temporary fences, shining barriers and signage at active work sites;
- (vi) contractor's preparedness in emergency response;
- (vii) adequate dissemination of GRM and contractor's observance and implementation of GRM; and
- (viii) upon availability, local people should be given an opportunity for work in the subproject activities.

122. **Occupational health and safety hazards.** Workers will be exposed to the crosscutting threats of the impacts above during construction. Inadequate supply of safe and potable water and inadequate sanitation facilities; poor sanitation practices on site; poor housing conditions; the handling and operation of construction equipment; handling of hazardous substances; exposure to extreme weather and non-observance of health and safety measures pose additional threats to the health and safety of construction workers. Construction workers may be potentially exposed to communicable and transmittable diseases in the community and the workforce.

123. To mitigate these impacts, contractors will be required to implement its approved SEMP, which should include an occupational health and safety plan following international best practices on occupational health and safety such as those in Section 4.2 of World Bank EHS Guidelines on Construction and Decommissioning Activities (footnote 17). As minimum and whichever are applicable, the occupational health and safety plan shall ensure the following:

- (i) Communication and Training
  - (a) Training of all workers on occupational health and safety prior to construction works;
  - (b) Conduct of orientation to visitors on health and safety procedures at work sites;
  - (c) Signages strategically installed to identify all areas at work sites, including hazard or danger areas;
  - (d) Proper labeling of equipment and containers at construction and storage sites; and
  - (e) Suitable arrangements to cater for emergencies, including: first aid equipment; personnel trained to administer first aid; communication with, and transport to, the nearest hospital with an accident/emergency department; monitoring equipment; rescue equipment; firefighting

equipment; and communication with nearest fire brigade station;

- (ii) Physical Hazards
  - (a) Use of personal protective equipment by all workers such as earplugs, safety shoes, hard hats, masks, goggles, etc., as applicable, and ensure these are used properly;
  - (b) Avoidance of slips and falls through good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths, cleaning up excessive waste debris and liquid spills regularly, locating electrical cords and ropes in common areas and marked corridors, and use of slip retardant footwear;
  - (c) Use of bracing or trench shoring on deep excavation works;
  - (d) Adequate lighting in dark working areas and areas with night works;
  - (e) Rotating and moving equipment inspected and tested prior to use during construction works. These shall be parked at designated areas and operated by qualified and trained operators only;
  - (f) Specific site traffic rules and routes in place and known to all personnel, workers, drivers, and equipment operators; and
  - (g) Use of air pollution source equipment and vehicles that are well maintained and with valid permits;
- (iii) General Facility Design and Operation
  - (a) Regular checking of integrity of workplace structures to avoid collapse or failure;
  - (b) Ensuring workplace can withstand severe weather conditions;
  - (c) Enough work spaces available for workers, including exit routes during emergencies;
  - (d) Fire precautions and firefighting equipment installed;
  - (e) First aid stations and kits are available. Trained personnel should be available at all times who can provide first aid measures to victims of accidents;
  - (f) Secured storage areas for chemicals and other hazardous and flammable substances are installed and ensure access is limited to authorized personnel only;
  - (g) Good working environment temperature maintained;
  - (h) Worker camps and work sites provided with housekeeping facilities, such as separate toilets for male and female workers, drinking water supply, wash and bathing water, rest areas, and other lavatory and worker welfare facilities; and
  - (i) Maintain records and make reports concerning health, safety and welfare of persons, and damage to property. Take remedial action to prevent a recurrence of any accidents that may occur.

#### **D. Assessment of Environmental Impacts and Mitigation Measures – Operation and Maintenance Phase**

124. Once completed, the subproject drainage canal will provide beneficial environmental impact to Manikganj town and its population. Needless to say that potential flooding will be avoided and improved aesthetic or landscape will be expected.

125. However, these beneficial impacts will not be sustained if no proper operation and

maintenance is in place. Hence, Manikganj *pourashava* as PIU will need to undertake the following actions to ensure that the subproject operates sustainably:

- (i) Establish a program of regular visual inspection to identify problems early, before they become critical (breakage, plugging, etc.);
- (ii) Ensure that all remedial action is implemented promptly, including clearing sediment and other material that could cause blockage, and conducting any required physical repairs to the drains to prevent leaks; and
- (iii) Include in the *pourashava* budget a permanent allocation for undertaking the above tasks.

## VI. CONSULTATION, INFORMATION DISCLOSURE, AND GRIEVANCE REDRESS MECHANISM

### A. Consultation

126. Stakeholder consultation and participation was an essential process during subproject preparation. The process of engaging stakeholders and affected people involved key informant interviews, on-site discussions and random field interviews of stakeholders.

127. **Preliminary Consultation.** Public consultations were conducted on 3 separate occasions and locations on 11 December 2017 and 29 June 2018, which was attended by various stakeholders. The summary of consultation meeting and attendance is attached as **Error! Reference source not found.** The following are some of the concerns discussed:

- (i) The consultees will support the project activities;
- (ii) With the heavy traffic congestion in the town, the consultees believe that the project will bring benefit to the people residing along the roads;
- (iii) During the construction period short term, the consultees believe that community activities will be affected. However, the PIU explained that the project will ensure measures shall be put in place to avoid any negative impact to the community;
- (iv) It was emphasized that no resettlement and land acquisition will be required for the project. However, compensations will be provided to affected persons who will be temporarily disrupted of their businesses during construction;
- (v) It was confirmed with the local stakeholders that there is no protected areas in and around the project areas; and
- (vi) It was also confirmed with the local stakeholders that the project will not impact on natural water body and will not contaminate the soil resources.

128. **Future consultations during final detailed design stage.** The stakeholder consultations during the final detailed design stage will continue to discuss about the subproject, including the implementation of the EMP and SEMP developed for the subproject. PMCU, Manikganj PIU and PDSC will ensure that consultations will be conducted as meaningful per definition of ADB SPS, 2009 (footnote 6). The Manikganj PIU, PDSC and contractors will ensure that public consultations will include representatives from all institutional establishments found along the Manikganj Khal such as schools, hospitals and the prior-identified Eidgah mosque as shown in

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131. **Figure 11.**

**B. Information Disclosure**

132. Information shall be disclosed through public consultation and more formally by making documents and other materials available in a form and at a location in which they can be easily accessed by stakeholders. This normally involves making draft reports available for the public in the subproject locations and providing a mechanism for the receipt of comments, and making documents available more widely by lodging them on ADB and LGED websites. LGED through the PMCU will submit to ADB the following documents for disclosure on ADB's website:<sup>19</sup>

- (i) the final IEE report;
- (ii) new or updated IEE report and corrective action plan prepared during project implementation, if any; and
- (iii) semi-annual environmental monitoring reports.

133. PMCU will provide relevant environmental information, including information from the relevant documents in a timely manner, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders. For illiterate people, other suitable communication methods will be used.

134. For the benefit of the community, the summary of the IEE will be translated in Bangla and made available at: (i) office of PMCU; and (ii) office of Manikganj PIU. Hard copies of the IEE will be available in the PMCU and PIUs, and accessible to citizens as a means of disclosing the document and at the same time creating wider public awareness. On demand, the person seeking information can obtain a hard copy of the complete IEE document at the cost of photocopy from the offices of the PMCU or PIUs, on a written request and payment for the same to the Project Director. Electronic version of the IEE will be placed in the official website of LGED after approval of the documents by government and clearance from ADB. PMCU will issue notification on the disclosure mechanism in local newspapers, ahead of the initiation of implementation of the project, providing information on the project, as well as the start dates, etc. The notice will be issued by the PMCU and PIUs in local newspapers one month ahead of the implementation works. This will create awareness of the project implementation among the public. PMCU and Manikganj PIU will consider other additional means of information disclosure depending on practicability, such as the distribution of posters to libraries within the locality to mass campaign the basic tenets of the IEE.

**C. Grievance Redress Mechanism**

135. The project will adopt the grievance redress mechanism (GRM) outline of the first CRDP. The GRM shall be set up to register grievances of the people regarding technical, social and environmental aspects. Also, the GRM welcomes all kinds of technical and safeguards-related queries, comments, suggestions and complaints from anyone. The process will be designed to be transparent, gender responsive, culturally appropriate and commensurate to the risks and adverse impacts of the project, as well as readily accessible to all segments of the affected people. The project GRM will not supersede any legal government grievance procedures.

136. Affected people are to be informed about the mechanism through information caravan and

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<sup>19</sup> Per ADB SPS, 2009, prior to disclosure on ADB website, ADB reviews the "borrower's/client's social and environmental assessment and plans to ensure that safeguard measures are in place to avoid, wherever possible, and minimize, mitigate, and compensate for adverse social and environmental impacts in compliance with ADB's safeguard policy principles and Safeguard Requirements 1-4."

orientation in the community to be conducted by the project officers and staff, printing of pamphlets and brochures, media and public outlets. To ensure wider coverage, complaints or grievances can be reported through but not limited to: letters, e-mails, text messages, verbal narration from walk-in complainants, phone calls, fax, online grievance registration form (in local dialects) through the project website, installation of Grievance Intake Box at the project area and other mode of filing that the affected people have access to. For those affected people who cannot read and write, a community leader/volunteer will be identified in every project area. The community leader/volunteer will serve as the focal person who will assist the affected people in filing the complaints. This participatory process shall ensure that all views of the people are adequately reviewed and suitably incorporated in the design and implementation process. The GRM will be implemented in three levels. See Figure 12 for the outline.

137. **First Level.** The first level and most accessible and immediate venue for the fastest resolve of grievances is the PIU, chiefly through the environment and/or social safeguard officers and project manager (or equivalent), with assistance from the environmental and social safeguard specialists of the preparation, design and supervision consultant (PDSC). The contact phone number will be posted in the project areas and at PMU and PIU websites and notice boards. Grievances will be resolved through continuous interactions with affected persons and the PIU will answer queries and resolve grievances regarding various issues including EMP implementation, land acquisition, structures acquisition, livelihood impacts, entitlements, and assistance. Corrective measures will be undertaken at the field-level itself within five days and feedback provided to the complainant on actions taken for resolution. All grievances will be documented with full information of the person and issue. A sample grievance form that may be used is in **Error! Reference source not found..** The suggested format for record-keeping of grievance is in **Error! Reference source not found..**

138. **Second Level.** Should the grievance remain unresolved, the PIU project manager (or equivalent), will activate the second level of the GRM by referring the issue (with written documentation) to the local grievance redress committee (GRC) of the pourashava or city corporation, who will, based on review of the grievances, address them in consultation with the safeguards officers of the PIU and PMCU, and affected persons. A hearing will be called, if necessary, where the affected person can present his/her concern/issues. The process will promote conflict resolution through mediation. The PIU project manager will be responsible for processing and placing all papers before the GRC, recording decisions, issuing minutes of the meetings, providing feedback to complainants and taking follow up actions so that formal orders are issued and decisions are carried out. The local GRC will consist of the following persons: (i) chief executive officer or secretary of the pourashava or city corporation (GRC Chair); (ii) representative of the mayor of the pourashava or city corporation; (iii) representative of the affected persons; (iv) official of the land registry department; (v) official of the DOE divisional office; (vi) town planner of the pourashava or city corporation; and (vii) environmental and/or social safeguards officers of the PIU. The local GRC shall meet weekly, unless the Head of the PIU informs that there are no grievances to address, or they shall meet as needed as per the severity of the grievance. The local GRC will suggest corrective measures at the field level and assign responsibilities for implementing its decisions.

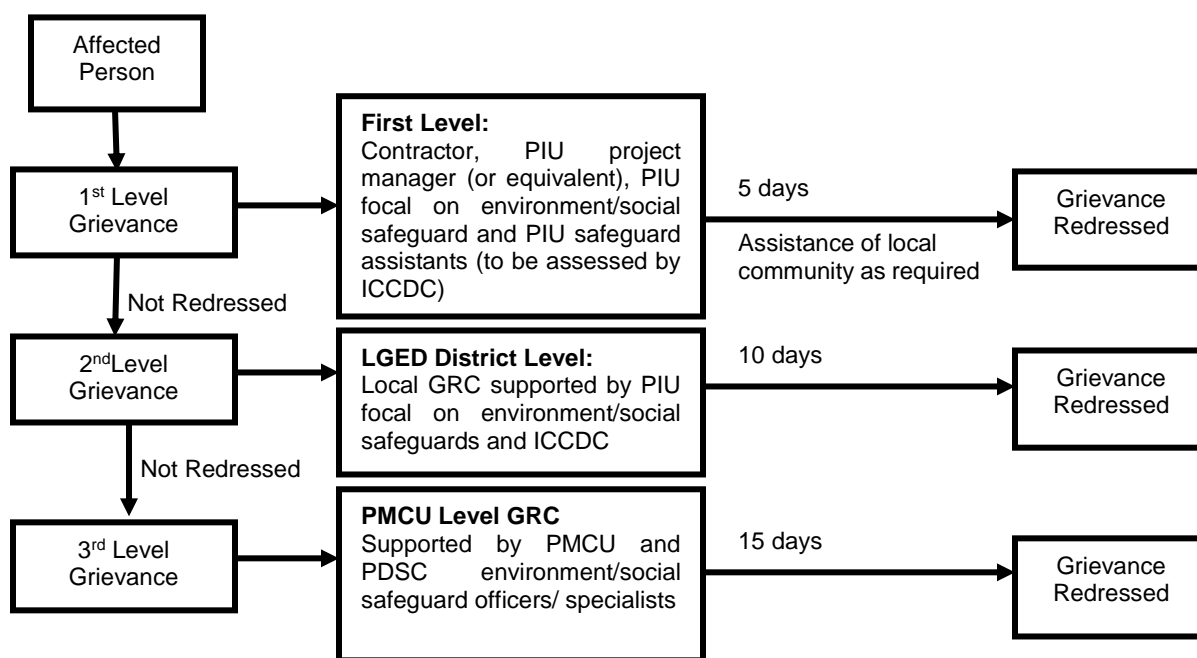
139. The functions of the local GRC are as follows: (i) provide support to affected persons on problems arising from land acquisition (temporary or permanent), asset acquisition and eligibility for entitlements, compensation and assistance, and other environmental or social safeguard issues unresolved at the first level of GRM; (ii) record grievances of affected persons, categorize and prioritize them and provide solutions within 10 days from receipt of grievance from the first level; and (iii) report to the aggrieved parties about developments regarding their grievances and

decisions of the GRC.

140. **Third Level.** Should the grievance remain unresolved, the PIU head will activate the third level of the GRM by informing the PMCU project director who will, based on review of the local GRC minutes and consultation with the local GRC chair, activate the PMCU level GRC. This committee shall comprise the following representatives: (i) project director, PMCU, (ii) deputy project director, PMCU; (iii) environmental/resettlement safeguards officer of the PMCU; (iv) representative from Land Ministry, (v) representative from DOE; (vi) representative of the affected persons; and (vii) environmental and/or social safeguards officers of the PIU. The project director will sign off on all grievances received by the PMCU.

141. The GRC at the PMCU level shall meet based on the receipt of grievances, and the meeting shall be convened and grievance redressed within 15 days of receipt of the grievance by the PMCU. The environmental and/or social safeguards officer of the PMCU will be responsible for processing and placing all papers before the PMCU GRC, recording decisions, issuing minutes of the meetings and taking follow up action to see that formal orders are issued and the decisions carried out, and final decision conveyed to the complainant.

**Figure 12: Project Grievance Redress Mechanism<sup>a</sup>**



GRC = grievance redress committee, ICCDC = institutional capacity and community development consultant, PDSC = preparation, design and supervision consultant; PIU = project implementation unit, PMCU = project management and coordination unit.

<sup>a</sup> Outline adopted from GRM of CRDP, and revised to conform with new arrangements and nomenclatures of the project.

142. The GRM notwithstanding, an aggrieved person shall have access to the country's legal system at any stage. This can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM.

143. If the established GRM is not in a position to resolve the issue, the affected persons can

also use the ADB Accountability Mechanism through directly contacting (in writing) the complaint receiving officer at ADB headquarters. The complaint can be submitted in any of the official languages of ADB's Developing Member Countries. The ADB Accountability Mechanism information will be included in the project information document to be distributed to the affected communities, as part of the project GRM.

## VII. ENVIRONMENTAL MANAGEMENT PLAN

### A. Institutional Arrangements

144. **Project Management and Coordination Unit.** The LGED will be the executing agency responsible for overall guidance of the project and implementation of urban roads and solid waste management subprojects. The PMCU, headed by a project director will be responsible<sup>20</sup> for planning, management, coordination, supervision and progress monitoring of the project in the two city regions. The PMCU has the responsibility of fulfilling environmental requirements of the government and conducting required level of environmental assessment as per ADB SPS, 2009. To ensure effective implementation of the environmental aspects, one full-time environmental safeguards officer who is a permanent employee of LGED will be assigned at PMCU. The environmental safeguards officer will primarily be responsible for the compliance to the statutory and legal requirements, including overall supervision of the implementation of the environmental management provisions in the IEEs/EMPs for the subprojects. The PDSC will assist the PMCU in this regard.

145. **Project Implementation Unit.** The Manikganj PIU will be responsible for the day-to-day activities of project implementation in the field and will have direct supervision to all contractors at subproject sites. Manikganj PIU will appoint at least one environment staff responsible for day-to-day monitoring of the project progress and implementation of the environmental provisions in the EMP. and the environment staff will ensure compliance with government and ADB requirements on environmental safeguards. The Manikganj PIU will prepare quarterly progress reports on all aspects concerning environmental assessment, management, monitoring, and report to the PMCU.

146. **Preparation, Design and Supervision Consultants.** The preparation, design and supervision consultant (PDSC) team shall include the following environmental safeguards expertise to effectively implement the EARF and relevant provisions of the IEE reports of the subprojects: (i) an international environmental safeguards specialist (to be hired only on “as needed” basis), and (ii) national environmental specialists (for duration of implementation). These personnel will provide technical support to the PMCU and Manikganj PIU including implementation of the environmental requirements, according to ADB SPS, and assist in monitoring impacts and mitigation measures associated with subprojects. The PDSC safeguards specialists will support environmental management functions including updating subproject IEEs with respect to environmental management plans, assisting in preparing IEEs, and assist in monitoring impacts and mitigation measures associated with subprojects. The consultants will also provide needed training and capacity building support to the PMCU and Manikganj PIU. The indicative terms of reference for project environmental personnel is provided in **Error! Reference source not found.**

147. **Contractors.** The contractors will have specific roles in the implementation of the EMPs. Each contractor shall have at least one full time environmental health and safety supervisor (or equivalent) responsible for implementing applicable measures in the EMP. All these specific roles and responsibilities are discussed in this IEE report which shall form part of the contract documents. Manikganj PIU will monitor contractors’ environmental performance.

148. Table 13 summarizes the overall roles and responsibilities of PMCU, Manikganj PIU, and

<sup>20</sup> PMCU responsibilities shall include management of (i) Local Government Grant facility, (ii) Investment components under the project, and (iii) Institutional Strengthening and Capacity building of the local governments. The project PMCU will be advised by a Technical Advisory and Selection Committee and an Urban Management Support unit.

ADB.

**Table 13: Institutional Roles and Responsibilities**

<b>Project Management Coordination Unit</b>	<b>Project Implementation Unit</b>	<b>ADB</b>
<b>Pre-construction stage</b>		
Environmental officer of the project management coordination unit (PMCU), with assistance from the Environmental Specialist(s) of the preparation, design and supervision consultant (PDSC) to conduct rapid environmental assessment (REA) for each subproject using checklists available on ADB's website. Based on the REA, categorize the project based on ADB's Safeguard Policy Statement (SPS), 2009. Submit all categorization forms to ADB.	PDSC will assist the project implementation unit (PIU) and conduct initial environmental examination (IEE) (or update existing IEE) for all Category B subprojects, which will include an environmental management plan (EMP). PIU with assistance from the Environmental officer of the PMCU and the environmental specialist of the PDSC to carry out public consultation during IEE process and incorporate consultation findings into project designs and IEE.	ADB to review the REA checklists and reconfirm the categorization.
PMCU based on review, will approve the IEE and send to ADB for review and clearance before contract award. The IEE also made available on request. Ensure IEE with the corresponding EMP is part of contract documents for category B subprojects and/or components. If the subproject and/or component is of category 'C', the PMCU to provide generic mitigation measures, if any, to be implemented. For Category C subprojects, no IEE/EIA is required, only a review of the environmental implications.	After the approval of IEE by PMCU and clearance by ADB, PIU with the assistance of PDSC to disclose the IEE and EMP to public information as required by ADB's SPS. PDSC, on behalf of the PIU, to incorporate mitigation measures in project design, specified in IEE and incorporate environmental mitigation and monitoring measures that need to be incorporated into contract document.	ADB will review and grant clearance of IEE/EMPs for subprojects before award of contracts. ADB will disclose cleared and government-endorsed IEEs on its website.
Environmental officer of PMCU to provide guidance to the PIU to ensure conformance of all subprojects to the regulatory compliance, with regard to environment. This shall include guidance in preparation of the documents as required for the issuance of Environmental Compliance Certificate (ECC) under the Environmental Conservation Rules (ECR) and other necessary clearances such as for example tree cutting permits from the Ministry of Environment and Forests, submission of application forms, and liaising with agencies towards obtaining ECC, tree-cutting permits, and other clearances from relevant government agencies. Environmental officer of PMCU shall notify the ADB on obtaining of these clearances, including the conditions specified if any in the clearances, and integration of these into the contracts/EMP.	ECR stipulates that for (i) green, (ii) orange-A, (iii) orange-B, and (iv) red category projects, obtaining of environmental clearance certificate from DOE is a prerequisite. The environmental support staff of the PIU with assistance from PDSC environmental specialists shall compile the necessary information required for submission of application forms for clearances, obtaining NOC from local authorities, etc. Until the obtaining of clearance certificate from DOE, the environmental support staff will interact with the DOE on a regular basis and provide necessary documentation/clarifications as required.	ADB to ensure that the clearance requirements are included in the contract provisions/EMP.
Environmental officer of PMCU to ensure that the IEE containing the EMP of each subproject is included in the bid and	The environmental support staff of PIU to ensure that: (i) each contractor prepares its SEMP based on the EMP in	

<b>Project Management Coordination Unit</b>	<b>Project Implementation Unit</b>	<b>ADB</b>
contract documents. At the same time, the environmental officer of PMCU to ensure that the total budget for implementing the EMP is included in the bid and contract documents.	the subproject IEE, and (ii) budget is included in the SEMP.	
<b>Construction stage</b>		
PMCU to review the PIU monthly monitoring reports to ensure that all mitigation measures are implemented. PMCU to consolidate the monthly reports and submit semi-annual reports to ADB for review. Corrective actions to be undertaken if needed.	Contractors to conduct environmental monitoring and implement EMPs. PIU with support of the environmental specialist(s) of PDSC to (i) review and approve the contractors' implementation plan for the environmental provisions in the EMP, and (ii) monitor the implementation of mitigation measures by contractor. The PDSC with PIU to prepare monthly progress reports including a section on implementation of the mitigation measures and submit to PMCU for review. PMCU to submit semi-annual monitoring report to ADB.	ADB to review the reports and provide necessary advice/guidance needed to the PMCU.
<b>Operation Stage</b>		
LGED and PIUs to conduct monitoring, as specified in the environmental monitoring plan of EMP. The DOE to monitor the performance, if required and as specified in monitoring plan of EMP.	ADB to review semi-annual environmental monitoring report and disclose on its website.  ADB to prepare Project Completion Report	
PMCU to continue submission of semi-annual environmental monitoring report to ADB until ADB issues a Project Completion Report.		

ADB = Asian Development Bank, DOE = Department of Environment, ECC = Environmental Compliance Certificate, ECR = Environmental Conservation Rules, EIA = environmental impact assessment, EMP = environmental management plan, IEE = initial environmental examination, PDSC = preparation, design, and supervision consultant, NOC = no objection certificate, PIU = project implementation unit, PMCU = project management and coordination unit, REA = rapid environmental assessment, SPS = safeguards policy statement.

## **B. Environmental Management Plan**

149. An environmental management plan (EMP) has been developed to provide mitigation measures to reduce all negative impacts to acceptable levels.

150. The EMP will guide the environmentally-sound construction of the subproject and ensure efficient lines of communication between PMCU, PIUs, consultants and contractors. The EMP will (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (ii) provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site; (iii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iv) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (v) ensure that safety recommendations are complied with. The EMP includes a monitoring program to measure the environmental condition and effectiveness of implementation of the mitigation measures. It will include observations on- and off-site, document checks, and interviews with workers and beneficiaries.

151. The contractor will be required to (i) carry out all of the mitigation and monitoring measures

set forth in the approved EMP; and (ii) implement any corrective or preventive actions set out in safeguards monitoring reports that PMCU will prepare from time to time to monitor implementation of this IEE, EMP and site-specific EMP (SEMP). The contractor shall allocate budget for compliance with these IEE, EMP and SEMP measures, requirements and actions. The contractor will be required to submit to PIU, for review and approval, SEMP including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid wastes and excavation spoils; (ii) specific mitigation measures following the approved EMP; and (iii) monitoring program per EMP. No works can commence prior to approval of SEMP.



**Table 14: Environmental Management Plan Matrix**

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
<b>1. Design and Pre-Construction Phase</b>					
Consents, permits, environmental clearances, etc.	Failure to obtain necessary consents, permits, etc. can result to design revisions and work stoppage	Obtain all of the necessary consents, permits, environmental clearances, etc. before the start of civil works. Include in detailed design drawings and documents all conditions and provisions if necessary.	Project management and coordination unit (PMCU), Manikganj Project implementation unit (PIU), and Preparation, design and supervision consultant (PDSC)	Incorporated in final design and communicated to contractors.	Before award of contract
Existing utilities such as electric poles, water supply lines, sewerage lines, telephone cables, etc.	Disruption of services	Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction. Require construction contractors to prepare a contingency and spoil management plan.	PMCU, Manikganj PIU, and PDSC	List of affected utilities and operators;  Bid document to include a requirement for a contingency plan for service interruptions, e.g. provision of water if disruption is more than 24 hours, spoil management plan.	During detailed design phase;  Review of spoils management plan: Twice (once after first draft and once before final approval)
Stormwater runoff and conveyance of pollutants.	Besides stormwater, silts, solid wastes, domestic wastewater and septic tank effluents from within the	The design to consider the following:  The inlet design to ensure that only storm or rainwater flows into the drainage system; Prevent households from connecting outlets of septic tanks and grey water to the community canals;	PMCU, Manikganj PIU, and PDSC	Incorporated in master plan hence, should also be included in the final detailed design.	During detailed design phase.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	<p>residential and commercial establishments may enter the Manikganj Khal and pollute the Kaliganga River.</p> <p>Also, the silts and solid wastes from the community canals may be washed down to the Manikganj Khal, which could result to heavy siltation of the Khal and obstruct flow along the khal in the medium to long term.</p>	<p>Provide siltation or sedimentation chambers (or similar structures) at all outlets of community canals along the Manikganj Khal to prevent accumulation of silts and solid wastes in the said canal. This will also prevent potential pollution of the Kaliganga River; and</p> <p>Position the outlets of community canals enough to have space for the provision of siltation or sedimentation chambers (or similar structures), including accessibility during operation and maintenance (O&amp;M) phase.</p>			
Construction work camps, stockpile areas, storage areas, and disposal areas	Disruption to traffic flow and sensitive receptors.	Determine locations before award of construction contracts.	Manikganj PIU and PDSC	<p>List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.</p> <p>Written consent of landowner/s (not lessee/s) for reuse of excess spoils to agricultural land.</p>	During detailed design phase
Waste generation	Generation of solid waste, wastewater from labor camp and other	Follow the principle of "Reduce, Reuse, Recycle, and Recover". Prohibition of unwanted littering and discharge of waste.	Contractor	Contractor's records. Visual inspection.	Visual inspection by Manikganj PIU on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	construction waste may cause pollution	Solid waste is managed and disposed through the municipal collection system.			
Sources of raw materials	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, resulting water logging, and water pollution	Prepare list of quarry sites and approved sources of materials.	Manikganj PIU and PDSC	List of approved quarry sites and sources of materials; (ii) Bid document to include requirement for verification of quarry sites	During detailed design phase, with a discussion with detailed design engineers and Manikganj PIU on the suitability of sources and permit for additional quarry sites if necessary.
EMP Implementation Training	Impact to the environment, workers, and community	Project manager and contractors should be trained on EMP implementation, including spoils management, traffic management, community and occupational health and safety, Bangladesh Labor Act, and other standard operating procedures.	PMCU, Manikganj PIU, PDSC, Contractor's EHS Supervisor (or equivalent)	Record of completion of training (Safeguards Compliance Orientation).  Contractor records for EMP implementation at worksites.	During the detailed design phase and before the mobilization of workers to site
<b>2. During Construction Phase</b>					
<b>A. Physical Characteristics</b>					
Topography landforms, geology, and soils and river morphology and hydrology	<p>Sand, gravel or crushed stone will be required for this subproject.</p> <p>Extraction of natural aggregate materials may cause localized</p>	Prepare Aggregates Management Plan as part of the SEMP. Source aggregates only from entities with environmental clearances and license. Use quarry sites and sources permitted by relevant government agencies only, such as the Bangladesh Water Resources Development Board for sand quarrying.	Contractor	Records of sources of materials.	Manikganj PIU on a monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	changes in topography and landforms (if on land) or river morphology and hydrology (if on the river).	No new quarry sites shall be used for the subproject. Verify suitability of all material sources and obtain approval of implementing agency. Document all sources of materials and include in the monthly reporting to the PIU.			
Water quality	Pollution of Kaliganga River due to: (i) poorly managed construction sediments, and waste materials; (ii) poor sanitation practices of construction workers; and (iii) improper storage of petroleum products or chemicals used during construction such as fuel, oil and lubricants.	<ul style="list-style-type: none"> <li>- follow World Bank's Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities;</li> <li>- dispose excess spoils per the Spoil Management Plan attached in <b>Error! Reference source not found.</b>;</li> <li>- locate temporary storage areas on flat grounds and away from any surface drainage routes (ideally at least 100 m from surface water);</li> <li>- shield temporary storage areas with sandbags;</li> <li>- provide adequate water supply and sanitation facilities at work sites;</li> <li>- provide impervious bunded areas with 110% volume for storage of petroleum products used during construction, such as fuel, oils, and lubricants;</li> <li>- provide orientation and training to assigned workers on the correct handling of petroleum-based products, clean-up of equipment, and response measures in case spills or emergencies using a well prepared emergency response plan; and</li> <li>- ensure no refueling within 100 m from surface water.</li> </ul>	Contractor	<p>Areas for stockpile storage of fuels and lubricants and waste materials.</p> <p>Number of silt traps installed along trenches leading to water bodies.</p> <p>No visible degradation to nearby drainage, water bodies due to construction activities.</p> <p>Results of river water quality testing.</p>	<p>Visual inspection by Manikganj PIU and PDSC on weekly basis</p> <p>Frequency and sampling sites to be finalized during detailed design.</p>
Groundwater	Pollution of	- follow World Bank's EHS Guidelines	Contractors	Areas for stockpile	Visual inspection by

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
quality	groundwater resource due to potential seepage of construction chemicals such as fuels and temporary latrines at construction camps.	<ul style="list-style-type: none"> <li>- on Construction and Decommissioning Activities;</li> <li>- provide impervious bunded areas with 110% volume for storage of petroleum products used during construction, such as fuel, oils, and lubricants. This will ensure these chemicals will not seep into the ground and eventually affecting groundwater quality. Contractors will provide construction camps with portable toilets for use of the workers and will ensure that handling of the septic wastes generated will be done by authorized handlers and transporters only; and</li> <li>- no toilets shall be put up within 500 m from groundwater wells, if any.</li> </ul>		<p>storage of fuels and lubricants.</p> <p>Availability of sanitary latrines at construction camps.</p>	Manikganj PIU and PDSC on monthly basis
Air quality	Excavation and construction works will create dust from various sources such as excavation of dry soil; backfilling; loading, transport and unloading of raw materials and spoils; movement of vehicles; rock-crushing; and concrete mixing. Smoke emission from construction vehicles and burning of fuels from labor camps may contain	<ul style="list-style-type: none"> <li>- follow World Bank's Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities;</li> <li>- confine earthworks according to excavation segmentation plan that should be part of site-specific environmental management plan (SEMP);</li> <li>- prepare and implement a dust management plan that should be part of the SEMP;</li> <li>- consult with PIU on the designated areas for stockpiling of sand, gravel, and other construction materials (ideally about 500 m from residential areas);</li> <li>- bring construction materials (aggregates, sand, etc.) to the construction site as and when required</li> </ul>	Construction Contractor	<p>Location of stockpiles;</p> <p>Number of complaints from sensitive receptors;</p> <p>Heavy equipment and machinery with air pollution control devices;</p> <p>A certification that vehicles are compliant with air quality standards.</p> <p>Results of ambient air quality testing.</p>	<p>Visual inspection by Manikganj PIU and PDSC on monthly basis</p> <p>Frequency and sampling sites to be finalized during the detailed design stage.</p>

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	pollutants such as carbon monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons that are dangerous to human health.	<ul style="list-style-type: none"> <li>- to avoid heavy stockpiling at the sites;</li> <li>- damp down with water dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary;</li> <li>- if re-surfacing of disturbed roads cannot be done immediately, spread crushed gravel over backfilled surfaces;</li> <li>- during demolition, water exterior surfaces, unpaved ground in the immediate vicinity and demolition debris;</li> <li>- place signage at active work sites in populated areas;</li> <li>- require trucks delivering aggregates and cement to have tarpaulin cover;</li> <li>- clean wheels and undercarriage of vehicles prior to leaving construction sites;</li> <li>- limit speed of construction vehicles on access roads and work sites to a maximum of 30 km per hour;</li> <li>- prohibit burning firewood in work and labor camps (promote liquified petroleum gas for cooking purposes and electric heater for heating purposes);</li> <li>- use vehicles that have government-issued permits and registrations; and</li> <li>- prohibit open burning of solid waste.</li> </ul>			
Acoustic environment	Noise level at the construction sites and their vicinities may be elevated due to construction activities. This will	<ul style="list-style-type: none"> <li>- follow World Bank's EHS Guidelines on Construction and Decommissioning Activities;</li> <li>- if applicable to subproject alignment, prepare and implement a noise and vibration management plan that should be part of the SEMP;</li> </ul>	Contractor	<p>Number of complaints from sensitive receptors;</p> <p>Use of silencers in noise- producing equipment and</p>	<p>Visual inspection by Manikganj PIU and PDSC on monthly basis.</p> <p>Frequency and sampling sites to be</p>

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	impact both the workers and community people near the construction sites, especially in noise-sensitive areas such as near health care facilities, educational institutions and places of worship.	<ul style="list-style-type: none"> <li>- provide prior information to the local public, including institutions such as schools and hospitals, about the work schedule;</li> <li>- use equipment that emits the least noise, well-maintained and with efficient mufflers. Install silencers if necessary and practical;</li> <li>- restrict noisy activities to day time;</li> <li>- avoid use of noisy equipment or doing noisy works at night time;</li> <li>- limit engine idling to a maximum of one minute;</li> <li>- spread out the schedule of material, spoil and waste transport;</li> <li>- minimize drop heights when loading and unloading coarse aggregates; and</li> <li>- not use horns unless it is necessary to warn other road users or animals of a vehicle's approach.</li> </ul>		<p>sound barriers;</p> <p>Results of ambient noise level measurements.</p>	finalized during the detailed design stage.
Aesthetics	Interference with the enjoyment of the area and creation of unsightly or offensive conditions	<ul style="list-style-type: none"> <li>- dispose excess spoils per the Spoil Management Plan;</li> <li>- avoid stockpiling of excess excavated soils as far as possible;</li> <li>- avoid disposal of any debris and waste soils in or near water bodies/rivers;</li> <li>- coordinate with PIU for beneficial uses of excess excavated soils or immediately dispose to designated areas;</li> <li>- recover used oil and lubricants and reuse or remove from the sites;</li> <li>- manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; and</li> <li>- remove all wreckage, rubbish, or</li> </ul>	Contractor	<p>Number of complaints from sensitive receptors;</p> <p>Worksite clear of hazardous wastes;</p> <p>Worksite clear of any wastes unutilized materials, and debris;</p> <p>Transport route and worksite cleared of dirt</p>	Visual inspection by Manikganj PIU and PDSC on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		temporary structures which are no longer required.			
<b>B. Ecological Resources</b>					
Terrestrial ecology including terrestrial biodiversity	Construction and rehabilitation activities at the Manikganj Khal may need to cut trees along the slopes and embankment of the canal.	<ul style="list-style-type: none"> <li>- while effort to avoid cutting of trees is the paramount consideration under the subproject, cutting of some trees may not be avoided at some instances. However, any unavoidable cutting should be minimized to greatest extent possible.</li> <li>- for any tree cut, conduct replacement planting at a ratio of 1:10 consistent with the approved EARF for the project and social forestry program of LGED (see Appendix 7 of the IEE for LGED Tree Plantation Program). Further, any tree cutting activities shall be undertaken only outside the bird breeding season.;</li> <li>- protect giant trees and locally-important trees (for religious reasons), if any, during implementation;</li> <li>- prevent workers or any other person from removing and damaging any flora and fauna found in the subproject sites; and</li> <li>- prohibit employees and workers from poaching animals and cutting of trees for firewood at the subproject sites or their vicinities.</li> </ul>	Contractors	<p>Written report from Contractor on trees that will be cut along the Manikganj Khal.</p> <p>Some complaints from sensitive receptors on disturbance of vegetation, poaching fishing, etc.</p>	Visual inspection by Manikganj PIU and PDSC on monthly basis
Aquatic ecology including aquatic biodiversity	Construction and rehabilitation works at the Manikganj Khal will degrade the quality of water	<ul style="list-style-type: none"> <li>- avoid excavation and other civil works during monsoon season;</li> <li>- store spoils away from the canal to avoid being washed down back to the canal; and</li> <li>- not undertake construction works</li> </ul>	Contractor	Reports of Contractors to Manikganj PIU.	Visual inspection by Manikganj PIU and PDSC on monthly basis



Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	flowing to the Kaliganga River. As such, aquatic species found at the Kaliganga river will be affected.	near these sites during the spawning and breeding period between June and September.			
<b>C. Socioeconomic Characteristics</b>					
Traffic and disturbance to community	At some areas along the Manikganj Khal, some construction and rehabilitation works will impede the flow of traffic. These activities may also cause damage to community facilities and utilities that could result to inconvenience of the local people.	<ul style="list-style-type: none"> <li>- prepare and implement a traffic management plan in collaboration with local authorities;</li> <li>- where traffic congestion will likely occur, place traffic flagmen during working hours;</li> <li>- provide compensation to affected people;</li> <li>- manage stockpile;</li> <li>- manage pumped water from excavations either to drains or drums for later use;</li> <li>- relocate the affected power supply poles, and</li> <li>- advise the concerned authority during accidental damage to utilities.</li> <li>- erect and maintain barricades if required</li> <li>- inform through display board about nature, duration of construction and contact for complaints</li> <li>- complete the work quickly nearby institution, place of worship, business, hospitals, and schools.</li> <li>- consult with business and institutions for work schedules.</li> <li>- restore damaged properties and utilities</li> </ul>	Contractor	<p>Traffic route during construction works, Including number of permanent signs, barricades, and flagmen on worksite;</p> <p>Number of complaints from sensitive receptors;</p> <p>Some signages placed at the subproject location;</p> <p>Number of walkways, signages, and metal sheets placed at subproject location</p>	Visual inspection by Manikganj PIU and PDSC on monthly basis
Socioeconomic status	Opportunity for. This can result in	<ul style="list-style-type: none"> <li>- Engage the local workforce. However, child and forced labor shall</li> </ul>	Construction Contractor	Employment records; Records of sources	Visual inspection by Manikganj PIU and

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	an increase in local revenue.	<ul style="list-style-type: none"> <li>- be strictly prohibited.</li> <li>- Secure construction materials from local market.</li> </ul>		<p>of materials</p> <p>Records of compliance to Bangladesh Labor Act 2006</p>	PDSC on monthly basis
Community health and safety	Construction works will impede the access of residents and business in limited cases	<ul style="list-style-type: none"> <li>- Implement the community health and safety plan in the SEMP, which follows international best practices on occupational health and safety such as those in Section 4.3 of World Bank EHS Guidelines on Construction and Decommissioning Activities</li> <li>- Restrict work force in designated areas.</li> <li>- Identify stockyard areas in consultation with local administration</li> <li>- Work on private land requires written permission of landowners and DSMC.</li> <li>- Prefer small mechanical excavator for trenching.</li> <li>- Construct gender friendly toilets for workers</li> <li>- Prohibit alcohol and drugs on site</li> <li>- Prevent excessive noise;</li> <li>- Code of conduct for workers includes restricting workers in designated areas, no open defecation, no littering, no firewood collection, no fire except designated places, no trespassing, no residence at construction sites, and no obligation to potentially dangerous work</li> <li>- Maintain a complaint logbook in workers camp and take action promptly of complaints.</li> </ul>	Contractor	<p>The number of permanent signs, barricades, and flagmen on worksites as per Traffic Management Plan (see <b>Error! Reference source not found.</b> of the IEE for sample);</p> <p>Number of complaints from sensitive receptors;</p> <p>Number of walkways, signs, and metal sheets placed at the subproject location;</p> <p>Agreement between landowner and contractors in case of using private land as work camps, storage areas, etc.</p>	<p>Visual inspection by Manikganj PIU and PDSC on weekly basis</p> <p>Frequency and sampling sites to be finalized during detailed design and final location of sub-subproject components</p>
Workers	There is invariably	<ul style="list-style-type: none"> <li>- Implement the occupational health</li> </ul>	Contractor	Equipped first-aid	Visual inspection by

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Health & Safety	<p>a safety risk when construction works such as excavation and earthmoving are conducted in urban areas.</p> <p>Workers need to be mindful of the occupational hazards which can arise from working at height and excavation works.</p>	<p>and safety plan in the SEMP, which follows international best practices on occupational health and safety such as those in Section 4.2 of World Bank EHS Guidelines on Construction and Decommissioning Activities</p> <ul style="list-style-type: none"> <li>- Comply Labor Act 2006</li> <li>- Train all site personnel on environmental health and safety</li> <li>- Exclude public from worksites</li> <li>- Provide personal protective equipment to workers and ensure their effective usage</li> <li>- Document procedures to be followed for site activities; and</li> <li>- Maintain accident reports and records.</li> <li>- Make first aid kits readily available</li> <li>- Maintain hygienic accommodation in work camps.</li> <li>- Ensure uncontaminated water for drinking, cooking and washing,</li> <li>- Assure clean eating areas</li> <li>- Make sure sanitation facilities are readily available</li> <li>- Provide medical insurance coverage for workers;</li> <li>- Provide orientation for guest visitors;</li> <li>- Ensure that visitors do not enter hazard areas unescorted;</li> <li>- Require workers to wear high visibility clothes;</li> <li>- Ensure moving equipment is outfitted with audible backup alarms;</li> <li>- Chemical and material storage areas need to be marked clearly;</li> <li>- Use of earplugs enforced at work</li> </ul>		<p>stations;</p> <p>Medical insurance coverage for workers;</p> <p>Number of accidents;</p> <p>Records of supply of uncontaminated water;</p> <p>Condition of eating areas of workers;</p> <p>Record of health and safety orientation training;</p> <p>Availability of personal protective equipment at construction site;</p> <p>Number of moving equipment outfitted with audible back- up alarms;</p> <p>Signage for storage and disposal areas;</p> <p>Condition of sanitation facilities for workers; and</p> <p>Records of results of noise level measurements.</p>	<p>Manikganj PIU and PDSC on a weekly basis.</p> <p>Frequency and sampling sites to be finalized during detailed design and final location of sub-subproject components</p>

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		areas with high noise level caused by operating equipment or machineries at the sites.			
<b>D. Historical, Cultural, and Archaeological Characteristics</b>					
Physical and cultural heritage	<p>The subproject will not encroach or run over into any physical, and cultural resources. As well, the subproject area is not a potential archaeological area and therefore no impact is envisaged.</p> <p>There are no archaeological, paleontological, or architectural sites of significance listed by Bangladesh Department of Archaeology.</p>	<ul style="list-style-type: none"> <li>- However, as a precautionary approach, the contractor will be required to:</li> <li>- strictly follow the protocol by coordinating immediately with Manikganj PIU and Bangladesh Department of Archaeology for any suspicion of chance finds during excavation works;</li> <li>- stop work immediately to allow further investigation if any finds are suspected; and</li> <li>- request authorized person from the Bangladesh Department of Archaeology to observe when excavation resumes for the identification of the potential chance find, and comply with further instructions.</li> <li>- .</li> </ul>	Contractors	Records of chance finds.	Visual inspection by Manikganj PIU and PDSC on monthly basis.
<b>E. Others</b>					
Submission of EMP implementation Report	Unsatisfactory compliance to EMP	<ul style="list-style-type: none"> <li>- Appointment of full time EHS supervisor (or equivalent)</li> <li>- Timely monitoring reports with field photographs</li> </ul>	Contractor	<p>Availability and competency of appointed supervisor</p> <p>Monthly report</p>	<p>Monthly monitoring report to be submitted by Contractor to Manikganj PIU;</p> <p>Quarterly report by Manikganj PIU to PMCU, and</p>

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
					Semi-annual report by PMCU to ADB.
<b>3. Post-Construction Phase</b>					
Post Construction Activities	Damage due to debris, spoils, excess construction materials	<ul style="list-style-type: none"> <li>- Remove spoils wreckage, rubbish, or temporary structures no longer required;</li> <li>- All excavated roads shall be reinstated to original condition;</li> <li>- All disrupted utilities should be restored;</li> <li>- All affected structures rehabilitated /compensated;</li> <li>- The construction camp needs to clear of spills; e.g. oil, paint, etc. and other pollutants after dismantling;</li> <li>- All hardened surfaces shall be ripped; all imported materials shall be removed and all temporary services shall be cancelled;</li> <li>- Fully reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition as recorded by the Contractor</li> <li>- Request PMCU/PIU in writing that worksites and camps are vacated and restored to at least pre-project conditions.</li> </ul>	Contractor	PMCU and/or Manikganj PIU report in writing that (i) worksite is restored to original conditions; (ii) camp has been vacated and restored to pre-project conditions; (iii) all construction related structures not relevant to O&M are removed, and (iv) worksite cleanup is satisfactory.	Before turnover of completed works to Manikganj PIU.
Environmental legislation compliance	Lack of awareness in Manikganj PIU about legislations and IEE requirements	<ul style="list-style-type: none"> <li>- Strengthen capacity of Manikganj PIU staffs;</li> </ul>	PMCU, Manikganj PIU, PDSC	Monitoring reports and checking operations against O&M manuals and permits/clearances	LGED - After completion of the drainage rehabilitation works
Domestic wastewater discharge	Illegal entry of waste water from buildings or households; Solid Waste	<ul style="list-style-type: none"> <li>- The design includes cover slab for the proposed drain hence, it should be ensured that each drain is provided with cover slab</li> <li>- Prepare and implement maintenance</li> </ul>	Manikganj PIU	Water quality of discharge at outfalls.	LGED and Manikganj PIU - Monthly or quarterly depending on the situation and

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	disposal to the drains resulting to water pollution and clogging.	<ul style="list-style-type: none"> <li>- plan.</li> <li>- Provision of regular monitoring.</li> <li>- Passage of local ordinance prohibiting discharge of domestic wastewater, septage and solid wastes into community canals including the Manikganj Khal.</li> </ul>			capacity of LGED and Manikganj PIU.

CRDP = City Region Development Project, EARF = environmental assessment and review framework, EHS = environmental, health and safety, EMP = environmental management plan, IEE = initial environmental examination, LGED = Local Government Engineering Department, PDSC = preparation, design and supervision consultant, PIU = project implementation unit, PMCU = project management and coordination unit, SEMP = site-specific environmental management plan.

### C. Environmental Monitoring Program

152. Monitoring of mitigation measures during construction is the responsibility of the PIU supported by the PMCU Environment Officer and PDSC Environmental Specialist.

153. Table 15 shows the proposed environmental monitoring plan for this subproject, which specifies the various monitoring activities, indicating location, frequency of monitoring and responsibility.

**Table 15: Environmental Monitoring Program**

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
<b>Pre-Construction</b>					
Secure Environmental Compliance Certificate (ECC) from Department of Environment	Project management and coordination unit (PMCU) office	PMCU, preparation, design and supervision consultant (PDSC)	Copy of approved ECC	Before construction activities	PMCU, PDSC
Initial environmental examinations (IEEs) and environmental management plans (EMPs) are included in bid and contract documents	PMCU office	PMCU, PDSC	Copies of bid and contract documents	Before approval tender document	PMCU, PDSC
Site-specific EMP (SEMP) submitted by Contractor for approval by Manikganj project implementation unit (PIU)	Manikganj PIU office	Contractor, Manikganj	Copy of approved SEMP	Before construction activities commence	PMCU, PDSC
Spoil management plan (SMP) submitted by contractor for approval by Manikganj PIU	Manikganj PIU office	Contractor, Manikganj	Copy of approved SMP	Before construction activities commence	PMCU, PDSC
Traffic management plan (TMP) submitted by Contractor for approval by Manikganj PIU	Manikganj PIU office	Contractor	Copy of approved TMP	Before construction activities commence	PMCU, PDSC
Baseline environmental data gathering	All subproject sites	Contractor	Ambient air quality sampling Noise level measurements	Once before construction activities commence	PMCU, Manikganj PIU, PDSC
Secure all other necessary permits and licenses from relevant government agencies	Manikganj PIU office, Contractor office or site	Contractor	Copies of permits and licenses	Before construction activities commence	PMCU, Manikganj PIU, PDSC
<b>CONSTRUCTION</b>					
Implementation of	Subproject	Contractor	Site visits,	Weekly or as	Manikganj PIU,

<b>Activities or Items to Monitor</b>	<b>Location</b>	<b>Responsible for Activities</b>	<b>Monitoring Method</b>	<b>Monitoring Frequency</b>	<b>Monitoring Responsibility</b>
SEMP, which includes implementation of community and occupational health and safety measures, consulting businesses and institutions regarding operating hours and factoring this in work schedules and ensure there is provision of alternate access to businesses and institutions during construction activities, etc.	sites		Contractor records,	needed	PDSC
Implementation of SMP, which include disposal of spoil material at a location approved to by Manikganj PIU, use of tarpaulin or similar cover to trucks during transport, quick removal of spoils stocked at construction sites, etc.	Subproject sites	Contractor	Site visits, Contractor records	Weekly or as needed	Manikganj PIU, PDSC
Implementation of TMP, including the list of roads to be closed, number of flagmen to be designated along length of drainage per work day, type and number of signs/barricades to be used, etc.	Subproject sites	Contractor	Site visits, Contractor records	Weekly or as needed	Manikganj PIU, PDSC
Conduct of ambient air quality sampling and noise level measurements	Subproject sites	Contractor	Contractor records, Results of laboratory analyses	At least semi-annual or as needed	PMCU, Manikganj PIU, PDSC
Develop and apply archaeological protocol to protect chance finds	All subproject sites	Contractor, PMCU, Manikganj PIU, PDSC	Contractor records	Once until protocol is approved	PMCU, Manikganj PIU, PDSC
Provide EHS training for all personnel	All subproject sites	Contractor	Contractor records; Interviews to	Monthly	Manikganj PIU, PDSC



Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
			workers		
Keep accident reports and records	All subproject sites	Contractor	Contractor records; Interviews to workers and community people	Monthly	Manikganj PIU, PDSC
Employ workforce from communities near sites	All subproject sites	Contractor	Contractor records	Monthly	Manikganj PIU, PDSC
Implementation of EHS measures at construction camps	Construction camp sites	Contractor	Site visits; Interviews to workers at camps	Monthly	Manikganj PIU, PDSC
<b>OPERATION AND MAINTENANCE</b>					
Passage of local ordinance prohibiting discharge of wastewater, septage and solid wastes into community drains including the Manikganj Khal.	Purashava Office	Manikganj PIU	Records of <i>pourashava</i>	Start of O&M phase	Local Government Engineering Department (LGED)
Maintain safe passage for vehicles and pedestrians during maintenance activities	Subproject road sites	Manikganj PIU	Site observations	Monthly	LGED
Maintain all (i) safety structures such as railings and footpaths along the drainage embankment; and (ii) warning signages at critical points along the drainage alignment particularly the accident-prone areas and areas near institutional establishments such as schools, places of worship, hospitals.	Subproject road sites	Manikganj PIU	Site observations	Monthly	LGED
During maintenance works, provide signboards informing nature and duration of maintenance activities.	Subproject road sites	Manikganj PIU	Site observations	Monthly	LGED
Prevent run-off/deposit of foreign materials (oil, grease, solid waste, plastics) into watercourses,	Subproject road sites	Manikganj PIU	Site observations	Monthly	LGED

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
and clean drain periodically; dispose of materials removed from drains					
Dispose of material from blocked drain in location away from roadway and drain	Subproject road sites	Manikganj PIU	Site observations	Monthly	LGED

#### D. Capacity Development Training

154. The PMCU safeguards experts (environmental and social) with support from PDSC Environment Specialist and Social Safeguard Specialist will be responsible for training the PIUs' safeguards officers (environmental and social). Training modules will need to cover safeguards awareness and management in accordance with both ADB and government requirements as specified below:

- (i) Environmental Safeguards
  - (a) sensitization on ADB's safeguard policy on environment;
  - (b) introduction to environment and environmental considerations in roads, drainage and solid waste management projects;
  - (c) review of IEEs and integration into the project detailed design;
  - (d) community and occupational health and safety considerations;
  - (e) consultation and participation requirements;
  - (f) project GRM and ADB's Accountability Mechanism;
  - (g) improved coordination within nodal departments; and
  - (h) monitoring and reporting system. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to work sites.
- (ii) Social Safeguards
  - (a) sensitization on ADB's policies on Involuntary Resettlement and Indigenous People;
  - (b) introduction to social safeguards assessment and document requirements;
  - (c) Consultation and participations requirements;
  - (d) Project GRM and ADB's Accountability Mechanism (AM); and
  - (e) monitoring and reporting system.

155. The proposed training project along with the frequency of sessions is presented in Table 16.

**Table 16: Training Program for Environmental Management**

Items	Pre-construction	Construction	
Training Title	Orientation workshop	Orientation program/ workshop for contractors and supervisory staff	Experiences and best practices sharing
Purpose	To make the participants aware of the environmental safeguard requirements of ADB and government of Bangladesh and	To build the capacity of the staff for effective implementation of the designed environmental management plans (EMPs) aimed at meeting the	To share the experiences and best practices aimed at learning lessons and

Items	Pre-construction	Construction	
	how the project will meet these requirements	environmental safeguard compliance of ADB and government of Bangladesh	improving implementation of EMP
Contents	<p>Module 1: Orientation ADB Safeguards Policy Statement government of Bangladesh Environmental Laws and Regulations</p> <p>Module 2: Environmental Assessment Process ADB environmental process, identification of impacts and mitigation measures, formulation of an EMP, implementation, and monitoring requirements Review of environmental assessment report to comply with ADB requirements Incorporation of EMP into the project design and contracts</p>	<p>Roles and responsibilities of officials/contractors/consultants towards protection of the environment Environmental issues during construction Implementation of EMP Monitoring of EMP implementation Reporting requirements</p>	<p>Experiences on EMP implementation – issues and challenges Best practices followed</p>
Duration	1 day	1 day	1 day on a regular period to be determined by project management and coordination unit (PMCU) and preparation, design and supervision consultant (PDSC)
Participants	PMCU and project implementation unit (PIU) staff (technical and environmental) involved in the project implementation	PMCU, PIU, Contractors	PMCU, PIU, Contractors

#### **E. Environmental Management and Monitoring Plan Implementation Cost (Indicative)**

156. Most of the costs associated with environmental mitigation and enhancement measures are included in the EMP budget. In consideration to the environmental impacts and their mitigation measures for this subproject, some items need to be incorporated in the Bill of Quantities (BOQ) of this subproject. A substantial part of environmental costs shall be covered under civil works contract. However, exact figures of environmental costs under civil works contract are not included in this IEE. Costs of these items will be dealt elsewhere in the respective subproject component document. The environmental costs presented in

157. Table **17** are tentative provisions and suggested to be incorporated in the bill of quantities of bid documents. These figures are estimated based on experience of undertaking similar works under different LGED projects and the assumption of an average of \$10,000 per annum as cost of implementing EMP mitigation measures. It is assumed that the environmental cost under civil works contract for each contract package will be more or less same.

**Table 17: Tentative Environmental Management Plan Budget for Bill of Quantities**

(The following items need to be incorporated in the Bill of Quantities of this subproject)

Item No.	Description of Items	Unit	Quantity	Unit Rate (Tk)	Total Item (Tk)
1	Environmental Monitoring a) Air Quality, b) Noise level, c) Water quality, d) Sediment at work site to the entire satisfaction of engineer-in-charge.	Lump sum			20,000.00
2	Dust suppression measures (excluding watering for compaction) to the entire satisfaction of the engineer-in-charge.	m	9,970	2.00	19,940.00
3	Prevention of spillage, leakages of polluting materials to the entire satisfaction of the engineer-in-charge.	Lump sum			5,000.00
4	Providing and maintaining adequate potable water supply facilities (Shallow Tube well) at camp site and work site to the entire satisfaction of engineer-in-charge. Water Supply Tube well 02 Nos.	Nos.	1	10,000.00	10,000.00
5	Providing and maintaining adequate sanitation facilities at camp site and work site to the entire satisfaction of engineer-in-charge. Sanitation Toilet 02 nos. (01 no. for women and 01 no. for men)	Nos.	2	5,000.00	10,000.00
6	Rehabilitation of ancillary sites including stockpile sites, brick crushing sites, borrow areas, workforce camp, to the entire satisfaction of the engineer-in-charge.	meter	5,000	2.00	10,000.00
7	Proper disposal of camp site wastes to the entire satisfaction of the engineer-in-charge.	Lump sum			10,000.00
8	Maintain First aid box at camp site to the entire satisfaction of the engineer-in-charge.	Lump sum			5,000.00
9	Implementation of mitigation measures indicated in the EMP and SEMP.	Lump sum			3,320,000
<b>Estimated cost for additional environmental items (over 4-year period)</b>					<b>3,409,940.00</b>

EMP = environmental management plan, SEMP = site-specific environmental management plan, Tk = taka.

### VIII. MONITORING AND REPORTING

158. The PMCU will monitor the progress of EMP implementation in the different subproject jurisdictions. The PMCU and PIU will undertake site inspections and document review to verify compliance with the EMP and progress toward the final outcome. The contractor will conduct day to day implementation of the SEMP.

159. The contractor will submit monthly reports to the PIU with jurisdiction over the subproject sites. The monthly reports will include compilation of copies of monitoring sheets accomplished and duly signed by the contractor's EHS supervisor (or equivalent) on a daily basis. A sample daily monitoring sheet which can be used by the contractors is in **Error! Reference source not found..** This monitoring sheet is indicative which can be further enhanced depending on the actual situations at subproject construction sites.

160. The PIU will submit quarterly environmental monitoring reports to PMCU, which will include summary of daily monitoring activities of contractor and results of any independent monitoring or inspection activities of the PIU. In the conduct of these independent inspection activities, PIU will be supported by PDSC in this regard. A sample inspection checklist is in **Error! Reference source not found..** This checklist is indicative which can be further enhanced depending on the actual situations at subproject construction sites.

161. The PMCU shall consolidate quarterly reports from the PIUs including Manikganj PIU and results of its independent monitoring or inspection activities. PMCU shall accomplish semi-annual environmental monitoring report (SEMRs), which shall be submitted to ADB for review and disclosure on ADB website. Submission of SEMR will continue until ADB issues a Project Completion Report. The template for the SEMR is attached as **Error! Reference source not found..**

162. ADB will carry out the following monitoring actions to supervise the project implementation:

- (i) On a need basis, conduct site visits for subproject with potential adverse environmental or social impact;
- (ii) Conduct supervision missions with detailed review by ADB's environment/social safeguard specialists and/or officers and/or consultants for subprojects with adverse environmental and social impacts;
- (iii) Review the SEMRs submitted by PMCU to ensure that adverse impacts and risks are mitigated as planned in the EMP;
- (iv) Work with LGED to rectify to the extent possible any failures to comply with its environmental safeguard commitments, as covenanted in the loan agreement and elaborated in all environmental safeguard documents; and formulate and implement a corrective action plan to re-establish compliance as appropriate; and
- (v) Prepare a project completion report that assesses whether the objective and desired outcomes of the safeguard plans have been achieved, taking into account the baseline conditions and the results of monitoring.

163. ADB's monitoring and supervision activities are carried out on an on-going basis until a Project Completion Report (PCR) is issued. ADB issues a PCR within 1-2 years after the project is physically completed and in operation.

### IX. FINDINGS, RECOMMENDATION AND CONCLUSION

164. The Manikganj Khal drainage subproject is designed to improve the quality of life of Manikganj residents by rehabilitating and improving the Manikganj khal. This will in turn allow uninterrupted flow of stormwater run-off from the many parts of the Manikganj *pourashava*. Further, improvement of facilities such as footpaths on both sides of the khal embankment located at the town center will create an improved environment of the khal surrounding neighborhoods.

165. The proposed subproject is not an environmentally critical undertaking. IEE indicates that the proposed subproject, and its components, is not located within or adjacent to environmentally sensitive areas.

166. The extent of adverse impacts is expected to be local, confined within the projects' main areas of influence, waste disposal sites, and the routes to and from these sites. With mitigation measures in place and ensuring that the bulk of earthworks are completed before the onset of the rainy season, the potential adverse impacts during construction would be site-specific.

167. The few adverse impacts of moderate magnitude during construction will be temporary and short-term (i.e., most likely to occur only during peak construction activities). These will not be sufficient to threaten or weaken the surrounding resources. Mitigation measures, integral to socially and environmentally responsible construction practices, are commonly used at construction sites and are well known to contractors. Hence, mitigation measures would not be difficult to implement.

168. Based on the above findings, the classification of the subproject under package no. CRDP-II/LGED/Manikganj/NCB/2018/W-01 as Category B per ADB SPS is confirmed, and no further special study or detailed EIA needs to be undertaken. However, this IEE shall be updated based on final detailed design and submit to ADB for final review and disclosure. In the updating of the IEE, the following are recommended:

- (i) Final detailed design on the construction and rehabilitation of Manikganj Khal, including the provision of safety infrastructures such as railings along the footpaths on the embankment of the canal and areas adjacent to residential and commercial establishments;
- (ii) Final calculations of the volume of spoils and wastes that will be excavated from the Manikganj Khal; and
- (iii) Final footprint of the spoil disposal location within the disposal site identified and approved by Manikganj PIU.

169. The approved updated IEE shall be treated as the final IEE, and shall be attached in the bid and contract documents. No works can commence until (i) the final IEE approved by ADB is provided to the Contractor, and (ii) the SEMP prepared by the Contractor is approved by Manikganj PIU. If circumstances would require, the IEE will be further updated for ADB's review during the implementation period. In the event of unanticipated impact and/or any design change and/or non-compliance during subproject implementation period, the IEE shall be updated to include (i) assessment of the unanticipated impact and corresponding mitigation measures; and/or (ii) information on the design change and assessment of associated environmental impacts, if any; and/or (iii) corrective actions, associated cost and schedule.



### Some Additional Photographs of Existing Khal Conditions





## RAPID ENVIRONMENTAL ASSESSMENT CHECKLIST

**Country/Project Title:** Bangladesh / Second City Region Development Project  
**Subproject / Package No.:** Drainage Subproject / CRDP-II/LGED/ Manikganj/NCB/2018/W-01

Screening Questions	Yes	No	Remarks
<b>A. Project Siting</b> Is the project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site		✓	Based on desk review of locations and field verifications by Project Management and Coordination Unit (PMCU), there are no environmentally sensitive areas located within or near the subproject sites.
▪ Protected Area		✓	
▪ Wetland		✓	
▪ Mangrove		✓	
▪ Estuarine		✓	
▪ Buffer zone of protected area		✓	
▪ Special area for protecting biodiversity		✓	
<b>B. Potential Environmental Impacts</b> Will the Project cause...			
▪ encroachment on historical/cultural areas; disfiguration of landscape by road embankments, cuts, fills, and quarries?		✓	
▪ encroachment on precious ecology (e.g. sensitive or protected areas)?		✓	
▪ alteration of surface water hydrology of waterways crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?	✓		Construction and rehabilitation of Manikganj drainage will potentially increase siltation of Kaliganga River. However, this impact will be mitigated through implementation of measures in the EMP.
▪ deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?	✓		Construction and rehabilitation of Manikganj drainage will potentially increase siltation of Kaliganga River. However, this impact will be mitigated through implementation of measures in the EMP.
▪ increased local air pollution due to rock crushing, cutting and filling works, and chemicals from asphalt processing?		✓	Rock crushing and asphalt processing will not be undertaken under the subprojects. Aggregates to be used in the construction will be sourced from legitimate suppliers.
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation during project construction and operation?	✓		Construction activities will pose risks to workers. However, this can be mitigated through the implementation of the EMP particularly occupational health and safety measures both at work sites and construction camp sites.
▪ noise and vibration due to blasting and other civil works?	✓		Construction activities will elevate noise levels and vibration. However, this can be mitigated through the implementation of related measures in the EMP.
▪ dislocation or involuntary resettlement of people?		✓	Not anticipated. All works will be confined on existing road and drainage alignments.

Screening Questions	Yes	No	Remarks
▪ dislocation and compulsory resettlement of people living in right-of-way?		✓	Not anticipated. All identified road and drainage alignments are free of settlements. No widening work is included.
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		✓	Once completed, the roads and drainages under the subprojects will benefit all sectors of the society, including the disadvantaged and vulnerable groups.
▪ other social concerns relating to inconveniences in living conditions in the project areas that may trigger cases of upper respiratory problems and stress?	✓		Construction activities will potentially increase pollutant concentration in ambient air. However, this can be mitigated through the implementation of community and occupational health and safety measures in the EMP.
▪ hazardous driving conditions where construction interferes with pre-existing roads?	✓		Construction activities may pose hazardous driving conditions at the sites. However, the implementation of the traffic management plans (TMPs) will mitigate this impact.
▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as STI's and HIV/AIDS) from workers to local populations?	✓		Construction activities may result to poor sanitation and improper solid waste handling and disposal. However, this can be mitigated through the implementation of related measures in the EMP.
▪ creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?	✓		The EMP provides measures to avoid proliferation of disease vectors.
▪ accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials?		✓	Not anticipated.
▪ increased noise and air pollution resulting from traffic volume?	✓		Construction activities will elevate noise levels and worsen air pollution due to traffic. However, the TMPs will provide measures to avoid traffic congestion at subproject sites.
▪ increased risk of water pollution from oil, grease and fuel spills, and other materials from vehicles using the road?		✓	Not anticipated.
▪ social conflicts if workers from other regions or countries are hired?		✓	Labor requirements will be sourced locally.
▪ large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	Labor requirements will be sourced locally.
▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?	✓		Construction activities will pose risks to community health and safety. However, this can be mitigated through the implementation of related measures in the EMP. These measures include implementation of

Screening Questions	Yes	No	Remarks
			the WB EHS guidelines on construction and decommissioning related to community health and safety.
<ul style="list-style-type: none"> <li>community and occupational safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning.</li> </ul>	✓		Construction activities will pose risks to community health and safety. However, this can be mitigated through the implementation of related measures in the EMP. These measures include implementation of the WB EHS guidelines on construction and decommissioning related to community and occupational health and safety.

### A Checklist for Preliminary Climate Risk Screening

**Country/Project Title: Bangladesh / Second City Region Development Project**  
**Subproject / Package No.: CRDP-II/LGED/ Manikganj/NCB/2018/W-01**

Screening Questions		Score	Remarks
<b>Location and Design of project</b>	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	1	
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc.)?	1	
<b>Materials and Maintenance</b>	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	1	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	1	
<b>Performance of project outputs</b>	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	1	

<sup>a</sup> If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high-risk project.

**Result of Initial Screening (Low, Medium, High): Medium**

**Other Comments:** \_\_\_\_\_

**Prepared by:** \_\_\_\_\_

**TEMPLATE FOR APPLICATION FOR ENVIRONMENTAL CLEARANCE CERTIFICATE  
FROM BANGLADESH DEPARTMENT OF ENVIRONMENT**

**Application for Environmental Clearance Certificate**

[See Rule 7(5) of ECR]

Director/Deputy Director  
Department of Environment  
Dhaka Division/Chittagong Division/Khulna Division/Rajshahi Division (Bogra),

Sir,

I do hereby apply for Environmental Clearance Certificate for my proposed industrial unit or project, or for the existing industrial unit or project, and enclose papers and furnish information as follows:

1. (a) Name of the industrial unit or project :  
Address of location of the industrial unit of Project :
- (b) Address of the present office :
2. (a) Proposed industrial unit or project :  
Expected date of starting construction :  
Expected date for completion of construction :  
Expected date of trial production, in case of industrial unit, in :  
other cases, date of starting operation of the project :
- (b) Existing industrial unit or project :  
Date of starting trial production in case of industrial unit, in :  
other cases, date of starting operation of the project :
3. Name of product and quantity to produced :  
(daily/monthly/yearly)
4. (a) Name of raw material and quantity (daily/monthly/yearly) :  
(b) Source of raw material :
5. (a) Quantity of water to be used daily :  
(b) Source of water :
6. (a) Name of fuel and quantity (daily/monthly/yearly) :  
(b) Source of fuel :
7. (a) Probable quantity of daily liquid waste :  
(b) Location of waste discharge :  
(c) Probable quantity of daily emission of gaseous substance :  
(d) Mode of emission of gaseous substance :
8. Mouza (village) map indicating "Daag" (plot) and "Khatiyar" :  
(land tax account) number
9. Approval of Rajdhani Unnayan Katripakkhya / Chittagong :  
Development Authority / Khulna Development Authority /  
Local Authority (if applicable)
10. (a) Design and time schedule of proposed Effluent :  
Treatment Plant :  
(b) Fund allocated :  
(c) Area :

- 11. Process Flow Diagram :
- 12. (a) Location map of industrial unit or project :
- (b) Layout plan (with location of Effluent Treatment Plant) :
- 13. (a) IEE / EIA report \* (if applicable) :
- (b) Environmental Management Plan\*(if applicable) :
- 14. Feasibility Report (if applicable) :

**Seal**

Signature of the entrepreneur:

Name:

Address:

Phone:

Date:

#### Declaration

I do hereby declare that all information provided by me in this application are true to the best of my knowledge and no information has been concealed or distorted.

Name and Signature of Entrepreneur

\* Each page must be countersigned by the person who fills out this application form and by the entrepreneur.

## SAMPLE SPOIL MANAGEMENT PLAN

**Purpose and application:** Spoil Management Plan (SMP) is to describe how the project will manage the spoil generated and reuse related to design, and construction works. This is an integral part of EMP. The objective of SMP is to reuse of spoil from works in accordance with the spoil management hierarchy outlined in this document.

**Objectives of SMP:** The objectives of SMP are:

- (i) To minimize spoil generation where possible;
- (ii) Maximize beneficial reuse of spoil from construction works in accordance with spoil management hierarchy;
- (iii) Manage onsite spoil handling to minimize environmental impacts on resident and other receivers;
- (iv) Minimize any further site contamination of land, water, soil; and
- (v) Manage the transportation of spoil with consideration of traffic impacts and transport related emissions.

### Structure of SMP:

Section 1: Introduction of SMP

Section 2: Legal and other requirements

Section 3: Roles and responsibilities

Section 4: Identification and assessment of spoil aspects and impacts

Section 5: Spoil volumes, characteristics and minimization

Section 6: Spoil reuses opportunities, identification and assessment

Section 7: On site spoil management approach

Section 8: Spoil transportation methodology

Section 9: Monitoring, Reporting, Review, and Improvements

### Aspects and potential impacts

The key aspects of potential impacts in relation to SMP are listed in table below:

**Table A3. Key Aspects of Potential Impacts in Relation to Spoil Management Plan**

Aspects	Potential Impacts
Air Quality	Potential for high winds generating airborne dust from the stock piles
Sedimentation	Potential for sediment laden site runoff from spoil stockpiles and potential for spillage of spoil from truck on roads
Surface and groundwater	Contamination of surface and ground water
Noise	Associated with spoil handling and haulage and storage
Traffic	Impacts associated with spoil haulage
Land Use	Potential for spoil to be transported to a that does not have permission for storage/disposal
Design specifications	Limitations on opportunities to minimize spoil generation
Sustainability	Limited sites for storage, reuse opportunities

### Spoil volumes, Characteristics and Minimization

**Spoil volume calculations:** Estimate the volumes of spoils produced from each of the construction sites.

**Characterization of spoil:** Based on the type of spoil; characterization is done (sand stone, mud mix materials, reusable materials)

**Adopt Spoil Reduce, Reuse Opportunities:** An overview of the assessment methodology to be used is mentioned below.

- Consideration of likely spoil characteristics
- Identification of possible reuse sites
- Screening of possible reuse opportunities

**Identification of possible safe disposal sites for spoil:** Those spoils which cannot be reuse shall be properly disposed in designated areas, such disposal areas should be identified in project locations. Such disposal areas should be safe from environmental aspects and there should be any legal and resettlement related issues. Such areas need to be identified and prior client approval should be obtained to use it as spoil disposal area. The local administration must be consulted and if required permission should be obtained from them.

#### **Storage and stock piling Transportation and haulage route**

Based on the above, the contractor will prepare a SMP as an integral part of EMP and submit it to the PDSC for their review and approval.

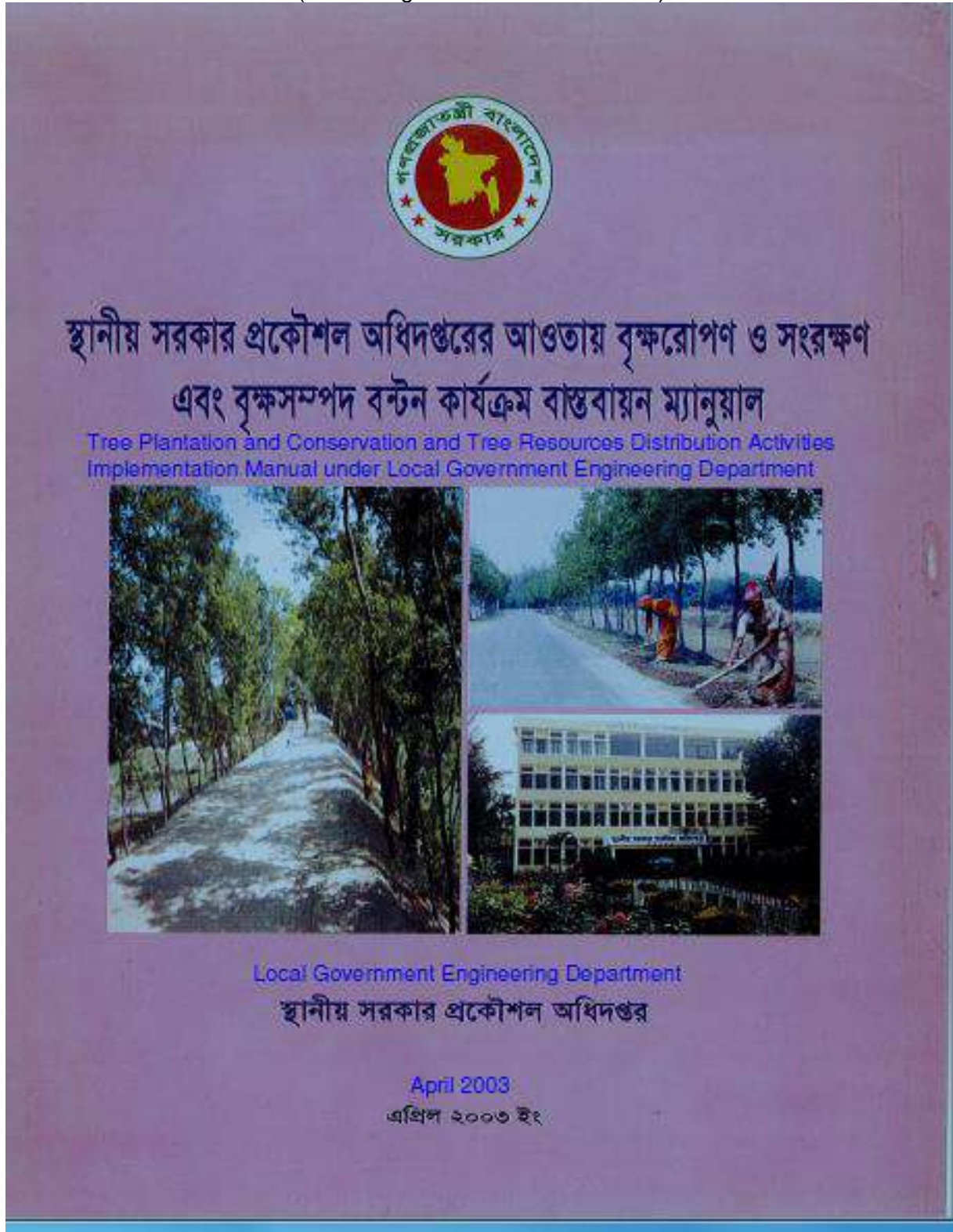
#### **Summary of Key Issues and Remedial Actions**

Summary of follow up time-bound actions to be taken within a set timeframe



# LOCAL GOVERNMENT ENGINEERING DEPARTMENT TREE PLANTATION PROGRAM MANUAL

(Cover Page and Table of Contents)



Note: Copy of the full manual is available upon request at the PMCU Office.

***Tree Plantation and Conservation and Tree Resources Distribution  
Activities Implementation Manual  
under  
Local Government Engineering Department***

**Table of Contents**

- 1. Tree Plantation and Conservation In the LGED's Premises and Fallow Land**
  - 1.1 Availability of Land
  - 1.2 Estimate Preparation of Schemes
  - 1.3 Implementation
  - 1.4 Tree Resources Distribution
  - 1.5 Financing
  - 1.6 Implementing Office and Designated Officer
  - 1.7 Responsibility of the Implementing Office's Designated Officer
- 2. Roadside Tree Plantation and Conservation**
  - 2.1 Road Maintenance
  - 2.2 Tree Plantation and Caring
  - 2.3 Road Maintenance , Tree Plantation and Conservation Activities Implementation
    - 2.3.1 Road Maintenance, Tree Plantation and Conservation Scheme Identification, Scheme Preparation, Approval, Financing and Implementation Process
    - 2.3.2 Implementation adopting Lenthperson Process by Organized Women Group
    - 2.3.3 Worker Selection
    - 2.3.4 Worker Selection Policy
    - 2.3.5 Formation of the Interview Board
    - 2.3.6 Campaign
    - 2.3.7 Interviewing and Selection
    - 2.3.8 Team Formation
    - 2.3.9 Responsibility of Women Worker
    - 2.3.10 Responsibility of Co- women group Leader
    - 2.3.11 Responsibility of Women group Leader
    - 2.3.12 Recruitment of Supervisor
    - 2.3.13 Provide Appointment Letters
    - 2.3.14 Provide Equipments among Worker Women for Maintenance Work
    - 2.3.15 Initiation of Implementation of Scheme
  - 2.4 Training
    - 2.4.1 General Awareness Training for Women Workers on Road Maintenance, Plantation and Conservation
    - 2.4.2 General Awareness Training for Women Workers on Primary Health Care and Income-generating Activities
  - 2.5 Inspection and Monitoring
    - 2.5.1 Inspection and Monitoring System of Road Maintenance, Plantation and Conservation Program

- 2.6 Wage
  - 2.6.1 Wage Fixation
  - 2.6.2 Bank Account
  - 2.6.3 Wage Payment
  - 2.6.4 Compulsory Savings
- 2.7 Distribution of Income from Trees
  - 2.7.1 Tree Resources Distribution System
  - 2.7.2 Template: Tree Resources Distribution
  - 2.7.3 Contract signed for Distribution of Tree Resources among different parties according to the Adopted Policy
  - 2.7.4 Monitoring the Implementation of the Contract
- 2.8 Financing
  - 2.8.1 Source of Funding for the Program
  - 2.8.2 Financing Process
- 2.9 Description of Responsibility of Representatives of Local Government Organizations and of LGED Officials in the Implementation of Road Maintenance (off-pavement), Plantation and Conservation Program
  - 2.9.1 Responsibility of Union Parishad (UP)
  - 2.9.2 Responsibility of UP Male/Female Member
  - 2.9.3 Responsibility of UP Chairman
  - 2.9.4 Responsibility of Upazila Parishad
  - 2.9.5 Responsibility of Upazila Executive/Nirbahi Officer (UNO)
  - 2.9.6 Responsibility of LGED's Community Organizer (CO)
  - 2.9.7 Responsibility of Sub-Assistant Engineer
  - 2.9.8 Responsibility of Upazila Engineer (UE)
  - 2.9.9 Responsibility of LGED's Executive Engineer (Training)
  - 2.9.10 Responsibility of LGED's District Executive Engineer
- 3. Tree Plantation at Embankment and Canal Bank and their Conservation
  - 3.1 Selection of Proposals for Tree Plantation and Conservation at Embankment Slope and Canal Bank
  - 3.2 Implementation
  - 3.3 Selection of Tree Species
    - 3.3.1 Tree planting Distance
    - 3.3.2 Tree Sapling Planting Method
    - 3.3.3 Tree Caring and Prohibition
    - 3.3.4 Inspection and Monitoring
  - 3.4 Wages
  - 3.5 Financing
  - 3.6 Implementing Agency
  - 3.7 Tree Resources Distribution
  - 3.8 Distribution of Money from Sale of Trees Grown at Embankment Slope and Canal Bank

**Annexures****A) Road**

Road/Annex – 1:	Tree Species Selection, Tree Plantation and Caution in
Road/Annex – 2:	Method of Tree Sapling Plantation
Road/Annex – 3:	Points Value for Priority Ranking
Road/Annex – 4:	Technical Report
Road/Annex – 5:	Format for Cost Estimate
Road/Annex – 6:	Appointment Letter of Women Worker
Road/Annex – 6a:	Appointment Letter of Supervisor
Road/Annex – 7:	Women Worker's acceptance Letter for Working Tools for Road Maintenance, Tree Plantation and Conservation Scheme
Road/Annex – 8:	Regular Road Maintenance and Tree Care Monitoring Register
Road/Annex – 8a:	Work Code and Description
Road/Annex – 8b:	Daily Activity Report of Regular Maintenance Work done by Women Worker
Road/Annex – 9:	Monthly Monitoring of Regular Road Maintenance and Tree Care
Road/Annex – 10:	Monthly Monitoring Summary Report
Road/Annex – 11:	Tree Resources Distribution Agreement

**B) Embankment**

Embankment/Annex- 1:	Proposal of Plantation at Embankment Slope and Canal Bank
Embankment/Annex- 2:	Schedule 1
Embankment/Annex- 3:	Executable at a Non-Judicial Stamp of Value of Taka 150.00
Embankment/Annex- 4:	Contractor's Responsibility and Condition of Recruitment
Embankment/Annex- 5:	Sample – Method of Tree Plantation at Embankment Slope
Embankment/Annex- 6:	Template of Monthly Proress Report

## RECORDS OF PUBLIC CONSULTATIONS

Details of date, time, location, type of participants and discussed issues are presented in a tabular form below:

Sl. No	Date of Consultation	Road and Place of Consultation	Number and Type of Participants	Issues Discussed
1	11 December 2017	Starting point of the propose khal	12 (Councilors, Retired Government Officials, Local Elite, Businessperson, project beneficiaries etc.)	General perception about the project and the awareness about the proposed project are disseminated in the meeting. The following predefined issues are discussed in the consultation meetings: <ul style="list-style-type: none"> <li>Information dissemination about the subproject</li> </ul>
2	29 June 2018	In <i>pourashava</i> , hall room Manikganj	12 (Councilors, Retired Government Officials, Local Elite, Businessperson, project beneficiaries etc.)	<ul style="list-style-type: none"> <li>possible impacts of the subproject</li> <li>participation of local people in different project activities</li> <li>Employment potential for local people in the project works</li> <li>Loss of residential/commercial structures, if any due to the project</li> </ul>
3	29 June 2018	- Ending point of propose khal	12 (Councilors, Local Elites, Businessperson, Beneficiaries Service holders etc.)	<ul style="list-style-type: none"> <li>Resettlement and land acquisition (if foreseen specially on private land).</li> <li>Impact on social issues due to the project</li> <li>Protected areas (national park, protected forest, religiously sensitive sites, historical or archaeological sites), if any</li> <li>Any critical issue or concern by the local people regarding the project?</li> <li>Grievances redress mechanism etc.</li> </ul>

### Findings in the Public Consultation Meeting

- Local people will support the project activities.
- The main issue arising from the consultation is that the people of this area suffering huge traffic congestion due to movement of heavy container truck. They cannot easily move to the school, hospital, and their working place from their due to congestion. Peoples will be benefitted who are residing alongside the road of area if the project will undertake.
- The area is dominating business area about 70% are depends on business and the rest service and cultivations.
- During construction period short term community activities will be affected.
- No resettlement and land acquisition required for due to the project, only compensation need for the unauthorized shop and residence.
- There is no protected area in and around the project area.
- The project will never impact on natural water body and not contaminate the soil resources.



- The NGOs within the areas are: ASA, BRAC, Grameen Bank, Karitas, MSS, ODC, UPPR, JIZ, Gonosasto, etc.
- It assured by the participant, that they will welcome the project, and will support/cooperate in all stages of the project works.

### Photographs of Community Consultations



FGD at place near the midsection of the khal



FGD at place near the midsection of the khal



FGD at place near the starting point of the khal



FGD at place near starting point of the khal



FGD at place near the ending point of the khal



FGD at place near the ending point of the khal

## List of Participants in Consultations Meetings in Different Location of Manikganj Khal

Venue: Pourashava Hall Room





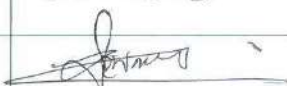
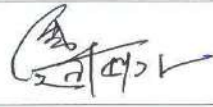
Date:

১৯/০৮/১৬

কোম্পানি গ্রুপ আলোচনায় অংশ গ্রহণকারীর তালিকা

ক্রমিক সংখ্যা	নাম ও ঠিকানা	পেশা/পদবী	স্বাক্ষর
১।	কাজী মাহমুদুল হক	কাজী	কাজী মাহমুদুল হক সভাপতি, ০৩নং ওয়ার্ড পৌরসভা, পুরশাবা, মণিকগঞ্জ।
২।	মোহাম্মদ আলী	"	মোহাম্মদ আলী ০৩নং ওয়ার্ড পৌরসভা, পুরশাবা, মণিকগঞ্জ।
৩।	ডাঃ ওয়াশাক আলী (চিকিৎসা)	ডাঃ	ডাঃ ওয়াশাক আলী ০৩নং ওয়ার্ড পৌরসভা, পুরশাবা, মণিকগঞ্জ।
৪।	মোহাম্মদ হুমায়ুন কবীর	মোহাম্মদ	মোহাম্মদ হুমায়ুন কবীর ০৩নং ওয়ার্ড পৌরসভা, পুরশাবা, মণিকগঞ্জ।
৫।	মোহাম্মদ হুমায়ুন কবীর	মোহাম্মদ	মোহাম্মদ হুমায়ুন কবীর ০৩নং ওয়ার্ড পৌরসভা, পুরশাবা, মণিকগঞ্জ।
৬।	উজ্জ্বল চন্দ্র	উজ্জ্বল	উজ্জ্বল চন্দ্র ০৩নং ওয়ার্ড পৌরসভা, পুরশাবা, মণিকগঞ্জ।
৭।	মোহাম্মদ হুমায়ুন কবীর	মোহাম্মদ	মোহাম্মদ হুমায়ুন কবীর ০৩নং ওয়ার্ড পৌরসভা, পুরশাবা, মণিকগঞ্জ।
৮।	মোহাম্মদ হুমায়ুন কবীর	মোহাম্মদ	মোহাম্মদ হুমায়ুন কবীর ০৩নং ওয়ার্ড পৌরসভা, পুরশাবা, মণিকগঞ্জ।
৯।	মোহাম্মদ হুমায়ুন কবীর	মোহাম্মদ	মোহাম্মদ হুমায়ুন কবীর ০৩নং ওয়ার্ড পৌরসভা, পুরশাবা, মণিকগঞ্জ।
১০।	মোহাম্মদ হুমায়ুন কবীর	মোহাম্মদ	মোহাম্মদ হুমায়ুন কবীর ০৩নং ওয়ার্ড পৌরসভা, পুরশাবা, মণিকগঞ্জ।

## ফোকাস গ্রুপ আলোচনায় অংশ গ্রহণকারীর হাজিরা

ক্রমিক সংখ্যা	নাম ও ঠিকানা	পেশা/পদবী	স্বাক্ষর
১১।	মুহিনুর রেজা	সহস্র T.L.C.C	
১২।	মাসুম হান্নান (কলি)	সহস্র T.L.C.C	মাসুম
১৩।	বিলকিস বেগম দেবী	সহস্র T.L.C.C	B
১৪।	সাকিলা বেগম	T.L.C.C	
১৫।	কমান্ডার মজিবুর	Town Planner Manikgonj Parishad	 29.05.2018
১৬।	আবদুল হামিদ মজিবুর	T.L.C.C	Bairuda
১৭।	কোম্পানী মজিবুর হোসেন	 T.L.C.C	
১৮।	আবদুল গিয়াস হাদিদ	সহস্র সার্জন	
১৯।			
১০।			



Venue: at a Public meeting place near the midsection of Manikganj Khal

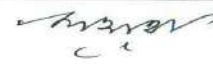

Date:

২০/০৫/১৮

ফোকাস গ্রুপ আলোচনায় অংশ গ্রহণকারীর হাজিরা

ক্রমিক সংখ্যা	নাম ও ঠিকানা	পেশা/পদবী	স্বাক্ষর
১।	মোঃ হানিফা হুসাইন	কর্মসূচী ২২; ৩০৩	মোঃ হানিফা হুসাইন কর্মসূচী ২২, ৩০৩ মানিকগঞ্জ পৌরসভা, মানিকগঞ্জ।
২।	আবুল কালাম আজাদ ২২, ৩০৩	কর্মসূচী ২২	আবুল কালাম আজাদ কর্মসূচী ২২, ৩০৩ মানিকগঞ্জ পৌরসভা।
৩।	মোঃ সালাহ উদ্দিন	কর্মসূচী ২২	মোঃ সালাহ উদ্দিন কর্মসূচী ২২, ৩০৩ মানিকগঞ্জ পৌরসভা, মানিকগঞ্জ।
৪।	আবুল কালাম আজাদ	T.L.C.C	আবুল কালাম আজাদ ২২/০৫/১৮
৫।	আবুল কালাম আজাদ	T.L.C.C মানিকগঞ্জ	আবুল কালাম আজাদ ২২/০৫/১৮
৬।	দীপক কুমার বোহা	সদস্য, টেকনিক্যাল অফিস, মানিকগঞ্জ	দীপক কুমার বোহা
৭।	মোঃ আব্দুল হামিদ	ইন্সপেক্টর	মোঃ আব্দুল হামিদ
৮।	আবুল কালাম আজাদ	২২, ৩০৩ মানিকগঞ্জ পৌরসভা	আবুল কালাম আজাদ ২২/০৫/১৮
৯।	আবুল কালাম আজাদ	T.L.C.C	আবুল কালাম আজাদ
১০।	আবুল কালাম আজাদ	SAE	আবুল কালাম আজাদ


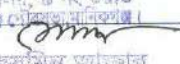



## ফোকাস গ্রুপ আলোচনায় অংশ গ্রহণকারীর হাজিরা

ক্রমিক সংখ্যা	নাম ও ঠিকানা	পেশা/পদবী	স্বাক্ষর
১।	মহাশয় মোহাম্মদ হোসেন	S.A.E	
২।	মো: মুহাম্মদ হোসেন	S.A.E (E)	
৩।			
৪।			
৫।			
৬।			
৭।			
৮।			
৯।			
১০।			

Venue: At a Public meeting place near the end part of Manikganj Khal  
Date:

Manikganj Khal  
২০/০৫/১৮

ফোকাস গ্রুপ আলোচনায় অংশ গ্রহণকারীর হাজিরা

ক্রমিক সংখ্যা	নাম ও ঠিকানা	পেশা/পদবী	স্বাক্ষর
১।	সিদ্দিক হোসেন	হাউসমাস্টার	 মোঃ উজ্জ্বল হোসেন পরিচালক, ৯ নং ওয়ার্ড মহাকালী পৌরসভা, মানিকগঞ্জ।
২।	ডাঃ হুমায়ুন ভাট্টাচার্য	u	 জেনারেল আফগার কাজিম, কলিকাতা-১৯, ভারত সকিৎসার বৈজ্ঞানিক, মনোবিজ্ঞান
৩।	হাদিদা বেগম	T.L.C.C	হাদিদা
৪।	বিনুদা ইয়াসমিন	T.L.C.C	বিনুদা ইয়াসমিন
৫।	বেলাল ভাট্টাচার্য	T.L.C.C	
৬।	বেলাল মোহাম্মদ আমজাদ	T.L.C.C	মোহাম্মদ
৭।	সমুদ্র মাস্ত	প্রবাসী, কলিকাতা কলিকাতা-১৯ মাস্ত আম, এম, সি, সি	
৮।	আবুল কালাম আজাদ/সিদ্দিক	মাস্তার আবুল কালাম মাস্ত	
৯।	মোঃ মোঃ আমান	মাস্ত T.L.C.C	মাস্ত
১০।	মোঃ মোঃ আমান	মাস্ত T.L.C.C	মোঃ মোঃ আমান

## ফোকাস গ্রুপ আলোচনায় অংশ গ্রহণকারীর হাজিরা

ক্রমিক সংখ্যা	নাম ও ঠিকানা	পেশা/পদবী	স্বাক্ষর
১১।	নিয়াকত হোসেন রফিক	টি, এম. এ. ডি.	
১২।	মুহাম্মদ আমর আলম	হাউস কম	
১৩।	Rupakolmi Chowdhury.	M.Sc. M.	 29.5.18.
১৪।	জোহা মোহিন	মাংসাদি প্রথম আলম	
১৫।	রুমা সার	হৃদয় ও মস্তিষ্ক কম	২০.০৫.১৮ 
১৬।	আব্দুল হকিম হাফিজ	কার্ডিনাল ৫ম ওয়ার্ড	 কার্ডিনাল, ৫ম ওয়ার্ড হাসিনা স্টেডিয়াম, মাদ্রাসা
৭।			
৮।			
৯।			
১০।			

## SAMPLE GRIEVANCE REGISTRATION FORM

(To be available in Bangla and Other Local Language, if any)

The \_\_\_\_\_ Project welcomes complaints, suggestions, queries and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.

Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing **\*(CONFIDENTIAL)\*** above your name. Thank you.

<b>Date</b>	<b>Place of registration</b>				
<b>Contact Information/Personal Details</b>					
<b>Name</b>		<b>Gender</b>	<input type="checkbox"/> Male <input type="checkbox"/> Female	<b>Age</b>	
<b>Home Address</b>					
<b>Village / Town</b>					
<b>District</b>					
<b>Phone no.</b>					
<b>E-mail</b>					
<b>Complaint/Suggestion/Comment/Question</b> Please provide the details (who, what, where and how) of your grievance below: If included as attachment/note/letter, please tick here:					
<b>How do you want us to reach you for feedback or update on your comment/grievance?</b>  <div style="height: 100px; border: 1px solid black;"></div>					

### FOR OFFICIAL USE ONLY

<b>Registered by:</b> (Name of Official registering grievance)	
<b>Mode of communication:</b> <input type="checkbox"/> Note/Letter <input type="checkbox"/> E-mail <input type="checkbox"/> Verbal/Telephonic	
<b>Reviewed by:</b> (Names/Positions of Official(s) reviewing grievance)	
<b>Action Taken:</b>	
<b>Whether Action Taken Disclosed:</b>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>Means of Disclosure:</b>	

## SUGGESTED TEMPLATE FOR RECORD-KEEPING OF GRIEVANCES

[illegible]

**INDICATIVE TERMS OF REFERENCE FOR SAFEGUARDS SPECIALIST FOR PROJECT  
MANAGEMENT COORDINATION UNIT, PROJECT IMPLEMENTATION UNITS AND  
PREPARATION, DESIGN AND SUPERVISION CONSULTANT**

**A. Preparation, Design, and Supervision Consultants**

**1. Environmental Safeguards Specialist (National)**

1. **Experience.** A civil engineer with specialization in environment, having at least 5-10 years of working experience related to the integration of environmental issues in design, and construction of infrastructure projects. Past experience working on donor projects preferable.

2. Detailed Tasks:

- (i) Prepare initial environmental examination (IEE) in accordance with the Environmental Assessment Review Framework (EARF) for subprojects;
- (ii) Assist PMCU Environment Officer in ensuring prepared IEEs are submitted to ADB for review;
- (iii) Assist PMCU in ensuring approved IEEs are disclosed on PMCU/LGED website;
- (iv) Ensure approved final IEEs and environmental management plans (EMPs) are included in contract documents;
- (v) Assist PMCU in ensuring compliance of the project and its subprojects with all relevant national laws;
- (vi) Interact with the sector specialists and integrate environmentally sound practices into the detailed design of project components;
- (vii) Work out the site-specific mitigation and adaptation measures for components as required and integrate the same into contractual provisions;
- (viii) Assist the international environment/Climate Change specialist in environmental training programs and workshops for the staffs of the PMCU, PIU and contractors and in accordance to the Capacity Building Program;
- (ix) Prepare activity plans as identified in IEE (includes site management plans, waste management plans, sludge management and disposal plans, occupational safety plans, etc.);
- (x) Assist PIU in reviewing the contractors' SEMP to ensure compliance with the IEE/EMP;
- (xi) Assist PIU in supervising the implementation of the EMP and SEMP by the contractors;
- (xii) Assist PIU in preparing quarterly environmental monitoring reports and submit to PMCU;
- (xiii) Review site specific environmental enhancement/mitigation designs worked out by the contractor and assist PIU in approving such designs;
- (xiv) Assist in providing occupational health and safety training for contractors' personnel before commencement of civil works for all subprojects;
- (xv) Assist the PMCU environment officer in preparing semi-annual environmental monitoring reports and submit to ADB;
- (xvi) Establish dialogue with the affected communities and ensure that the environmental concerns and suggestions are incorporated and implemented in the project;
- (xvii) Assist PMCU and PIUs in attending to or facilitating responses to any public grievances per GRM; and
- (xviii) Assist in any other task assigned by the PMCU Environment Officer and/or supervising consultant in relevance to effective project implementation.

## **B. Project Management Coordination unit**

### **1. Environmental Safeguards Officer – PMCU**

3. **Experience.** An Environmental Engineer/scientist with experience in management of environmental issues of infrastructure projects and understanding of the regulatory framework for environmental management in Bangladesh.

#### 4. Detailed Tasks:

- (i) Ensure the conformance of all Subprojects proposed under the project to the regulatory compliance to the government, with reference to environmental requirements, with support from the Environmental Officer of the PIUs. This shall include preparation of the documents as required under the Environmental Conservation rules, submission of application forms, and obtaining clearances from the DOE; and ensuring conformance to the clearance conditions laid down in the clearances for the Subprojects by the DOE;
- (ii) Liaise with the various government agencies on environmental and other regulatory matters pertaining to implementation of the subprojects;
- (iii) Work closely with the PIUs and provide guidance on the shifting of utilities and services, including obtaining necessary clearances from the respective line agencies, prior to award of civil works contracts;
- (iv) Provide support and assistance to the government Agencies and the Asian Development Bank to supervise the implementation of the IEE during the construction as well as operation stage of the project;
- (v) Monitor construction activities to ensure that identified and appropriate control measures are effective and in compliance with the IEE and advise PIUs for compliance with statutory requirements;
- (vi) Work in close co-ordination with the Social Safeguards officer of the PMCU and participate in the Grievance Redressal Mechanism for all grievances that are brought forward to the PMCU. Monitor on a continuous basis the effective functioning of the Grievance mechanisms at the PIU and *pourashava* levels on all grievances related to environmental issues; and
- (vii) Jointly (with the environmental engineer of the PMCU), review the environmental performance of the project through an assessment of the periodic environmental monitoring reports submitted by the PDSC; provide a summary of the same to the Project Director, and initiate necessary follow-up actions.

### **1. Environmental Engineer – Project Management Coordination Unit**

5. **Experience.** A Civil Engineer with specialization in Environment with experience in implementation of environmental management plans of infrastructure projects, especially those funded by donor agencies.

#### 6. Detailed Tasks.

- (i) Review the IEE Document and contract clauses and ensure adequacy under ADB's Environmental Assessment Guidelines, 2003 and the updated Safeguards Policy Statement, 2009 and identify any areas for improvement.
- (ii) Ensure that the subproject design and specifications adequately reflect the IEE.



- (iii) Monitor construction activities to ensure that identified and appropriate control measures are effective and in compliance with the IEE.
- (iv) Review and approve the Contractor's Implementation Plan for the environmental measures, as per IEEs/EMPs.
- (v) Liaise with the Contractors and Consultants on the implementation of the Environmental management measures proposed in the IEE/EMP.
- (vi) Jointly (with the environmental safeguards officer of the PMCU), review the environmental performance of the project through an assessment of the periodic environmental monitoring reports submitted by the PDSC; provide a summary of the same to the Project Director, and initiate necessary follow-up actions.
- (vii) Document the good practices in the project, with support from Environmental Specialists of the PDSC and PIU on (a) incorporation and integration of environmental issues into engineering design and (b) on implementing environmental measures in the construction, and dissemination of the same.

## C. Project Implementation Unit

### 1. Environmental Officer – Project Implementation Unit

7. **Experience.** A civil engineer with working experience related to the integration of environmental issues in design, and construction of infrastructure projects.

8. Detailed tasks:

- (i) Support the Environmental Safeguards officer of the PMCU towards ensuring the conformance of the subproject to the regulatory compliance to the government, with reference to environmental requirements; including preparation of documents required for clearances, obtaining clearances from the divisional office of the DOE, etc.
- (ii) Work with the PDSC Environmental Specialists in the preparation of the Environmental Safeguards Documents; including integration of environmental provisions into the contract provisions of the respective subprojects.
- (iii) With support of the PMCU and PDSC Environmental Specialists, monitor compliance of the implementation of the environmental provisions; and ensure that identified control measures are effective and in compliance with the IEE.
- (iv) Review and approve the Contractor's Implementation Plan for the environmental measures, as per IEEs/EMPs.
- (v) Liaise with the Contractors and Consultants on the implementation of the Environmental management measures proposed in the IEE/EMP; including the implementation of the environmental monitoring plan outlined in the IEE.
- (vi) Establish dialogue with the affected communities and ensure that the environmental concerns and suggestions are incorporated and implemented in the project.
- (vii) Participate in the Grievance redressal of all grievances pertaining to environment and support the PIU/*pourashava* in redressal of the same.
- (viii) Prepare and submit environmental monitoring and implementation progress reports with support from PDSC consultants, to the PMCU.
- (ix) Assist Environmental Specialist of the PMCU to prepare good practice dissemination notes based on the experience gained from site supervision.

## **TRAFFIC MANAGEMENT PLAN TEMPLATE**

### **A. Principles**

1. One of the prime objectives of this traffic management plan (TMP) is to ensure the safety of all the road users along the work zone, and to address the following issues:

- (i) the safety of pedestrians, bicyclists, and motorists travelling through the construction zone;
- (ii) protection of work crews from hazards associated with moving traffic;
- (iii) mitigation of the adverse impact on road capacity and delays to the road users;
- (iv) maintenance of access to adjoining properties
- (v) Avoid hazards in addressing issues that may delay the project.

### **B. Operating Policies for Traffic Management Plan**

2. The following principles will help promote safe and efficient movement for all road users (motorists, bicyclists, and pedestrians, including persons with disabilities) through and around work zones while reasonably protecting workers and equipment.

- (i) Make traffic safety and temporary traffic control an integral and high-priority element of every project from planning through design, construction, and maintenance.
- (ii) Inhibit traffic movement as little as possible.
- (iii) Provide clear and positive guidance to drivers, bicyclists, and pedestrians as they approach and travel through the temporary traffic control zone.
- (iv) Inspect traffic control elements routinely, both day and night, and make modifications when necessary.
- (v) Pay increased attention to roadside safety in the vicinity of temporary traffic control zones.
- (vi) Train all persons that select, place, and maintain temporary traffic control devices.
- (vii) Keep the public well informed.
- (viii) Make appropriate accommodation for abutting property owners, residents, businesses, emergency services, railroads, commercial vehicles, and transit operations.

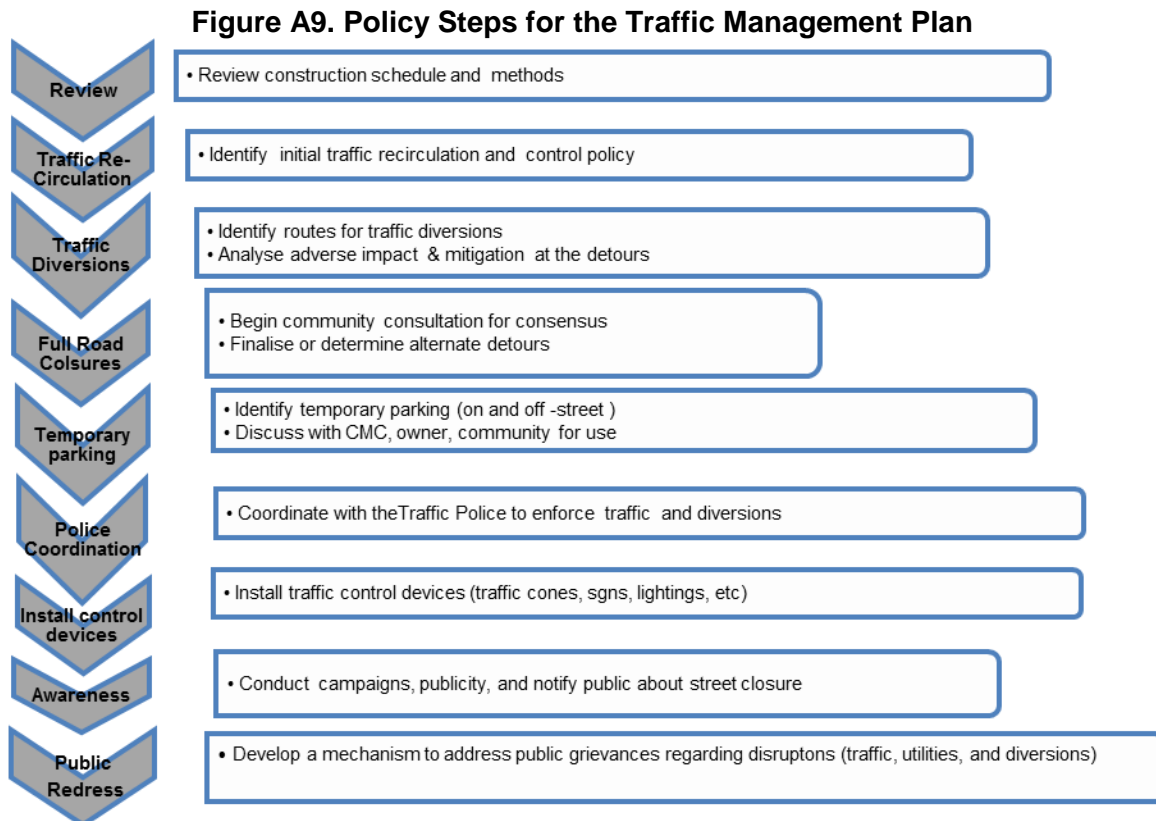
### **C. Analyze the Impact Due to Street Closure**

3. Apart from the capacity analysis, a final decision to close a particular street and divert the traffic should involve the following steps:

- (i) approval from the local authorities to use the local streets as detours;
- (ii) consultation with businesses, community members, traffic police, etc, regarding the mitigation measures necessary at the detours where the road is diverted during the construction;
- (iii) determining of the maximum number of days allowed for road closure, and incorporation of such provisions into the contract documents;
- (iv) determining if additional traffic control or temporary improvements are needed along the detour route;
- (v) considering how access will be provided to the worksite;
- (vi) contacting emergency service, school officials, and transit authorities to determine

- (vii) if there are impacts to their operations; and developing a notification program to the public so that the closure is not a surprise. As part of this program, the public should be advised of alternate routes that commuters can take or will have to take as result of the traffic diversion.

4. If full road-closure of certain streets within the area is not feasible due to inadequate capacity of the Detour Street or public opposition, the full closure can be restricted to weekends.



#### **D. Public awareness and notifications**

5. As per discussions in the previous sections, there will be travel delays during the constructions, as is the case with most construction projects, albeit on a reduced scale if utilities and traffic management are properly coordinated. There are additional grounds for travel delays in the area, as most of the streets lack sufficient capacity to accommodate additional traffic from diverted traffic as a result of street closures to accommodate the works.

6. The awareness campaign and the prior notification for the public will be a continuous activity which the project will carry out to compensate for the above delays and minimize public claims as result of these problems. These activities will take place sufficiently in advance of the time when the roadblocks or traffic diversions take place at the particular streets. The reason for this is to allow sufficient time for the public and residents to understand the changes to their travel plans. The project will notify the public about the roadblocks and traffic diversion through public notices, ward level meetings and city level meeting with the elected representatives.

7. The PMCU and PIU will also conduct an awareness campaign to educate the public about the following issues:

- (i) traffic control devices in place at the work zones (signs, traffic cones, barriers, etc.);
- (ii) defensive driving behavior along the work zones; and
- (iii) reduced speeds enforced at the work zones and traffic diversions.

8. It may be necessary to conduct the awareness programs/campaigns on road safety during construction.

9. The campaign will cater to all types of target groups i.e. children, adults, and drivers. Therefore, these campaigns will be conducted in schools and community centers. In addition, the project will publish a brochure for public information. These brochures will be widely circulated around the area and will also be available at the PMCU, PIU and the contractor's site offices. The text of the brochure should be concise to be effective, with a lot of graphics. It will serve the following purpose:

- (i) Explain why the brochure was prepared, along with a brief description of the project;
- (ii) Advise the public to expect the unexpected;
- (iii) Educate the public about the various traffic control devices and safety measures adopted at the work zones;
- (iv) Educate the public about the safe road user behavior to emulate at the work zones;
- (v) Tell the public how to stay informed or where to inquire about road safety issues at the work zones (name, telephone, mobile number of the contact person; and
- (vi) Indicate the office hours of relevant offices.

#### **E. Vehicle Maintenance and Safety**

10. A vehicle maintenance and safety program shall be implemented by the construction contractor. The contractor should ensure that all the vehicles are in proper running condition and it comply with roadworthy and meet certification standards of government of Bangladesh. All vehicles to be used shall be in perfect condition meeting pollution standards of government of Bangladesh. The vehicle operator requires a prestate of shift checklist. Additional safety precautions will include the requirement for:

- (i) Driver will follow the special code of conduct and road safety rules of government of Bangladesh.
- (ii) Drivers to ensure that all loads are covered and secured drivers to ensure operation equipment can't leak materials hauled
- (iii) Vehicles will be cleaned and maintained in designed places.

#### **F. Install traffic control devices at the work zones and traffic diversion routes**

11. The purpose of installing traffic control devices at the work zones is to delineate these areas to warn, inform, and direct the road users about a hazard ahead, and to protect them as well as the workers. As proper delineation is a key to achieve the above objective, it is important to install good traffic signs at the work zones. The following traffic control devices are used in work zones:

- (i) Signs
- (ii) Pavement Markings
- (iii) Channelizing Devices
- (iv) Arrow Panels
- (v) Warning Lights

12. Procedures for installing traffic control devices at any work zone vary, depending on road configuration, location of the work, construction activity, duration, traffic speed and volume, and pedestrian traffic. Work will take place along major roads, and the minor internal roads. As such, the traffic volume and road geometry vary. The main roads carry considerable traffic; internal roads in the new city areas are wide but in old city roads very narrow and carry considerable traffic. However, regardless of where the construction takes place, all the work zones should be cordoned off, and traffic shifted away at least with traffic cones, barricades, and temporary signs (temporary “STOP” and “GO”).
13. The work zone should take into consideration the space required for a buffer zone between the workers and the traffic (lateral and longitudinal) and the transition space required for delineation, as applicable. For the works, a 30 cm clearance between the traffic and the temporary STOP and GO signs should be provided. In addition, at least 60 cm is necessary to install the temporary traffic signs and cones.
14. Traffic police should regulate traffic away from the work zone and enforce the traffic diversion result from full street closure in certain areas during construction. Flaggers/ personnel should be equipped with reflective jackets at all times and have traffic control batons (preferably the LED type) for regulating the traffic during night time.
15. In addition to the delineation devices, all the construction workers should wear fluorescent safety vests and helmets in order to be visible to the motorists at all times. There should be provision for lighting beacons and illumination for night constructions.
16. The PIU and contractor will coordinate with the local administration and traffic police regarding the traffic signs, detour, and any other matters related to traffic. The contractor will prepare the traffic management plan in detail and submit it along with the EMP for the final approval.

## SAMPLE DAILY MONITORING SHEET FOR CONTRACTORS

### Second City Region Development Project Contractor Monitoring Sheet

Name of Subproject: \_\_\_\_\_  
 Location of Subproject: \_\_\_\_\_  
 Chainage covered (for linear works): \_\_\_\_\_  
 Supervising PIU: \_\_\_\_\_  
 Contractor: \_\_\_\_\_  
 Contractor EHS Supervisor (or equivalent): \_\_\_\_\_  
 Date of monitoring: \_\_\_\_\_

#### Summary of Findings

Monitoring Item	Status	Remarks
<b>1. Compliance with Local Permit Requirements</b>	<b>(Secured / Application Submitted / Not Applicable)</b>	
<i>Location/zoning permits</i>		
<i>Permit to construct</i>		
<i>Building permit</i>		
<i>Transport / hauling permits</i>		
<b>2. Compliance with IEE Requirements</b>	<b>(Approved / Under Preparation / Submitted to PIU for Approval)</b>	
<i>Site-specific EMP (SEMP)</i>		
<i>Corrective Action Plan, if any</i>		
<b>3. Compliance with SEMP</b>		
<b>Construction Site</b>	<b>(Satisfactory / Needs Improvement / Not Implemented)</b>	
- Conduct of toolbox talk		
- Use of PPE		
- Rest areas for male and female workers		
- Toilets for male and female workers		
- Medical kits		
- Drinking water supply		
- Dust control		
- Noise control		
- Solid waste management		
- Wastewater management		
- Chemicals storage (fuel, oil, etc.)		
- Siltation or erosion control		
- Heavy equipment staging / parking area		
- Barricades around excavation sites		
- Access to residential houses/shops/businesses		
- Traffic routing signages		
- Lightings at night		
- Trench shoring / landslide protection		
<b>Construction Workers' Camp Site</b>	<b>(Available / Needs Improvement / Not Available)</b>	
- Quarters for male and female workers		

Monitoring Item	Status	Remarks
- Sleeping utilities (e.g. beds, pillows, blankets, mosquito nets, etc.)		
- Power/Electricity supply		
- Drinking water supply		
- Toilets for male and female workers		
- General purpose water supply (cooking, washing, bathing)		
- Cooking facilities and areas		
- Solid waste management		
- Wastewater management		
- Pest control		
<b>4. Implementation of GRM</b>	<b>(Yes / No or None / Under Resolution)</b>	
<i>Complaints</i>		
<i>Complaints resolution</i>		
<b>5. Environmental Quality Measurement</b>	<b>(Passed / Failed / Not Applicable)</b>	
<i>Ambient air quality sampling</i>		
<i>Noise level measurement</i>		
<i>Receiving water quality sampling</i>		

**Other Issues:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Attachments:**

1. Copies of permits secured, if any.
2. Photos taken at worksites, if any.  
(photos attached in previous monitoring sheets should not be used again).
3. Laboratory results of environmental quality measurements, if any.

**Prepared by:** \_\_\_\_\_

Name, Designation and Signature

## SAMPLE INSPECTION REPORT FOR PROJECT MANAGEMENT COORDINATION UNIT AND PROJECT IMPLEMENTATION UNITS

### Second City Region Development Project Site Inspection Checklist

Subproject: \_\_\_\_\_

Date: \_\_\_\_\_

Location: \_\_\_\_\_

Chainage (for linear works): \_\_\_\_\_

Monitoring/Inspection Questions		Findings			Comments/Clarifications
1.	<b>Supervision and Management On-Site</b>	Yes	No	NA	
	a. Is an EHS supervisor available?				
	b. Is a copy of the SEMP available?				
	c. Are daily toolbox talks conducted on site?				
2.	<b>The Facilities</b>	Yes	No	NA	
	a. Are there a medical and first aid kits on site?				
	b. Are emergency contact details available on-site?				
	c. Are there PPEs available? What are they?				
	d. Are the PPEs in good condition?				
	e. Are there firefighting equipment on site?				
	f. Are there separate sanitary facilities for male and female workers?				
	g. Is drinking water supply available for workers?				
	h. Is there a rest area for workers?				
	i. Are storage areas for chemicals available and with protection? in safe locations?				
3.	<b>Occupational Health and Safety</b>	Yes	No	NA	
	a. Are the PPEs being used by workers?				
	b. Are excavation trenches provided with shores or protection from landslide?				
	c. Is breaktime for workers provided?				
	d. How many for each type of collection vehicle is in current use?				
4.	<b>Community Safety</b>	Yes	No	NA	
	a) Are excavation areas provided with barricades around them?				
	b) Are safety signages posted around the sites?				
	c) Are temporary and safe walkways for pedestrians available near work sites?				
	d) Is there a record of treated wastewater quality testing/measurement?				
5.	<b>Solid Waste Management</b>	Yes	No	NA	
	a. Are excavated materials placed sufficiently away from water courses?				



Monitoring/Inspection Questions		Findings			Comments/Clarifications
	b. Is solid waste segregation and management in place?				
	c. Is there a regular collection of solid wastes from work sites?				
6.	Wastewater Management	Yes	No	NA	
	a) Are there separate sanitary facilities for various types of use (septic tanks, urination, washing, etc.)?				
	b) Is any wastewater discharged to storm drains?				
	c) Is any wastewater being treated prior to discharge?				
	d) Are measures in place to avoid siltation of nearby drainage or receiving bodies of water?				
	e) Are silt traps or sedimentation ponds installed for surface runoff regularly cleaned and freed of silts or sediments?				
7.	Dust Control	Yes	No	NA	
	a. Is the construction site watered to minimize generation of dust?				
	b. Are roads within and around the construction sites sprayed with water on regular intervals?				
	c. Is there a speed control for vehicles at construction sites?				
	d. Are stockpiles of sand, cement and other construction materials covered to avoid being airborne?				
	e. Are construction vehicles carrying soils and other spoils covered?				
	f. Are generators provided with air pollution control devices?				
	g. Are all vehicles regularly maintained to minimize emission of black smoke? Do they have valid permits?				
8.	Noise Control	Yes	No	NA	
	a) Is the work only taking place between 7 am and 7 pm, week days?				
	b) Do generators operate with doors closed or provided with sound barrier around them?				
	c) Is idle equipment turned off or throttled down?				
	d) Are there noise mitigation measures adopted at construction sites?				
	e) Are neighboring residents notified in advance of any noisy activities expected at construction sites?				
9.	Traffic Management	Yes	No	NA	
	a) Are traffic signages available around the construction sites and nearby roads?				

Monitoring/Inspection Questions		Findings			Comments/Clarifications
	b) Are re-routing signages sufficient to guide motorists?				
	c) Are the excavation sites along roads provided with barricades with reflectors?				
	d) Are the excavation sites provided with sufficient lighting at night?				
10.	Recording System	Yes	No	NA	
	a) Do the contractors have recording system for SEMP implementation?				
	b) Are the daily monitoring sheets accomplished by the contractor EHS supervisor (or equivalent) properly compiled?				
	c) Are laboratory results of environmental sampling conducted since the commencement of construction activities properly compiled?				
	d) Are these records readily available at the site and to the inspection team?				

**Other Issues:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Prepared by:** \_\_\_\_\_

Name, Designation and Signature

## SEMI-ANNUAL ENVIRONMENTAL MONITORING TEMPLATE

### Introduction

- Overall project description and objectives
- Environmental category as per ADB Safeguard Policy Statement, 2009
- Environmental category of each subproject as per national laws and regulations
- Project Safeguards Team

Name	Designation/Office	Email Address	Contact Number	Roles
1. PMU				
2. PIUs				
3. Consultants				

- Overall project and subproject progress and status
- Description of subprojects (package-wise) and status of implementation (preliminary, detailed design, on-going construction, completed, and/or O&M stage)

Package Number	Components/List of Works	Contract Status (specify if under bidding or contract awarded)	Status of Implementation (Preliminary Design/Detailed Design/On-going Construction/Completed/O&M) <sup>a</sup>	If On-going Construction	
				%Physical Progress	Expected Completion Date

<sup>a</sup> If on-going construction, include %physical progress and expected date of completion

### Compliance status with National/State/Local statutory environmental requirements<sup>a</sup>

Package No.	Subproject Name	Statutory Environmental Requirements <sup>b</sup>	Status of Compliance <sup>c</sup>	Validity if obtained	Action Required	Specific Conditions that will require environmental monitoring as per Environment Clearance, Consent/Permit to Establish <sup>d</sup>

<sup>a</sup> All statutory clearance/s, no-objection certificates, permit/s, etc. should be obtained prior to award of contract/s. Attach as appendix all clearance obtained during the reporting period. If already reported, specify in the "remarks" column.

- <sup>b</sup> Specify (environmental clearance? Permit/consent to establish? Forest clearance? Etc.).
- <sup>c</sup> Specify if obtained, submitted and awaiting approval, application not yet submitted.
- <sup>d</sup> *Example: Environmental Clearance requires ambient air quality monitoring, Forest Clearance/Tree-cutting Permit requires 2 trees for every tree, etc.*

### Compliance status with environmental loan covenants

No. (List schedule and paragraph number of Loan Agreement)	Covenant	Status of Compliance	Action Required

### Compliance status with the environmental management plan (refer to EMP TABLES in APPROVED IEE/S)

- Confirm if IEE/s require contractors to submit site-specific EMP/construction EMPs. If not, describe the methodology of monitoring each package under implementation.

### Package-wise IEE Documentation Status

Package Number	Final IEE based on Detailed Design				Site-specific EMP (or Construction EMP) approved by Project Director? (Yes/No)	Remarks
	Not yet due (detailed design not yet completed)	Submitted to ADB (Provide Date of Submission)	Disclosed on project website (Provide Link)	Final IEE provided to Contractor/s (Yes/No)		

- For each package, provide name/s and contact details of contractor/s' nodal person/s for environmental safeguards.

### Package-wise Contractor/s' Nodal Persons for Environmental Safeguards

Package Name	Contractor	Nodal Person	Email Address	Contact Number

- With reference to approved EMP/site-specific EMP/construction EMP, complete the table below

### Summary of Environmental Monitoring Activities (for the Reporting Period)

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
<b>Design Phase</b>						

<b>Pre-Construction Phase</b>						
<b>Construction Phase</b>						
<b>Operational Phase</b>						

<sup>a</sup> Attach Laboratory Results and Sampling Map/Locations.

### Overall Compliance with CEMP/ EMP

No.	Subproject Name	EMP/ CEMP Part of Contract Documents (Y/N)	CEMP/ EMP Being Implemented (Y/N)	Status of Implementation (Excellent/ Satisfactory/ Partially Satisfactory/ Below Satisfactory)	Action Proposed and Additional Measures Required

### Approach and methodology for environmental monitoring of the project

- Briefly describe the approach and methodology used for environmental monitoring of each subproject.

### Monitoring of environmental IMPACTS on PROJECT SURROUNDINGS (ambient air, water quality and noise levels)

- Discuss the general condition of surroundings at the project site, with consideration of the following, whichever are applicable:
  - Confirm if any dust was noted to escape the site boundaries and identify dust suppression techniques followed for site/s.
  - Identify if muddy water is escaping site boundaries or if muddy tracks are seen on adjacent roads.
  - Identify type of erosion and sediment control measures installed on site/s, condition of erosion and sediment control measures including if these are intact following heavy rain;
  - Identify designated areas for concrete works, chemical storage, construction materials, and refueling. Attach photographs of each area in the Appendix.
  - Confirm spill kits on site and site procedure for handling emergencies.
  - Identify any chemical stored on site and provide information on storage condition. Attach photograph.
  - Describe management of stockpiles (construction materials, excavated soils,

- spoils, etc.). Provide photographs.
  - Describe management of solid and liquid wastes on-site (quantity generated, transport, storage and disposal). Provide photographs.
  - Provide information on barricades, signages, and on-site boards. Provide photographs in the Appendix.
  - Indicate if there are any activities being under taken out of working hours and how that is being managed.
- Briefly discuss the basis for environmental parameters monitoring.
  - Indicate type of environmental parameters to be monitored and identify the location.
  - Indicate the method of monitoring and equipment used.
  - Provide monitoring results and an analysis of results in relation to baseline data and statutory requirements.

*As a minimum the results should be presented as per the tables below.*

### Air Quality Results

Site No.	Date of Testing	Site Location	Parameters (Government Standards)		
			PM10 µg/m3	SO2 µg/m3	NO2 µg/m3

Site No.	Date of Testing	Site Location	Parameters (Monitoring Results)		
			PM10 µg/m3	SO2 µg/m3	NO2 µg/m3

### Water Quality Results

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity µS/cm	BOD mg/L	TSS mg/L	TN mg/L	TP mg/L

Site No.	Date of Sampling	Site Location	Parameters (Monitoring Results)					
			pH	Conductivity µS/cm	BOD mg/L	TSS mg/L	TN mg/L	TP mg/L

### Noise Quality Results

Site No.	Date of Testing	Site Location	LA <sub>eq</sub> (dBA) (Government Standard)	
			Day Time	Night Time

Site No.	Date of Testing	Site Location	LA <sub>eq</sub> (dBA) (Monitoring Results)	
			Day Time	Night Time

### Grievance Redress Mechanism

- Provide information on establishment of grievance redress mechanism and capacity of grievance redress committee to address project-related issues/complaints. Include as appendix Notification of the GRM (town-wise if applicable).

### Complaints Received during the Reporting Period

- Provide information on number, nature, and resolution of complaints received during reporting period. Attach records as per GRM in the approved IEE. Identify safeguards team member/s involved in the GRM process. Attach minutes of meetings (ensure English translation is provided).

### SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

- Summary of follow up time-bound actions to be taken within a set timeframe.

### APPENDIXES

- Photos
- Summary of consultations
- Copies of environmental clearances and permits
- Sample of environmental site inspection report
- all supporting documents including signed monthly environmental site inspection reports prepared by consultants and/or contractors
- Others