Initial Environmental Examination

Project No. 49329-006
November 2022

Bangladesh: Second City Region Development Project

Drainage Improvement in Kaliakoir Pourashava
Package No. CRDP-II/LGED/KALIAKOIR/NCB/2021/W-01

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

ABBREVIATION

ADB	-	Asian Development Bank
BDT	-	Bangladesh Taka
BOQ	-	Bill of Quantities
CRDP	-	City Region Development Project
DOE	-	Department of Environment
EARF	-	Environmental Assessment and Review Framework
ECR	-	Environmental Conservation Rules
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
MDSC	-	Management, Design and Supervision Consultant
NGO	-	nongovernment organization
NOC	-	no objection certificate
O&M	-	operations and maintenance
PIU	-	Project Implementation Unit
PMCU	-	Project Management Coordination Unit
REA	-	rapid environmental assessment
ROW	-	right of way
SPS	-	safeguard policy statement

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Executive Summary

The Second City Region Development Project (Second CRDP) was envisaged from the achievements of the first City Region Development Project (CRDP). Similar to CRDP, Second CRDP aims to promote inclusive and environmentally sustainable economic growth in Dhaka and Khulna city regions and will be implemented over a four-year period. Second CRDP will support improving the (i) transportation and/or road network within Dhaka region; (ii) solid waste management of Khulna City; and (iii) coordination mechanisms of various agencies involved in delivering climate- and disaster-resilient, inclusive, and environmentally sensitive infrastructure and basic services in these two city regions.

Subproject Scope. This initial environmental examination (IEE) report has been prepared for one of the subprojects of the project in the municipality of Kaliakoir that is covered under package number CRDP-II/LGED/Kaliakoir/NCB/2021/W-01. This package includes combination of construction and rehabilitation of roadway and/or drain for the following road alignments or components in the Kaliakoir Pourashava in Dhaka region: (i) Construction of drain from Kaliakoir Bus Terminal to Bangshi River at Bazar area (Ch.0-465m); (ii) Re-construction of drain with footpath from Fulbaria road and Palpara road to Bangshi River (Ch.0-475m); (iii) Re-construction of drain from Pourashava Office to Bazar road via Bangshi River bridge (Ch.0-1075m & Ch. 2850-3875m) including 1000m link drain and 500m link road; (iv) Improvement road from Mission road to Bypass road (Ch.1000-1475m); and (v) Re-construction of drain with footpath along the Hospital road from Bypass to College road (Ch.0-920m). 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 Safeguard Policy Statement (SPS), 2009. Using ADB Rapid Environmental Assessment Checklist, the subproject is classified as Environmental Category B as per the ADB SPS, 2009 as no significant impacts are envisaged. 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 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 environmental management plan (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 total length of the subproject drains is 4.960km and roads is 0.975 km. The subproject scheme alignments pass more or less through built-up areas of small and medium enterprises, markets or bazars, open fields, sporadically scattered human settlements and various ponds, ditches and low-lying areas on both sides; and traverse along and/or cross some canals.

The subproject scheme alignments are not within or located near any ecologically

critical areas, and further development interventions to these roads will not have any significant 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 schemes occupy existing right-of-ways (ROWs). There will be no road 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 for approval to the project implementation unit (PIU). These will cover the following areas of impact which are potentially significant but can be mitigated by the adoption of good practice: (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 (GRM). Second CRDP will adopt the grievance redress mechanism (GRM) outline of 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 has establish a project management and coordination unit (PMCU) comprising officials including an Environmental Safeguard Officer who is a permanent employee of LGED. The PMCU is strengthened with external experts or consultants in environmental and social safeguards, including experts on finance, procurement, technical areas, and contract management. PIUs has been established at the local level where subprojects are located. In this subproject, Kaliakoir Pourashava will serve as the PIU. The PMCU and Kaliakoir PIU have the 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 PIU for approval; (iv) carry out all of the monitoring and mitigation measures set forth in the approved SEMP; and (v) implement any corrective or preventative 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 Kaliakoir PIU, with support of external experts or consultants. Contractors will submit monthly reports to Kaliakoir PIU, while Kaliakoir 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. The overall finding of this IEE is that the subproject will result in significant environmental benefits because the current conditions of the drain and road of Kaliakoir Pourashava will be improved and will be much better for local residents. 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.

This IEE has been prepared based on updated designs of the subproject. The PMCU shall update this draft IEE based on any change in design and submit to ADB for review and disclosure. 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 Kaliakoir 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; respectively.

I. INTRODUCTION

A Background

1. The Second City Region Development Project (Second CRDP) was envisaged from the achievements of the first City Region Development Project (CRDP). Similar to CRDP, Second CRDP aims to promote inclusive and environmentally sustainable economic growth in Dhaka and Khulna city regions, the two city regions within one of the promising corridors of Bangladesh - named as Southwest Economic Corridor.[1] Recognizing the economic potential of this corridor, the Government of Bangladesh has given high priority to develop and emphasize economic growth in the said two city regions. Second CRDP will help in fulfilling this priority objective by supporting infrastructure development and regional urban planning to stimulate urban development in Dhaka and Khulna city regions. Specifically, Second CRDP will support improving the (i) transportation and/or road network within Dhaka region; (ii) solid waste management of Khulna City; and (iii) coordination mechanisms of various agencies involved in delivering climate- and disaster-resilient, inclusive, and environmentally sensitive infrastructure and basic services in these two city regions.[2]

2. Second CRDP will be implemented over a four-year period (2018 – 2022). The indicative list of subprojects is summarized in the environmental assessment and review framework drafted for Second CRDP. The subprojects are largely built around 'integrated area planning' which seeks to enhance economic activity in the city region and provides opportunities for investment, including (i) transport infrastructure upgrading, and (ii) solid waste management.

3. Second CRDP has been classified as environmental category B per ADB SPS.[3] A project preparatory technical assistance (PPTA 49329-BAN) was approved by ADB to assist Government of Bangladesh prepare Second CRDP for ADB financing. Part of this PPTA is the preparation of environmental assessment and review framework (EARF) and initial environmental examination (IEE) reports in accordance with the requirements of ADB Safeguard Policy Statement (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/KALIAKOIR/NCB/2021/W-01, which includes combination of construction and rehabilitation of drain and /or roadway for the following road alignments or components in the Kaliakoir Pourashava in Dhaka region:
(i) Construction of drain from Kaliakoir Bus Terminal to Bangshi River at Bazar area (Ch.0-465m); (ii) Re-construction of drain with footpath from Fulbaria road and Palpara road to

[1] ADB. 2015. Comprehensive Integrated Multimodal Economic Corridor Network (CIMECON): Bangladesh. Manila.

[2] https://www.adb.org/projects/49329-006/main#project-pds

[3] 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.

Bangshi River (Ch.0-475m); (iii) Re-construction of drain from Pourashava Office to Bazar road via Bangshi River bridge (Ch.0-1075m & Ch. 2850-3875m) including 1000m link drain and 500m link road; (iv) Improvement road from Mission road to Bypass road (Ch.1000-1475m); and (v) Re-construction of drain with footpath along the Hospital road from Bypass to College road (Ch.0-920m).

B Purpose of the IEE

5. The purpose of this IEE is to describe the assessment of environmental impacts due to the proposed subproject based on the detailed design produced under the Second CRDP, and to specify measures to address impacts. This IEE is based on engineering design information, a field visit, and secondary data to characterize the environment. It contains the results of interviews and consultations with stakeholders. This IEE includes an environmental management plan (EMP) outlining mitigation measures and monitoring requirements, and environmental specifications to be appended to contract documents.

6. Screening using ADB's Rapid Environmental Assessment Checklist for Road was initially conducted, and results of the rapid assessment show that the project is unlikely to cause any significant adverse impacts, and therefore classified under Category B per ADB Safeguard Policy Statement (SPS). Thus, this initial environmental examination (IEE) has been prepared in accordance with ADB SPS requirements for environment category B projects. The location of the subproject is shown in **Figures 1 & 2**.

Figure 1: Location Map of Subproject on Google Earth (Red Lines for Roads and Drains)

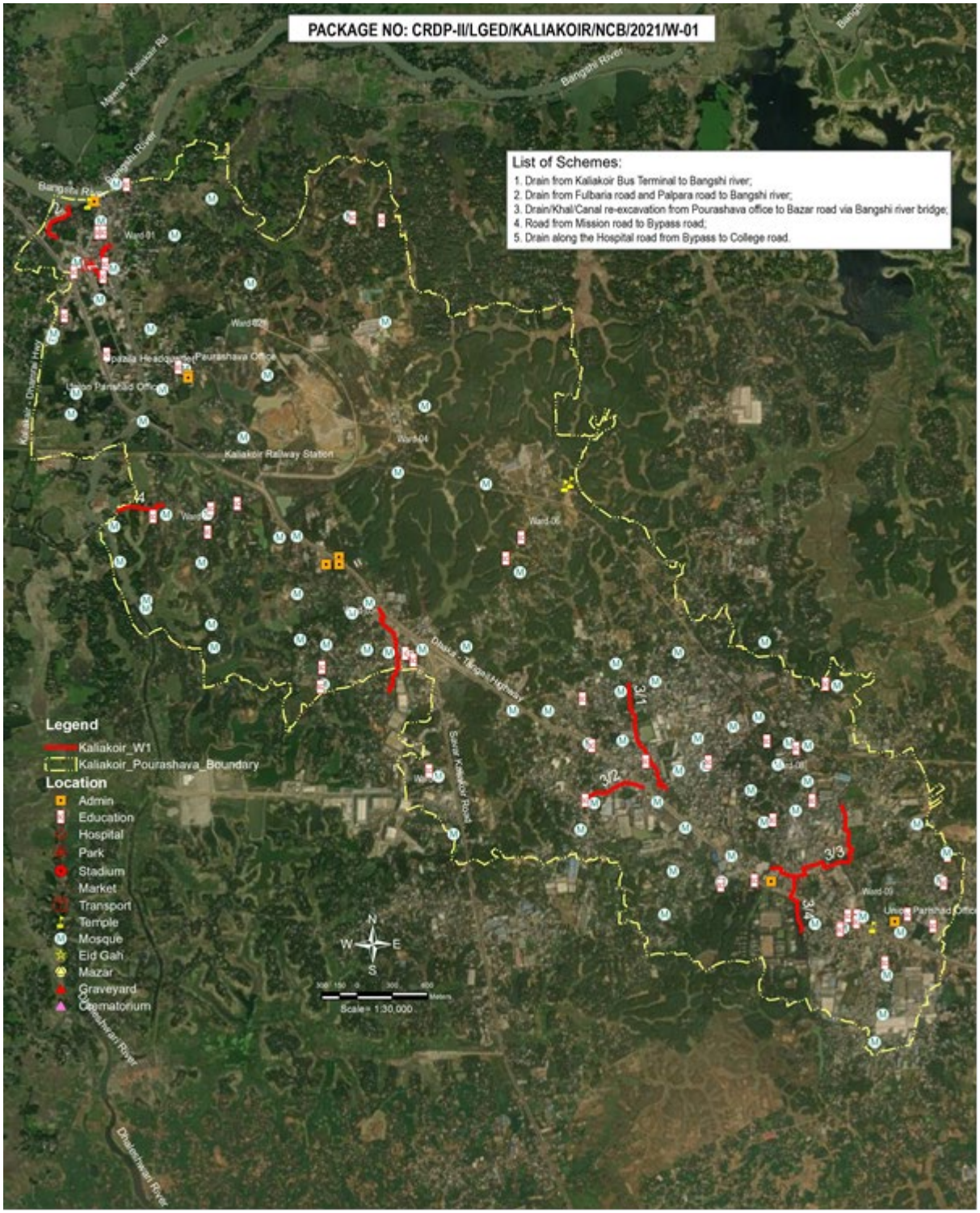
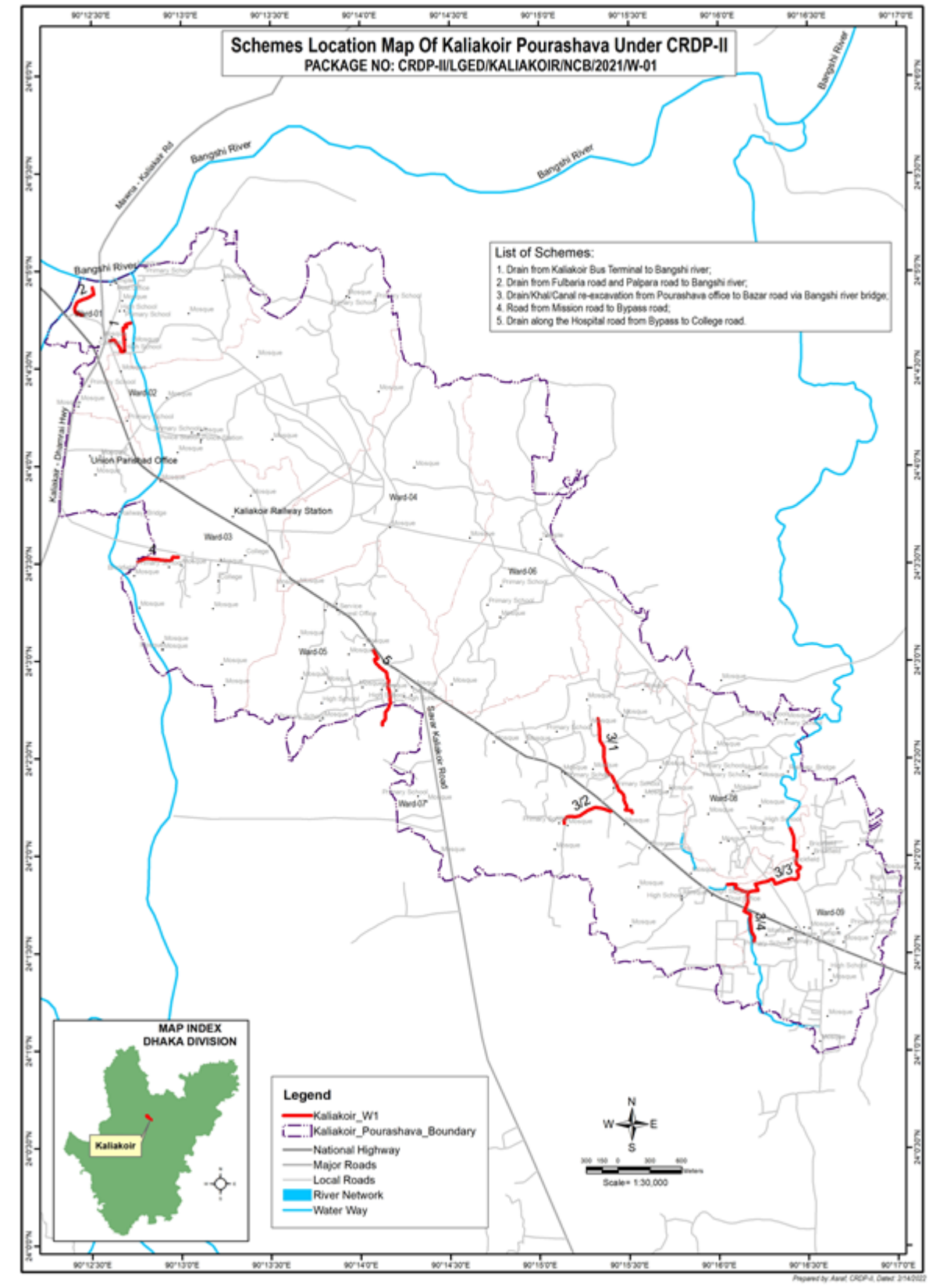


Figure 2: Location Map of Subproject (Red Lines for Roads and Drains)



C Extent of the Study

7. This IEE has been carried out based on most up-to-date subproject details provided by the design team during the preparation of this report. Minor changes may occur in the structural component of the sub-projects at the detailed designing stage. The scope of the IEE study has been confined to project related activities associated with design, construction (e.g. site clearing, earth borrowing, quarrying, material transportation, paving, camping) and operation stages.

D Methodology

8. The approach in preparing the IEE has been followed the sequence of steps outlined in the EARF. Apart from following standard environmental impact assessment practices and procedures, methodologies have deployed the technologies, techniques and tools to the extent these are applicable and relevant to this project. The methodology followed in preparing this IEE consists of the following steps:

- Review of available details of the subproject, and to take into accounts various parameters of the environment - including topography, physiography, soils, hydrology and drainage, meteorology, qualities of ambient air and noise, surface water, groundwater, biodiversity, socio-economic aspects including physical and cultural resources;

- Review of the policy and regulatory requirements; and EARF;

- Reconnaissance field visit and initial scoping and screening of the identified proposed investment sites to determine the key environmental parameters and aspects that are likely to be impacted by the project activities. The purpose of such screening is to get a preliminary idea about the degree and extent of potential environmental impacts of a particular sub-project, which would subsequently be used to assess the need for and the scope of further detailed environmental assessment;

- Collection of baseline data for environmental attributes from primary and secondary sources: a) primary sources includes site visits and visual inspection, and b) secondary sources include the reports, books, maps and documents from various government and non-government organizations on subject matter;

- Assessment of potential impacts of the Project activities at stages of design, construction and operation;

- Develop Environmental Management Plan to mitigate the adverse impacts and to enhance the quality of environmental traits;
- Consultations/meetings with various stakeholders including local communities;

9. IEE has been carried out using reconnaissance survey, field visits, consultation with stakeholders and others, NGOs, 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 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 of Bangladesh policies exist, ADB's policy will prevail. Moreover, ADB SPS 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 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, CRDP2 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. [4]

12. **Screening and Categorization.** Subprojects are to be screened for their expected environmental impacts, and are assigned to a specific category (footnote 3). Categorization is to be based on the most environmental 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 Second CRDP roads 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 training measures, implementation schedule, cost estimates, and performance indicators.

[4] ADB. 2009. *Safeguard Policy Statement*. Manila.

15. **Public Disclosure**. 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: [5]

(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 Kaliakoir PIU carried out meaningful consultation6 with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. The consultation process and its results are documented and reflected in this initial environmental examination report

17. **Grievance Redress Mechanism.** 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 Second CRDP, a grievance redress mechanism (GRM) has been established and discussed in detail in Section VI below.

18. **Monitoring and Reporting.** 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 Kaliakoir 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 Safety Guidelines. These standards contain performance levels and measures that are normally acceptable and applicable to subprojects. When the Government of Bangladesh 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.

[5] 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."

21. **Occupational Health and Safety.** PMCU[6] shall ensure that workers[7] 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.[8]

23. **Community Health and Safety.** 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**. PMCU is responsible for sitting 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 Kaliakoir PIU. The PMCU and Kaliakoir PIU shall also ensure that bidding and contract documents include specific provisions requiring contractors to (i) comply with all other conditions required by ADB,[10] and (ii) to submit to Kaliakoir PIU, for review and approval, a site-specific environmental management plan

[6]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.

[7]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.

[8]World Bank Group, 2007. *Environmental, Health, and Safety General Guidelines.* Washington, DC.

(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) DOE-approved IEE (i.e. IEE in compliance with ECR, 1997) and other necessary permits from relevant government agencies have been obtained. For "design, build, and operate" type contracts, PMCU shall ensure no works for a 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 (ECA), 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 Department of Environment (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 (ECR), 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 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.

Table 1: Summary Environmental Clearance Application Requirements Per Category [a]

Category	Requirements
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

Category	Requirements
	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.

[a]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 ECR	DOE Classification
1.	Roads	Roads	Construction, re-construction and extension of road (feeder road, local road)	Orange – B
		Bridges and culverts	Construction, re-construction and extension of bridge/culvert (length below 100 meters)	Orange – B

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**. This involves the completion and submission of an application using a form available from the DOE website,[9]which is revised from time to time. The

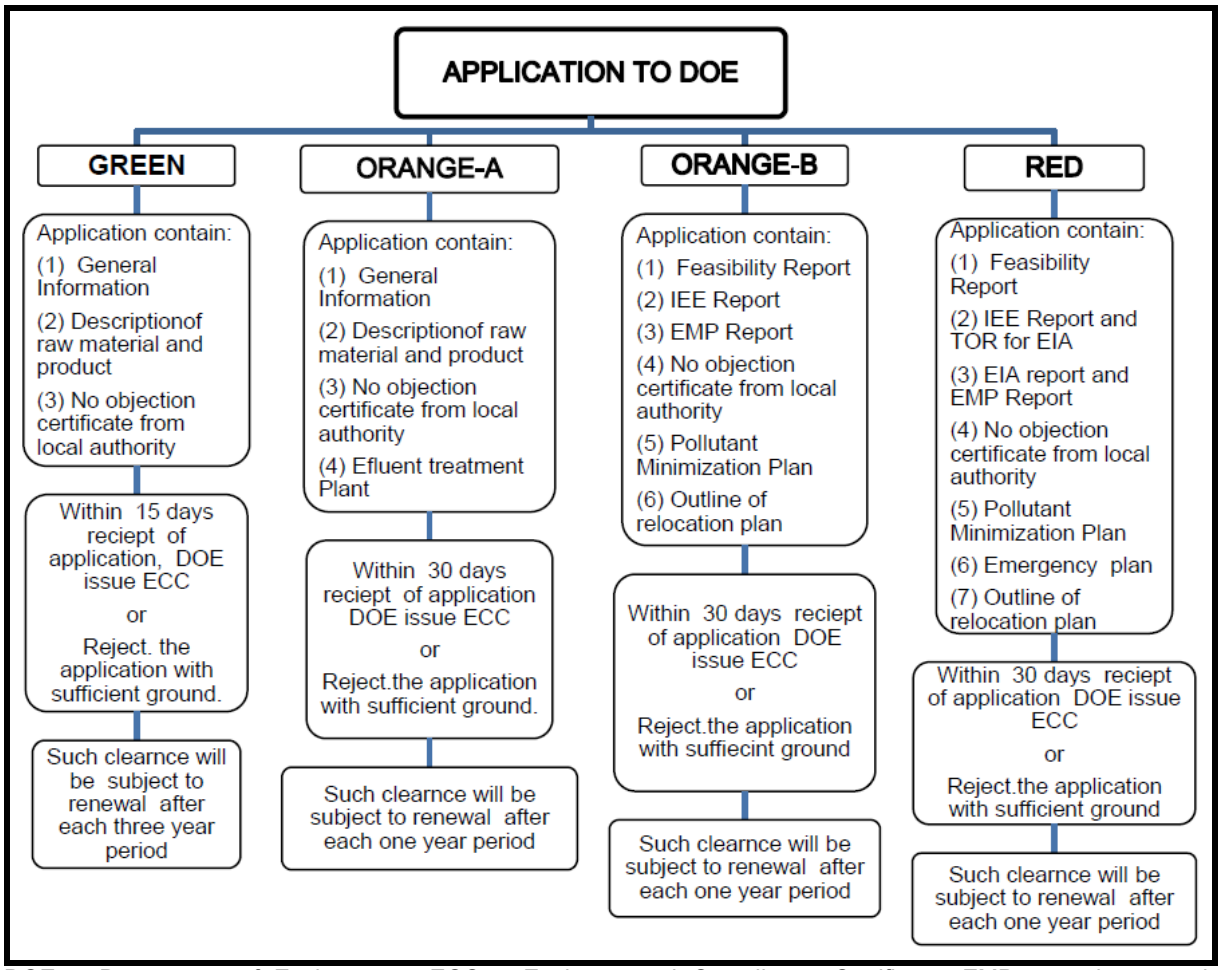
[9] www.doe-bd.org

accomplished application form is submitted to DOE together with requirements as enumerated in **Table 1**.

32. The ECC is issued within 30 days from receipt of the application by DOE. Such ECC is required to renewed every year from the date of its effectivity. For the Second CRDP, PMCU is responsible for application for ECC. Application for said ECC is approved and renewed. The approved and the renewed ECC have been attached in this IEE (Appendix-11 and Appendix-12).

33. **Figure 3** shows the summary of review process and timelines set under ECR, 1997, leading to the issuance of environmental clearance certificate (ECC) by DOE.

Figure 3: 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

34. The ECR, 1997 also provides the environmental standards applicable to Second CRDP. 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, the subproject shall apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in EHS Guidelines. When the Government of Bangladesh 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. In view of this, **Table 3** and **Table 4** show the ambient air quality standards and noise level standards to be followed by the subproject.

Table 3: National Ambient Air Quality Standards
(Bangladesh Ambient Air Quality Standard as adopted in 2005)

Pollutant	Objective	Average
CO	10 mg/m^3 (9 ppm)	8 hours(a)
	40 mg/m^3 (35 ppm)	1 hour(a)
Pb	0.5 µg/m^3	Annual
NO^3	100 µg/m^3(0.053 ppm)	Annual
PM_{10}	50 µg/m^3	Annual (b)
	150 µg/m^3	24 hours (c)
$PM_{2.5}$	15 µg/m^3	Annual
	65 µg/m^3	24 hours
O_3	235 µg/m^3 (0.02 ppm)	1 hour (d)
	157 µg/m^3 (0.08 ppm)	8 hours
SO_2	80 µg/m^3 (0.03 ppm)	Annual
	365 µg/m^3 (0.14 ppm)	24 hours (a)

[a] Schedule 2 of ECR, 1997
[b] Source: WB Environmental, Health and Safety General Guidelines, 2007.
[c] Source: Air Quality Guidelines for Europe, Second Edition, 2000; WHO Regional Office for Europe, Copenhagen
[d] 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.

Ambient air quality standards for Bangladesh and WHO Guideline

Pollutant	Bangladesh standard	WHO Guideline	Averaging time
Carbon Monoxide (CO) (mg/m^3)	10 (9 ppm)	10	8 hour(a)
	40 mg m^3/ (35 ppm)	30	1 hour(a)
Oxides of Nitrogen (NOx) (µg/ m^3)	100 µg/ m^3 (0.053 ppm)	-	Annual
Particulates (PM10) (µg/ m^3)	50 µg/ m^3	15	Annual(b)
	150 µg/ m^3	50	24 hours(c)
Fine Particulates (PM2.5) (µg/ m^3)	15 µg/ m^3	10	Annual
	65 µg/ m^3	25	24 hours
Ozone (O_3) (µg/ m^3)	235 µg m^3/ (0.12 ppm)	-	1 hour(d)
	157 µg/ m^3 (0.08 ppm)	100	8 hours
Sulfur dioxide (SO_2) (µg/ m^3)	80 µg/ m^3 (0.03 ppm)	-	Annual
	365 µg/ m^3 (0.14 ppm)	20	24 hours(a)

Notes:

A Not to be exceeded more than once per year.

B The objective is attained when the annual arithmetic mean is less than or equal to 50 ug/ m^3.

C The objective is attained when the expected number of days per calendar year with a 24-hour average of 15 µg/ m^3 is equal to or less than 1.

The objective is attained when the expected number of days per calendar year with the maximum hourly average of 0.12 ppm is equal to or less than

Table 4: Ambient Noise Quality Standards

Receptor/ Source	*Bangladesh Noise Pollution (Regulation and Control) Rules, 2006*[a] (dBA)		WHO Guidelines Value For Noise Levels Measured Out of Doors[b] (One Hour LA_q in dBA)		Applicable Per ADB SPS[c] (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	55 *(6 am to 9 pm)*	45 *(9 pm to 6 pm)*	55	45	50	40
Silent Zone	50	40	55	45	45	35

[a] Schedule 4 of ECR, 1997

[b] Guidelines for Community Noise, WHO, 1999**(**WB Environmental, Health and Safety General Guidelines, 2007)

[c] 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.

Surface Water quality Standards

Standard	**pH**	**Ec µS/cm**	**DO mg/l**	**BOD^{5d} mg/l**	**COD (mg/l)**	TSS mg/L	TDS mg/L	**Fe mg/l**	Mn **mg/l**	**As ppb**	**Turbi-dity NTU**	**NO3-N mg/l**	**Cl- mg/l**	**Tota Coliform cfu/100ml**
Standard per ECR,1997 (Schedule 3A)	**6.5-8.5**		**5 0r abo ve**	**6 or less**	**NYS**			**NYS**	**NYS**	**NYS**		**NYS**	**NYS**	**5000 or less**
Standard per ECR,1997 (Schedule 10)	**6-9**		**4.5-8**	**50**	**200**			**2**	**5**	**20**		**10**	**600**	**NYS**

Ground Water quality Standards

Standard	**pH**	**DO (mg/l)**	**BOD^{5d} (mg/l)**	**COD (mg/l)**	**EC (µs/Cm)**	**Fe (mg/l)**	**Mn (mg/l)**	**As (ppb)**	**NO3-N (mg/l)**	**Chlo-ride (mg/l)**	**TSS (mg/l)**	**TDS (mg/l)**
Standard per ECR,1997 (Schedule 3B)	**6.5-8.5**	**6.0 or above**	**0.2**	**4.0**	**NYS**	**0.3-1.0**	**0.1**	**50.0**	**10.0**	**150-600**		**1000**

E Other Relevant National Laws

35. The implementation of subprojects proposed under Second CRDP will be governed by Government of Bangladesh (the Government) Environmental Acts, Rules, Policies, and Regulations. **Table 5** summarizes the applicable national and local laws, regulations, and standards for environmental assessment and management, including applicable international environmental agreements.

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

Laws, Regulations, and Standards	Details	Relevance/Applicability
National Environmental Policy 2018	The National Environmental Policy 2018 has been adopted in order to ensure sustainable development in the face of various environmental disasters, the effects of climate change and the limitation of natural resources. The main focus of this policy is to protecting the environment, controlling pollution, conserving biodiversity and tackling the adverse effects of climate change.	This Policy is applicable to CRDP-2 as the proposed interventions are required to comply with all the policy/directives stressing particularly on reducing adverse environmental impacts.
National 3R Strategy for Waste Management, 2010	The 3Rs are meant to a hierarchy, in order of importance – 'reduce' followed by 'reuse' and then 'recycle', which classify waste management strategies according to their desirability. The National 3R goal for waste management is to achieve complete elimination of waste disposal on open dumps, rivers and floodplains by 2015 and promote recycling of waste through mandatory segregation of waste at source as well as create a market for recycled products and provide incentives for recycling of waste.	CRDP-2 is relevant to the National 3R Strategy for Waste Management and will contribute to achieve complete elimination of waste disposal on open dumps, rivers and floodplains
The Draft Solid Waste Management Handling Rules, 2020	The Draft Solid Waste Management (SWM) Rules, 2020 shall apply to every municipal authority responsible for collection, segregation, storage, transportation, processing and disposal of municipal solid wastes. Every municipal authority shall, within the territorial area of the municipality be responsible for the implementation of the provisions of these rules.	The SWM Rules 2020 is applicable to CRDP-2 as the rule narrates on necessary details from collection of wastes to its final disposal
Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009	The BCCSAP is built on six pillars: (i) food security, social safety and health; (ii) comprehensive disaster management; (iii) infrastructure; (iv) research and knowledge management; (v) mitigation and low carbon development; and (vi) capacity building. Five programs have been suggested related to improvement of the water management infrastructures in coastal areas of Bangladesh under pillar 3 (Infrastructure) of BCCSAP, including Planning, design and implementation of resuscitation of the network of rivers and *khals* through dredging and de-siltation work.	CRDP-2 is relevant to the BCCSAP's programs and will contribute towards achieving the objective of restoration of the network of rivers and *khals* through dredging and de-siltation work
The Embankment and Drainage Act (1952)	This Act describes the protection of embankments and drainage facilities	The Embankment and Drainage Act (1952) is applicable to CRDP-2 as

Laws, Regulations, and Standards	Details	Relevance/Applicability
		the project will support drainage improvement of Pourashavas
Wetland Protection Act 2000	The Bangladesh Water Development Board Act, 2000 was enacted for the development and efficient management of water resources. The Water Development Board is established under the Act, with the power to control the flow of water in all rivers, channels and underground aquifers.	CRDP-2 is relevant to the Wetland Protection Act 2000 as the project will involve in maintaining the flow of water in subproject khals /canals
National Disaster Management Act 2012	The Disaster Management Act 2012 recognized the impacts of climate change and provided guidance for setting up an institutional mechanism for disaster management, reducing vulnerabilities, rehabilitation, and providing humanitarian assistance to the victims of both disasters and climate change impacts.	The National disaster Management Act 2012 is relevant to CRDP-2 as it shall promote disaster-resilient infrastructures
National Land Transport Policy 2004	The National Land Transport Policy, adopted in 2004, which stated that services and infrastructure in the water sector will be studied so that an analysis can be made of potential opportunities for integration, and competition where appropriate. Transports including land and water, sector can also play a vital role to promote the low carbon climate resilient development in Bangladesh.	This policy is applicable to CRDP-2 as it is designed to support improving the transportation and/or road network
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.	CRDP-2 is relevant to the Environmental Court Act, 2000 as the court has jurisdiction over any subproject-related environmental cases or litigations or complaints elevated to it.
The Pourashava (Municipality) Ordinance of 1977, the City Corporation Ordinances of	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	The subproject aims to help Chalna Pourashava (as the LGI) achieve or fulfill these mandates.

Laws, Regulations, and Standards	Details	Relevance/Applicability
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; Pourashava Act 2009, 6 Oct 2009.	and infectious disease control, etc. for the residents. LGIs have the authority to address all related issues within their legal and administrative mandate.	
National Forestry Policy, 2016	This policy specifically states the following relevant objectives (among many other objectives): (i)to arrest deforestation, and degradation of forest resources, enrich and extend areas under tree cover, through appropriate programmes 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.	CRDP-2 is relevant to the National Forestry Policy, 2016 as the development of subproject roads and drainage will have potential tree cutting. 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.	CRDP-2 is relevant to Bangladesh Labor Act, 2006 as this act provides security and safety of work force during construction period. Compliance with this law will be included in the responsibility of the Contractor.
Occupational Health and Safety Laws and Rules in Bangladesh, June 2015	Special importance has been given on occupational health and safety and work environment. It includes: a) Safety condition in Bangladesh, b) Construction accidents in Bangladesh, c) Existing health & safety legislation in practice, d) Definition of safety accident,hazard&risk, e)Type of hazard, f) Type of accident, g) Type of PPE, h) PTW (permit to work), i) Reasons and benefits to improve health & safety in construction, and j) How to improve health and safety on construction sites	This Occupational Health and Safety Laws and Rules in Bangladesh, June 2015 is applicable to CRDP-2 as the proposed subproject interventions are required to comply with all the rules/directives related to Occupational Health and Safety issues at work place

CRDP = City Region Development Project, DOE = Department of Environment, ECC = Environmental Clearance Certificate, EMP = environmental management plan, IEE = initial environmental examination, LGI = local government institutions

F International Environmental Agreements

36. Below lists the relevant international environmental agreements that Government of Bangladesh is party to, and their relevance to the subproject.

Table 6: International Environmental Agreements Relevant to Second CRDP

International Environmental Agreement	Year Ratified	Details	Relevance
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 CRDP, 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	The road and drainage works may impact undiscovered cultural and natural heritage relics during construction phase. The subproject EMP ensures measures for chance finds.
Ramsar Convention on Wetlands of International Importance, 1971	1992	Parties to conserve and wisely use wetlands (i.e., maintaining their ecological character) as a contribution towards achieving sustainable development locally and throughout the world	Road and drainage construction works may impact wetlands. The subproject EMP ensures measures are in place to protect significant wetland and prevent draining or filling into the wetlands during construction.
Convention on Biological Diversity, 1992	1997	Parties to require the environmental assessment of projects that are likely to have significant adverse effects on biological diversity with a view of avoiding or minimizing such effects	Biodiversity sites and species not previously identified might be discovered during construction works along the alignments. The subproject EMP ensures measures to protect biodiversity, if any, during construction and post-construction activities.

III. DESCRIPTION OF THE SUBPROJECT

A. Subproject Scope and Components

37. The proposed subproject is a combination of construction and rehabilitation roadway and components. Description of drainage and roadway works is presented in **Table 7.** All construction works and improvements will be conducted within existing right-of-ways (ROWs).The road widths along the alignments will be varied at different chainage depending on the available space within the existing ROWs to ensure that no encroachment to private properties.

Table 7: Description of the Schemes

Sl. No.	Scheme no. (Road/Drain)	Description	Subproject component	Length, (km/m)
1	Scheme no. 1 (Drain-1)	Construction of drain from Kaliakoir Bus Terminal to Bangshi River at Bazar area (Ch.0-465m);	Drain	0.465km
2	Scheme no. 2 (Drain-2)	Re-construction of drain with footpath from Fulbaria road and Palpara road to Bangshi River (Ch.0-475m);	Drain	0.475km
3	Scheme no. 3 (Drain-3)	Re-construction of drain from Pourashava Office to Bazar road via Bangshi River bridge (Ch.0-1075m & Ch. 2850-3875m) including 1000m link drain and 500m link road;	Drain	1.025km
	+			
	(Road-1)	Re-construction of drain from Pourashava Office to Bazar road via Bangshi River bridge (Ch.0-1075m & Ch. 2850-3875m) including 1000m link drain and 500m link road;	Road	0.500km
4	Scheme no. 4 (Road-2)	Improvement road from Mission road to Bypass road (Ch.1000-1475m);	Road	0.475km
5	Scheme no. 5 (Drain-4)	Re-construction of drain with footpath along the Hospital road from Bypass to College road (Ch.0-920m).	Drain	0.920km

B. Existing Condition of Subproject Components

1. Scheme 1 (Drain-1): Construction of drain from Kaliakoir Bus Terminal to Bangshi River at Bazar area (Ch.0-465m)

38. **Drain Location**. The subproject drain is 0.465km long. It starts from Kaliakoir Bus Terminal at Ch.0+00 km and ends at Bangshi River at Bazar area at Ch.0+465km (start coordinate: N 24 4' 38.568", E 90^0 12' 36.197") and ends at Bangshi river at Bazar area (end coordinate: N 24^0 4' 44.090", E 90^0 12' 43.150").

39. **Drain Condition**. Major parts of the drain traverse through residential lots, trade and commercial and bazar areas. This drain 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 dwellers Photos of existing condition of the subproject Drain are shown in **Figure 4**.

Figure 4*:* Photograph of Existing Condition of the Drain from Kaliakoir Bus Terminal to Bangshi River at Bazar area (Ch.0-465m)

	
Existing condition of drain at Ch.325m	**Existing condition of drain at Ch.250m**

2. Scheme 2 (Drain-2): Re-construction of drain with footpath from Fulbaria road and Palpara road to Bangshi River (Ch.0-475m)

40. **Drain Location.** The subproject drain is 0.475km long. It starts from Fulbaria road and Palpara road at Ch.0+00 km and ends at Bangshi River at Ch.0+475km (start coordinate: N 240 4' 44.090", E 900 12' 43.150") and (end coordinate: N 240 4' 46.545", E 900 12' 26.817").

41. **Drain Condition**. Major parts of the drain traverse through residential lots, trade and commercial and bazar areas. This drain 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 dwellers. Photos of existing condition of the subproject Drain are shown in Figure 5.

Figure 5: Photograph of Existing Condition of Re-construction of drain with footpath from Fulbaria road and Palpara road to Bangshi River (Ch.0-475m)

	
Existing condition of drain at Ch. 275m	**Existing condition of drain at Ch.175m**

3. Scheme 3 (Drain-3 plus Road-1): Re-construction of drain from Pourashava Office to Bazar road via Bangshi River bridge (Ch.0-1075m & Ch. 2850-3875m) including 1000m link drain and 500m link road.

a) <u>Drain-3</u>

42. **Drain Location**. The subproject drain is 2.10km long. It starts from Pourashava Office to Bazar road via Bangshi River Bridge at Ch.0+00km – 1+075km & Ch.2+850km – 3+875km) (**section 3/1**: start coordinate: N 24^0 2' 42.117", E 90^0 15' 19.555", end coordinate: N 24^0 2' 13.117", E 90^0 15' 30.965"), (**section 3/2**: start coordinate: N 24^0 2' 13.628", E 90^0 15' 23.873", end coordinate: N 24^0 2'9.922", E 90^0 15' 8.253"); (**section 3/3**: start coordinate: N 24^0 1' 50.993", E 90^0 16' 2.868", end coordinate: N 24^0 2'8.266", E 90^0 16' 23.949") and (**section 3/4**: start coordinate: N 24^0 1'48.514", E 90^0 16' 9.733", end coordinate: N 24^0 1' 33.460", E 90^0 16' 11.744").

43. **Drain Condition**. Major parts of the drain traverse through residential lots, trade and commercial and bazar areas. This drain 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 dwellers. Photograph of existing condition of the subproject Drain is shown in **<u>Figure 6</u>**.

Figure 6: Photograph of Existing Condition of Re-construction of drain from Pourashava Office to Bazar road via Bangshi River bridge (Ch.0-1075m & Ch. 2850-3875m) including 1000m link drain and 500m link road

Existing Condition of Drain at Ch.150m (Section 3/2)

Existing Condition of Drain at Ch. 2975m (Section 3/3)

Existing Condition of Drain at Ch.200m (Section 3/4)

b) <u>Road-1</u>

44. **Road Location:** This subproject link road is 0.500km long, start from Pourashava Office (start coordinate: N 24° 3' 32.00" and E 90° 12’ 58.958”) and ends at Bazar road (end coordinate: N 24° 3' 30.561" and E 90° 12' 45.489"). This road passes through markets/bazaars, open fields and sporadic settlements alongside the road alignment. Existing vacant road width varies along the road - minimum is 5.70m at chainage 85m and maximum is 6.20m at chainage 225m. Existing carriageway width of the road is 5.50m all throughout the road alignment.

45. **Road Condition:** This road contains carriageway of width 5.50m all throughout the road alignment. The existing road surface is made of bituminous carpeting all throughout. Major part of the road has suffered wear and tear with cracks, potholes, broken edges and depressions. The distressed condition of the road is mainly due to improper drainage facilities and movement of heavy vehicular traffic for a long time without any proper

maintenance work. Photograph of existing condition of the subproject road is shown in **Figure 7.**

Figure 7: Photograph of Existing Condition of the Road

46. **Existing Alignment and Right-of-Ways (RoW)***:* The existing subproject road will be improved within existing alignment/RoW. The vacant road width varies between 5.70m~6.20m and includes carriageway of width 5.50m. The side slope of road embankment will be of 1:1.5. From field investigation, no tree is found along the proposed carriageway. No trees will be cut and all trees found along the sides of the proposed carriageway will be preserved per detailed design.

47. **Strip Map.** The strip map showing no locations of the physical cultural structures, particularly religious structures along this alignment (Appendix 1). The strip map was drawn as a result of the field surveys conducted along the alignment and show that no physical cultural resources will be encroached or affected.

4. Scheme 4 (Road-2): Improvement road from Mission road to Bypass road (Ch.1000-1475m)

48. **Road Location:** This subproject link road is 0.475km long, start from Mission road (start coordinate: N 24° 3' 3.206" and E 90° 14’ 4.264”) and ends at Bypass road (end coordinate: N 24° 2' 40.291" and E 90° 14' 7.316"). This road passes through markets/bazaars, built-up areas, open fields and sporadic settlements alongside the road alignment. Existing vacant road width varies along the road - minimum is 5.60m at chainage 1110m and maximum is 6.00m at chainage 1280m. Existing carriageway width of the road is 3.00m all throughout the road alignment.

49. **Road Condition:** This road contains carriageway of width 3.00m all throughout the road alignment. The existing road surface is made of bituminous carpeting all throughout. Major part of the road has suffered wear and tear with cracks, potholes, broken edges and depressions. The distressed condition of the road is mainly due to improper drainage facilities and movement of heavy vehicular traffic for a long time without any proper maintenance work. Photograph of existing condition of the subproject road is shown in

Figure 8.

Figure 8: Photograph of Existing Condition of the Road at Ch. 1100m

50. **Drain: T**here is no functional roadside drain along the alignment of this road. Currently, rain water during monsoon season flows toward the sides of the road which have lower elevation and then flows to nearby canals or ponds.

51. **Drainage Structures:** There are 4 (four) Cross-Drain structures of size 1.00m x 1.00m at Ch. 1091m, Ch. 1123m, Ch. 1320m & Ch. 1414m. Of these 4 structures, 3 structures at Ch. 1091m, Ch. 1320m & Ch. 1414m will be replaced with structures of larger size 1.00m x 1.20m for free flow of drainage and to avoid water accumulations or congestion.

52. **Existing Alignment and Right-of-Ways (RoW)***:* The existing subproject road will be improved within existing alignment/RoW. The vacant road width varies between 5.60m~6.00m and includes carriageway of width 3.00m. The side slope of road embankment will be of 1:1.5. From field investigation, no tree is found along the proposed carriageway. No trees will be cut and all trees found along the sides of the proposed carriageway will be preserved per detailed design.

53. **Strip Map**. The strip map showing no locations of the physical cultural structures, particularly religious structures along this alignment (**Appendix 2)**. The strip map was drawn as a result of the field surveys conducted along the alignment and show that no physical cultural resources will be encroached or affected.

5. Scheme 5 (Drain-4): Re-construction of drain with footpath along the Hospital road from Bypass to College road (Ch.0-920m)

54. **Drain Location***.* The subproject drain is 0.920km long alongside the Hospital road. It starts from Bypass road at Ch.0+00 km and ends at College road at Ch.0+920km (start coordinate: N 24^0 2’ 55.254”, E 90^0 14’ 13.250”) and (end coordinate: N 24^0 2’ 44.293”, E 90^0 13’ 47.743”).

55. **Drain Condition**. Major parts of the drain traverse through residential lots, trade and commercial and bazar areas. This drain 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 dwellers. Photos of existing condition of the subproject Drain are shown in **Figure 9**.

Figure 9: Photograph of Existing Condition of the Drain

	
Existing condition of drain with footpath at Ch. 600m	**Existing condition of drain with footpath at Ch. 125m**

C. Proposed Interventions or Development

1. Scheme 1 (Drain-1): Construction of drain from Kaliakoir Bus Terminal to Bangshi River at Bazar area (Ch.0-465m)

56. The proposed Drain will be constructed from Kaliakoir Bus Terminal (at Ch. 00m) to Bangshi River at Bazar area (at Ch.465m). As per design, the construction works will be done along the left side of the existing drain alignment and within available vacant width of the drain to remove the roadside rainfall and run-off stagnant water.

Scheme No.	Name of Scheme with Chainage	Type of Drain	Outfall at Ch. (Location)	Length of drain (m)	Position
1	Construction of drain from Kaliakoir Bus Terminal to Bangshi River at Bazar Area (Ch. 0-465m)	RCC Box Drain	Ch. 550m)	465	Left side of the alignment

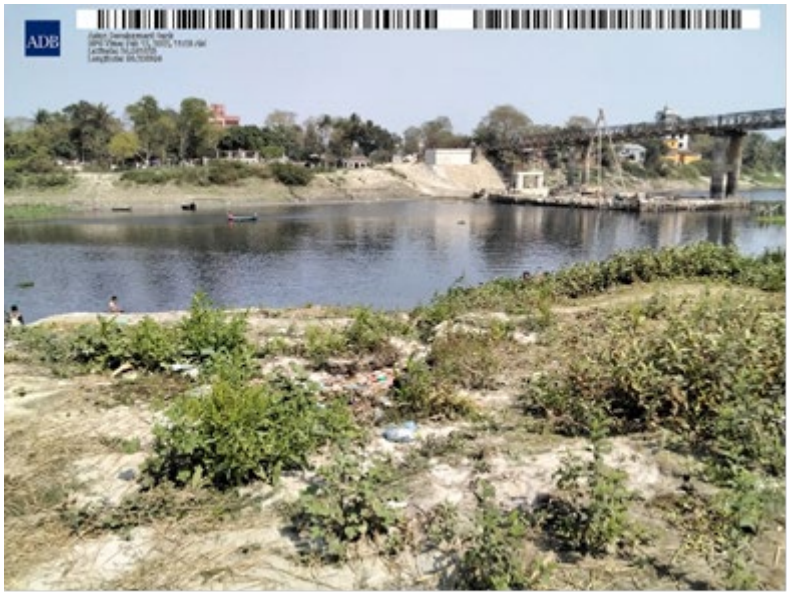
Photograph of the Outfall of the Drain at Bangshi River at chainage 550m

2. Scheme 2 (Drain-2): Re-construction of drain with footpath from Fulbaria road and Palpara road to Bangshi River (Ch.0-475m)

57. The proposed Drain will be constructed with footpath from Fulbaria road and Palpara road (at Ch.00m) to Bangshi River (at Ch.475m). As per design, the construction works will be done along the left side of the existing drain alignment and within available vacant width of the drain to remove the roadside rainfall and run-off stagnant water.

Scheme No.	Name of Scheme with Chainage	Type of Drain	Outfall at Ch. (Location)	Length of drain (m)	Position
2	Re-Construction of drain with Footpath from Fulbaria road and Palpara road to Bangshi River (Ch. 0-475m)	RCC Box Drain	Ch. 00m)	475	Left side of the alignment

Photograph of the Outfall of the Drain at Bangshi River at chainage 00m



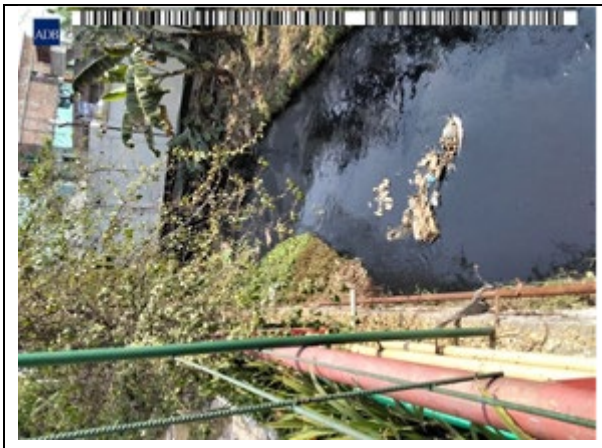
3. Scheme 3 (Drain-3 plus Road-1): Re-construction of drain from Pourashava Office to Bazar road via Bangshi River bridge (Ch.0-1075m & Ch. 2850-3875m) including 1000m link drain and 500m link road

a) Drain-3

58. The proposed Drain will be constructed with footpath from Pourashava Office to Bazar road via Bangshi River Bridge (Ch.0-1075 m & Ch. 2850-3875m) including 1000m link drain. As per design, the construction of the drain will be done through the Centre line of the existing drain alignment and within available vacant width of the drain to remove the roadside rainfall and run-off stagnant water.

The proposed Drain will be constructed with footpath from Pourashava Office to Bazar Road via Bangshi River Bridge (Ch.0-1075 m & Ch. 2850-3875m) including 1000m link drain. As per design, the construction of the drain will be done through the Centre line of the existing drain alignment and within available vacant width of the drain to remove the roadside rainfall and run-off stagnant water. An estimated 2320 sqm shore protection work has been considered In the design and included in the BoQ (*Ref: Drain Item no. 35 and Item Code 5.02.15).*

Scheme No.	Name of Scheme with Chainage	Type of Drain	Outfall at Ch. (Location)	Length of drain (m)	Position per alignment
3	Re-construction of drain from Pourashava office to Bazar road via Bangshi River bridge (Ch.0-1075m and 3075-4100m) including 1000m link drain and 500m link road	RCC open Drain	**<u>Section 3/1</u>** Ch. 1050m (in an existing drain, constructed under CRDP-1), **<u>Section 3/2</u>** Ch. 00m (in an existing drain), **<u>Section 3/3</u>** Ch. 3875m (in an existing drain), **<u>Section 3/4</u>** Ch. 500m (in an existing drain),	1025	Centre line
		Drain with Palisading Post		2075	Centre line

	
Outfall of the Drain at Ch.1050m in an Existing Drain (constructed under CRDP-1) **<u>Drain section 3/1</u>**	**Outfall of the Drain at Ch.00m in an Existing Drain** **<u>Drain section 3/2</u>**

	
Outfall of the Drain at Ch.3875m in an Existing Drain **<u>Drain section 3/3</u>**	**Outfall of the Drain at Ch.500m in an Existing Drain** **<u>Drain section ¾</u>**

b) Road-1

59. Proposed interventions planned for the Existing 500m Link Road under the Scheme 3 are as follows:

(i) Improvement of the existing BC link road, including shoulders on both sides of the road within the ROW;
(ii) Construction of RCC carriageway of 5.5 m width as per design, and it will include hard/soft shoulder/s or walkway/s on either side depending on the availability of vacant road width;
(iii) Pavement works comprising construction of sub-grade, sub-base, base binder course and wearing course;
(iv) Road improvement based on design that considers road safety requirement as per LGED published guidelines and standards;

4. Scheme 4 (Road-2): Improvement road from Mission road to Bypass road (Ch.1000-1475m)

60. Proposed interventions planned for the eexisting rroad from Mission road to Bypass road (Ch.1000-1475m) are as follows:

(i) Improvement of the existing road, including hard & soft shoulders on both sides of the road within the ROW;
(ii) Construction of BC carriageway of 5.5 m width as per design, and it will include hard shoulder/s or walkway/s and soft shoulders on either sides depending on the availability of vacant road width;
(iii) Pavement works comprising construction of sub-grade, sub-base, base binder course and wearing course;
(iv) Road improvement based on design that considers road safety requirement as per LGED published guidelines and standards;
(v) Protection works (palisading) to be undertaken for a segment of length 45m on the right side of the road embankment from Ch.1025 to 1070m (where ditches/pond are found, and this palisading shall protect road edges from being eroded or sliding.

Photograph of roadside protection site at Ch.1025m for the proposed road

5. Scheme 5 (Drain-4): **Re-construction of drain with footpath along the Hospital road from Bypass to College road (Ch.0-920m)**

61. The proposed Drain will be constructed with footpath along the Hospital road from Bypass to College road from Ch.00 to 920m. As per design, the construction of the drain will be done through the Centre line of the existing drain alignment and within available vacant width of the drain to remove the roadside rainfall and run-off stagnant water.

Cross sections of the schemes have been shown in Appendix-13 of this IEE.

Scheme No.	Name of Scheme with Chainage	Type of Drain	Outfall at Ch. (Location)	Length of drain (m)	Position per alignment
5	Re-Construction of drain with Footpath along the Hospital road from Bypass to College road (Ch. 0-920m)	RCC Open Drain	Ch. 920m	920	Centre line

. **Outfall of the Drain at Ch. 825m in an existing drain**

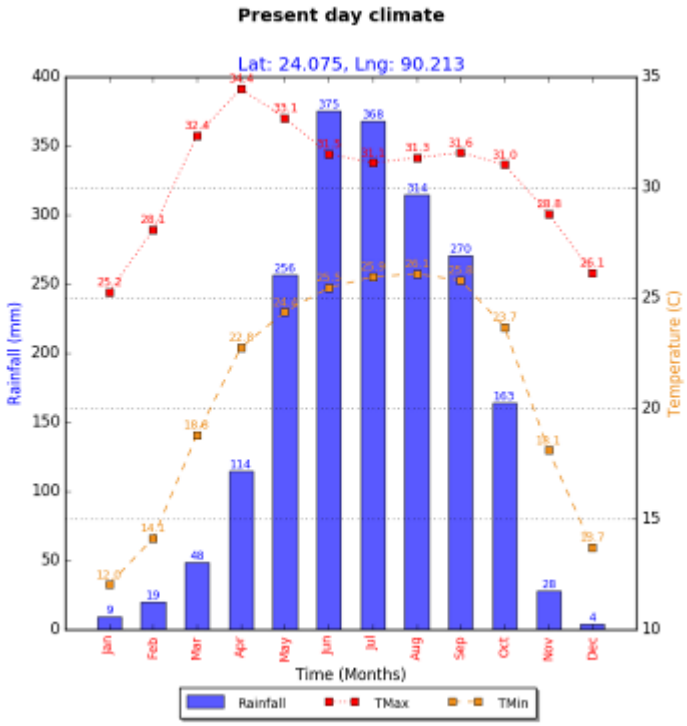
IV. DESCRIPTION OF THE ENVIRONMENT

A. Physical Resources

62. Location and Extent. The proposed subproject drains and roads are located in Kaliakoir Pourashava, which is in Gazipur District. Kaliakair Pourashava, having land area 27.28 sq. km is located in between 24'05' North and 90'10' East latitudes It is bounded by Sreefaltali and Mouchak Union Parishad on the north, Atabah Union Parishad on the south, Mouchak Union Parishad on the east, Sreefaltali Union Parishad on the west. Kaliakoir Pourashava was established in 2001 and consists of nine wards and 18 mahallas.

63. Topography, Soil and Geology. The area is relatively highland and a large part of which is free from normal seasonal flooding. The terrain of the area is sloping downwards to the south to southeast direction. The top soil consists of loam, silt, silty loam and very fine sandy loam that made it medium texture soil and semi-stable in Character. The area is under greater Dhaka district and lies in the southern part of the Madhupur Tract. Red soils of the Pleistocene Madhupur clay residuum usually form the surface of the Madhupur Tract. As the terrain is undulated with many depressions and low-lying areas, the area has water logging problem from rainwater as well as river water during wet season. The natural drainage system of the project site particularly because of existence of some low-lying marshy lands and depressions. Bangshi and Turag river are the two major drainage channels of the area, in which slowly draining canals Goala and Betjuri will transport surface runoff to the river Bangshi and Turag, and surface runoff also finds its way into the beels and low-lying depressions/basins.

64. Climate. The temperature maximum (Tmax) at Kaliakoir Upazila ranges from 25.2^0 C (in January) to 34.4^0 C (in April), and temperature minimum (Tmin) ranges from 12.0^0 C (in January) to 26.1^0 C (in August).The monthly rainfall averages 375mm (in June) in monsoon and 4mm (in January) in winter.



65. Air Quality and Noise Level. Air quality data for areas in and around the subproject sites are not available. During field visit, no particular problem with air quality could be noticed. The apparently good air quality is probably due to the fact that there are no big

industrial installations near the project site that could serve as a major source of air pollutants. To evaluate the existing condition of air quality contractor will perform the air quality test prior to construction, and also at the end of construction for comparing with the base situation. There was no existing noise pollution data of Kaliakair Pourashava area. High noise pollution has been observed in Kaliakair bus Terminal, Safipur Bazar road and Chandra Bus-stand (Source: The Final Master Plan of Kaliakair Pourasva, 2011). The baseline noise level will be measured by the subproject contractors prior to commencement of work. At the end of the construction, contractors will be required to conduct noise level measurements for confirming no deterioration of ambient noise quality. This is included in the environmental management plan.

66. Surface Water. There are two main river channels that drain the area. One is the Bangshi River on the north flows from west to east, and then connects the Salda River and then flows towards south that is located east of Kaliakoir Pourashava. Another one is the Turag River that is located to the west and flows from north to south. The subproject drainage system converges directly with the Turag and Bangshi River. The baseline surface water quality of the subproject canals will be tested before the commencement of the work, and the test results will be documented in the relevant SEMR.

- **Hydrology** The project site is located on the highland and the area is virtually free from normal seasonal flooding. However, as the terrain is undulated with some depressions and low-lying areas, the area suffers from water-logging problem resulting from accumulation of rainwater as well as from overflow of river water during wet season. The annual average rainfall in the area is 2130 mm. During heavy rainfall over extended periods, some parts of the Pourashava become inundated with 2 to 3 feet deep water. Accumulated water flows towards south-southeast and falls into the low-lying areas.

- **Water Quality:** The Rivers Turag and Bangshai are located within 5 km. of the project site. The rivers receive discharges from some industries located on or adjacent to their banks. These industries include dairy plant, textile dyeing and printing, jute and spinning mills, poultry firms, saw mills, rice mills and some small-scale chemical factories such as mosquito coils manufacturing factory. Most of these industries have no wastewater treatment plant and they discharge their wastewater directly into the rivers Bangshai and Turag. Besides, the river also receives domestic wastewater from the adjacent areas. Navigation activities including engine boating also add some pollution loads to the river, primarily in the form of lube oil, Mobil and grease

67. Ground Water. Groundwater is available in and around the subproject site. Manually operated hand pumps and power driven tube wells extract groundwater from a depth of 150 to 200 feet. 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

68. District Statistics 2011 of Gazipur district contains detail information of flora and fauna of the district as a whole. As Kaliakair Pourashava is a part of this district, the growing trees and plants in this Pourashava is obviously influenced by this district. Hence, relevant information from this document is used for documenting the ecological resources of Kaliakoir Pourashava,

1. Terrestrial Ecosystem

69. Terrestrial Flora. The subproject area includes rural households and villages, open

fields, artificial and natural water bodies, and some tree plantations. The proposed site is located on the highland with mixed plants, crop and vegetation. Crops cultivated at the site mainly include rice, other grains and vegetables. A significant number of different types of fruit trees with economic values have been observed in the project site. The fruit trees include jackfruits and mangos. There are also some other trees of economic values in the subproject site. Considerable amount of lower species trees and bushes in the subproject site provide habitats for birds and some animals. The composition of plant community includes low growing grasses and vegetation as well as other flora, some are well adapted to regular inundation with water. The data collected from environmental reconnaissance survey suggests that the predominant species are those of cultivated crops and trees

70. Terrestrial Fauna. The diversified habitat and ecosystem in the proposed subproject area support various types of local birds and animals. Nevertheless, a number of avian species were observed in the area including Pariah kite and House crow. Magpie Robin, the national bird of Bangladesh which is commonly known as “Doyel” is frequently found in the subproject area. In addition to the avian species, the habitat is likely to contain a variety of reptiles, mammals and invertebrates. These may include fox, rodent, rabbits, snakes, frogs, toad, lizards, tortoise, jackals, rats, shrew, squirrel, bats etc. No rare and endangered species of flora and fauna have been reported in the subproject. No wild animals inhabit the area.

2. Aquatic Ecology

71. Aquatic flora. Wetland and ditches of the subproject site provides a habitat for various hydrophytes and floating ferns that grow in abundance. Tall grasses present a picturesque site near the bank of rivers and the marshes. Different types of aquatic floral species were recorded in the subproject areas. The most abundant hydrophytes in the project area are Kochuripana or Water Hyacinth *(Eichhornia crassipes),* Topapana *(Pistia stratiotes),* Khudipana *(Lemna minor)* Pata Jhajii *(Vallisneria spiralis),* Shapla *(Nymphaea sp.),* Kolmi *(Ipomoea aquatica),* Helencha (*Altemathera philoxeroides*), and Duckweed *(Spiredella* sp.). Numerous algae (e.g. *Spirogyra* and *Scytonema)* and amphibian plant, Dhol kolmi (Ipomoea *fistulosa)* are also found in the in the low-lying marshy grounds and wetlands and roadside waterbodies of the subproject area.

72. Aquatic Fauna. The main aquatic faunas in this area are the different types of fishes. A few ponds that remain almost dry in the summer season in this area are used for cultivation of seasonal (wet season) fresh water fish. The fresh water fishes are mainly carp (Rui, Katal, Mrigel, Ghania, Kalibaus, *silver carp, grass carp, karpio* etc.), The stretch of the river Turag and Bangshi provides habitat for a wide variety of fishes as well. Tortoise, frogs, water snakes etc. are other aquatic fauna found in the subproject area

C Economic Development

73. Land Use. The major part (31.15%) of the Kaliakair Pourashava area is being used for residential purposes. Industrial use is the second highest land use of the Pourashava containing 15.36% of land. A large part (7.93%) of the land is occupied by the water bodies including one river. The industrial and commercial use occupied 20.46% and 1.94% of land respectively.

74. Industry and Agriculture. As per gathered information from Kaliakoir Pourashava, the livelihood of the people of Pourashava is primarily dominated by trade and business. The economy of the Kaliakair is predominantly commercial. However, service and agricultural activities also play significant role in the economy of this area. The income from non-farm establishments mainly comes from factories, saw mills, rice mills, construction, wholesale and retail trade, hotel and restaurant, transport and communication, bank, insurance and

financial institution, real estate and renting, community, social and personal services. There are about 60 nos. of industries. Noted manufactories Textile mill, saw mill, rice mill, ice cream factory. Cottage industries Goldsmith, blacksmith, weaving, potteries, bamboo work, wood work, tailoring. The prominent mills and factories include Transom Beverage Ltd, Interstoff Apparels Ltd, Ocotex Ltd, Devine group of Industries Ltd etc. The major agricultural and horticultural products include paddy, jute, sugarcane, mustard, potato, wheat, lentils, maize, chilly, sweet potato, spinach, sweet gourd, gourd, bitter gourd, bean, eggplant, cucumber, jackfruits, papaya banana and wax apple. Moreover, good quality milk and milk products including ghee (clarified butter) and sweetmeats are produced in the locality.

75. Infrastructure, Transport and Communications. The Pourashava data 2018 reveals that the Kaliakair Pourashava area is served by 199.89 km of road network. Among the total length of road network, 70 km is BC road, 13 km is RCC road, 91 km is HBB road, 25 km is earthen road and only 1 km is footpath. Also there are 13.5km Pucca Drain and 10.5km Kutcha Drain. Paurashava sources revealed the existing condition of roads 60-70% are in bad condition. As per provided information from Kaliakoir Pourashava, non-motorized transport (rickshaw, van, bicycle, etc.) dominates the traffic scene in the Paurashava where percentage of rickshaws and bicycles varies between 70 to 91% of the traffic. The Pourashava have an existing solid waste management system which include a 2 acre disposal site and 6 waste collection vehicles. They have a plan to construct a 10 acre waste disposal site in near future.

D Social and Cultural Resources

76. **Demography.** As per Pourashava statistics, the total population of Kaliakoir Pourashava is 7,00,000 of which male 3,13,416 & female 2,86,585; Muslim 231672, Hindu 34306, Buddhist 910, Christian 30 and others 85.

77. **Health and Educational Facilities.** There are a number of health facilities like Upazila health complex 1, maternity and child care center1, eye hospital 1, satellite clinic 1 and family planning center 1, Vet Clinic 1 etc. There are numerous educational facilities within the Pourashava. The Pourashava data 2018 reveals that there are 32 primary schools of which 10 are government and 20 are non-government, 6 colleges of which 2 are government and 9 are non-government, one government vocational or technical school, 2 governments vocational or technical colleges, 15 Hafijia madrashas and 2 Alia madrashas. According to the Population and Housing Census 2011, the literacy rate of the Pourashava is 48.4percent among the both sex where the literacy rate among the male is 54.9 percent and the femaleis 41.5 percent.

78. **Water Supply and Sanitation.** According to the Population and Household Census 2011, the most of the people (85.8%) of the Pourashava collect drinking water from tube well and 1% of the people from other sources. However, the Pourashava data 2018 reveals that there is no underground sewerage system in Kaliakair Pourashava area. High income people made their toilets with septic tank but there is no facility to clean the septic tank in Pourashava. Community sanitation facility is also limited here. There are five public toilets within Pourashava area which are installed by the Pourashava.

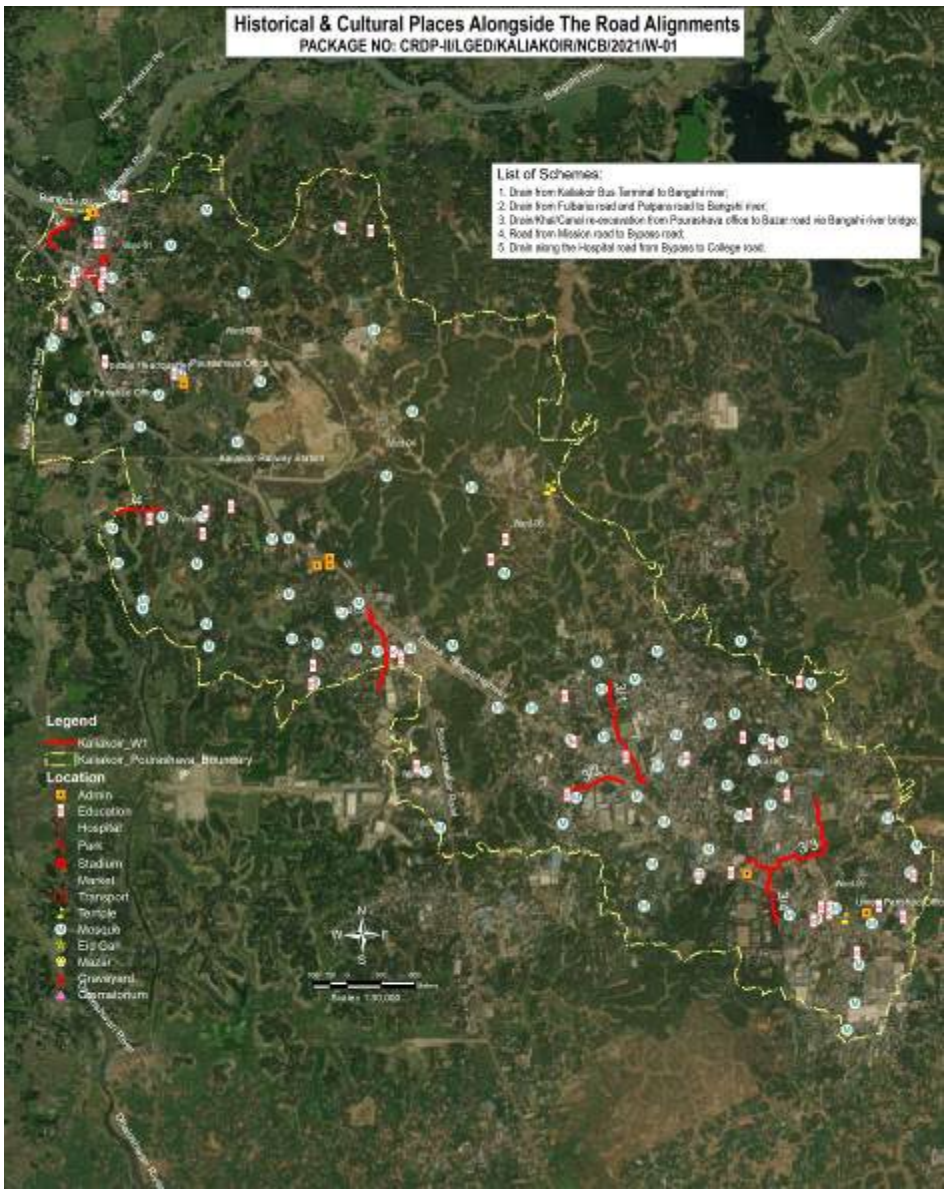
79. **Access to Electricity.** All the unions of the upazila are under rural electrification network.However, 37.79% of the dwelling households have access to electricity.

E History, Culture and Tourism.

80. Kaliakair Pourashava is very rich in cultural, historical and religious heritage. There are a number of places of interest within Paurashava area that can become attractions for

tourists from home and abroad. These may be broadly classified as heritages and recreational sites. Important heritages in and around the city include Amusement centres and Tourist spots Nandan Park, Shiddhimadhav Pillar, Ansar VDP Academy, Bangladesh Scouts' National Training Centre, Baliadi Zamindar Bari, Sreefaltali Zamindar Bari, Talibabad Satellite Ground Centre. Cultural organisations Library 38, club 132, cinema hall 2, theatre group 5, women society 6. A map showing the locations of these points of interest are in **Figure 10**.

Figure 10: Map Showing Location of Heritage Sites in Kaliakoir



F Baseline and Projected Climate.

81. A climate change vulnerability and disaster risk assessment was conducted for the various subprojects under Second CRDP. Results of this assessment have been used to design the various subprojects, including the Kaliakoir Pourashava roads and drains subproject package W-01. The baseline climate and future projection at 2050 Tmax and Rainfall for Kaliakoir for RCP 6.0 are shown in Table 8 which demonstrate that the temperature is expected to increase in the future. Changes of both temperature and rainfall

are shown in Table 9.

Table 8: Baseline data and projection for 2050 of Tmax and Rainfall for Kalikoir

Month	Baseline		Future	
	Max Temp (degree C)	Rainfall (mm)	Max Temp (degree C)	Rainfall (mm)
January	26.0	9	29.3	10
February	28.7	20	30.1	24
March	32.4	57	33.5	57
April	34.5	144	35.6	177
May	33.4	258	34.0	275
June	31.9	381	32.6	407
July	31.1	379	32.0	431
August	31.4	325	32.3	330
September	31.7	257	33.3	205
October	31.3	157	33.5	158
November	29.1	35	31.1	39
December	26.6	5	29.6	0
Year	30.7	2027	32.2	2113

Table 9: Changes of Tmin and Tmax (0C) and Rainfall (mm) in Kaliakoir

Month	**Tmin**	**Tmax**	**Mean**	**Rainfall**	**% Change in rainfall**	**Seasonal**
Jan	2.2	3.3	2.75	1	11	0% (DJF)
Feb	1.6	1.4	1.5	4	20	
Mar	1.3	1.1	1.2	0	0	11% (MAM)
Apr	2.3	1.1	1.7	33	23	
May	1.6	0.6	1.1	17	7	
Jun	1.1	0.7	0.9	26	7	7 % (JJA)
Jul	1.6	0.9	1.25	52	14	
Aug	1.4	0.9	1.15	5	2	
Sep	1.5	1.6	1.55	-52	-20	-10%(SON)
Oct	2.5	2.2	2.35	1	1	
Nov	1.8	2	1.9	4	11	
Dec	1.1	3	2.05	-5	-100	

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82. For roads, 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 road foundation stability (footnote 4).

83. Hot days temperature is also an important road design consideration, particularly for asphalt roads, due to its effect on stiffness of the pavement. The stiffness modulus of asphalt is affected by temperature. Migration/bleeding of liquid asphalt is a concern at sustained air temperatures above32°C.For concrete roads, the range of temperature variation determines the proper width of joints, including the composition of the joint sealants (footnote 4).

84. For bridges, the critical design parameter derived from precipitation and catchment characteristics is flood level, which determines the required vertical clearance of the bridge deck.

85. It is to mention that the changes, in projected monthly temperature and precipitation, when presented in comparison to the historical mean, will help the engineers, planners and designers to design projects more effectively with precision.

V. ASSESSMENT OF ENVIRONMENTAL IMPACTS AND MITIGATIONMEASURES

A. Compliance with subproject selection criteria

86. The subproject was selected based on the selection criteria in the environmental assessment and review framework (EARF) of Second CRDP. **Table 10** below is a summary of the assessment of compliance with the subproject selection criteria under Second CRDP.

Table 10: 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 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. Ensures detailed designs and environmental safeguards conditions are included in the planning.	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. Anticipated Impacts and Mitigation Measures - Planning, Location and Design Phase

87. **Impacts Due to Location.** The subproject does not involve any special considerations regarding planning and location, since all of the components involve construction of drain, slope protection, reconstruction of road and drain with footpath. These improvements will take effect within the 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

88. In this drainage subproject, there are minor impacts that result from the planning, designor location, because:

- The drain improvements are confined within the existing drai/khal boundary;
- No additional acquisition of land will be required;
- If cutting of trees will be needed, compensatory plantation for trees lost will be implemented;
- 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 drain;
- Drain/road alignment is neither passing through nor near any ecological sensitive area like forests, reserve forest, National Park or wildlife sanctuary;
- There is no negative impact on water body;
- There is no negative impact on any water supply source like tube wells/handpumps, wells, etc.;
- There is no negative impact on any community structure;
- There is no negative impact on irrigation structures;
- There is no negative impact on religious structures;
- There are no historical/archaeological sites along the drain/road alignment;
- The subproject involves straightforward construction and rehabilitation activities, so impacts will be mainly localized and not significant; and
- Construction and rehabilitation activities will be undertaken within public rights-of- way, and no land acquisition and encroachment on private property will arise.

89. **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.

90. According to the 4th Intergovernmental Panel on Climate Change Assessment Report,[10] 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.

91. 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 widening activities should also consider any social safeguard implications; and

(iv) 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.

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 11** below. An indicative cost for climate resilient features, estimated approximately 20% of the overall design cost.

[10] 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.

Table 11: Issues, Concerns and Mitigation Measures During Design Phase

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsibility
Detailed design			
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 Kaliakoir drain/Khal	Not properly designed outlets will wash down silts and solid wastes, from community canals straight to the Kaliakoir drain/Khal. This will cause heavy accumulation of silts and solid wastes in the Kaliakoir drain/Khal in the medium to long term. 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 Kaliakoir drain/Khal. This will eventually pollute the Bangshi River.	Integrate in the design provision for sedimentation or siltation chamber (or similar structure) at each outlet of community canals along the Kaliakoir Khal. Ensure that the design will provide space for maintaining these chambers during the operation and maintenance (O&M) phase. Ensure that appropriate ordinances are in place and implemented that prohibit the discharge of domestic wastewater and septic tank effluents to the community canals.	PMCU, PDSC, Kaliakoir 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	Incorporate in the design safety protection along the drainage canals, especially at sections located in the town center and residential or commercial areas. Ensure to include in the design the following: (i) signages in critical areas of the drainage canal; (ii) barricades or similar structures in	PMCU, PDSC

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsibility
		accident-prone areas; and (iii) railings, among others.	

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

Project Activity	**Potential Environmental Impacts**	**Proposed Mitigation Measures**	**Responsibility**
		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 Pourashava. 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. Anticipated Impacts and Mitigation Measures – Construction Phase

92. 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 theinvasive 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

93. 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. The contractor will provide detail information for labour requirement, construction materials, and construction equipment and implementation schedule before commencement of the work.

94. **Non-Compliance with Environmental Legislation:** This issue will arise when there is alack of awareness among subproject staff and management of environmental safeguard requirements, compliance with the requirements, conditions specified in the IEE report, approvalstatus, and consent.

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

2. Impact on Physical Resources

96. **Topography, Soils and Geology**. The subproject area is a plain land, so there will be no impact on topography. The interventions for the subproject construction activities is on the shallow layer of earth surface and there is no requirement pumping water from deep soil, so there will be no impact on geology.

97. **Sources of Materials**. Significant amount of gravel, sand and aggregate, will be requiredfor this subproject. The contractor will be required to:
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;
No new quarry sites shall be used for the subproject;
Verify suitability of all material sources and obtain approval of implementing agency; and
Document all sources of materials and include in the monthly reporting to the PIU.

98. **Surface Water Quality.** The civil works will have direct impact to surface water quality ofBangshi River since these are location in the Kaliakoir drain/khal. The construction works will expose the Bangshi 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 Bangshi river.

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

- follow World Bank's Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities;[17]
- dispose excess spoils per the Spoil Management Plan attached in (Appendix 3)
- locate temporary storage areas on flat grounds and away from any surface drainage routes (ideally at least 100 m from surface water);
- shield temporary storage areas with sandbags;
- provide adequate water supply and sanitation facilities at work sites;
- provide impervious bunded areas with 110% volume for storage of petroleum products used during construction, such as fuel, oils, and lubricants;
- 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
- ensure no refueling within 100 m from surface water.

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

- follow World Bank's EHS Guidelines on Construction and Decommissioning Activities (footnote 17)
- collection of recyclable solid wastes and supply to scrap vendors;
- 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 receivingwater;
- 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

- consultation with PIU on the proper disposal of all residual wastes.

100. **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. The contractor will identify the intake of the water to be used in the works during construction.

101. 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:

- follow World Bank's EHS Guidelines on Construction and Decommissioning
- Activities (footnote 17);
- 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
- no toilets shall be put up within 500 m from groundwater wells, if any.

102. **Air Quality**. While most construction works will be conducted during the dry season, thereis 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) 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 (v) burning of firewood for cooking and heating in work and labor camps.

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

- follow World Bank's Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities (footnote 17);
- confine earthworks according to excavation segmentation plan that should be partof site-specific environmental management plan (SEMP);
- prepare and implement a dust management plan that should be part of the SEMP;
- consult with PIU on the designated areas for stockpiling of sand, gravel, and other construction materials (ideally about 500 m from residential areas);
- bring construction materials (aggregates, sand, etc.) to the construction site as and when required to avoid heavy stockpiling at the sites;
- damp down with water dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary;
- if re-surfacing of disturbed roads cannot be done immediately, spread crushed gravel over backfilled surfaces;
- during demolition, water exterior surfaces, unpaved ground in the immediate vicinity and demolition debris;
- place signage at active work sites in populated areas;
- require trucks delivering aggregates and cement to have tarpaulin cover;
- clean wheels and undercarriage of vehicles prior to leaving construction sites;
- limit speed of construction vehicles on access roads and work sites to a maximumof 30 km per hour;

[17] IFC World Bank Group. 2007. *Environmental, Health, and Safety (EHS) Guidelines – General EHS Guidelines: Construction and Decommissioning.*

- prohibit burning firewood in work and labor camps (promote liquified petroleum gas for cooking purposes and electric heater for heating purposes);
- use vehicles that have government-issued permits and registrations; and
- prohibit open burning of solid waste.

104. **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.[18] The comparative illustration of national standards versus WHO guidelines is in Table 4 in Section II hereof.

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

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

106. **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.

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

- dispose excess spoils per the Spoil Management Plan attached in Appendix 3;
- avoid stockpiling of excess excavated soils as far as possible;
- avoid disposal of any debris and waste soils in or near water bodies/rivers;
- coordinate with PIU for beneficial uses of excess excavated soils or immediately dispose to designated areas;
- recover used oil and lubricants and reuse or remove from the sites;
- manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; and
- remove all wreckage, rubbish, or temporary structures which are no longer required.

108. **Disposal of spoils and debris.** Consistent with the Spoil Management Plan, all dredged or excavated silts and soil from the Kaliakoir 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:

- 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;
- Handle and haul the non-biodegradable wastes and hazardous materials separately from the excavated soil;
- Dispose spoils immediately and avoid stocking for longer period to prevent potential nuisance and complaints;
- 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
- Utilize haulers that are authorized to handle and transport these kinds of wastes.

109. For the disposal of subproject excavated spoils, the contractor shall submit the Spoil management plan showing disposal site before commencing of the work. It is to point out that excavated spoil from the the subproject drain/khals will be re-used in slope protection of subproject drain/khals. The cost for disposing excavated soils has been included in the Bo

3. Impact on Ecological Resources.

110. While various flora and fauna resources are found in the subproject pourashava, 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.

111. **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. However, the subproject area does not include any forest, so the impacts to flora and fauna will be minimal. Mostly perennial shrubs and grasses grow in the subproject area and these are common local plants in Bangladesh and not protected species. For trees found along the alignments that will be used for footpaths or drains, the design will ensure that these trees will not be cut.

112. To mitigate the impact of tree cutting, contractors will be required to:

- avoid, or minimize when avoidance is not possible, tree cutting;
- 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 4** for LGED Tree Plantation Program);
- protect giant trees and locally-important trees (for religious reasons), if any, during implementation;
- prevent workers or any other person from removing and damaging any flora and fauna found in the subproject sites; and
- prohibit employees and workers from poaching animals and cutting of trees for firewood at the subproject sites or their vicinities.

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

113. **Aquatic Ecology.** The subproject sites are comprised of drain/khal and road under the Kaliakoir Pourashava. The khal/canal of the subproject area is ultimately connected to the Bangshi river. This river is used by many locals for fishing, either for domestic consumption or livelihood. All aquatic species found at the Bangshi river are not protected species. Nevertheless, the construction of the subproject may affect Bangshi river due to siltation and therefore may impact the quality of the water and eventually the productivity and harvest of these aquatic resources.

114. To mitigate this impact, contractors will be required to:

- provide temporary protection at sections adjacent or near ponds or khals to avoid sliding of soils;
- avoid excavation and other civil works during monsoon season;
- store spoils away from the drain/canal to avoid being washed down back to the canal(ideally at least 100 m from the surface water); and
- not undertake construction works near these sites during the spawning and breeding period between June and September.

4. Impacts On Physical Cultural Resources.

115. The subproject will not encroach or run over into any physical, and cultural resources**.** Aswell, 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:

- strictly follow the protocol by coordinating immediately with Kaliakoir PIU and Bangladesh Department of Archaeology for any suspicion of chance finds during excavation works;
- stop work immediately to allow further investigation if any finds are suspected; and
- 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.

5. Impacts On The Socioeconomic, Environment And Resources.

The impacts will result from excavation works, 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).

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

(i) Prepare 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.

117. **Community health and safety hazards**. The civil work for road construction or rehabilitation include earth excavation or opening of trenches, and such activities may lead to short-term negative impact to community health & safety. For consequential mitigation measures, excavation and construction activities will be done through segmentation planning with around 100m-200m per segment or stretch. This will ensure that impacts can easily be managed by the contractor. The contractor will provide detail implementation schedule before start of the work. However, to mitigate the impacts on mobility of people, goods, and services; accesses to properties, economic activities, and social services, the contractor will be required to implement its approved site-specific EMP (SEMP) which includes a community health and safety plan. Besides SEMP, Environmental Management Plan Matrix (Table 13) may be consulted as it also includes impacts and mitigation measures for community health and safety. The indicative cost for mitigation measures related to community health & safety has been included in the Tentative EMP Budget for BOQ (Item 16 of Table 16).

118. 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.[11] 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 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 excavation and construction activities will be done in segments around 100-200m per segment; 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.

119. **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. Further to mention that the contractor will

[11] https://www.ifc.org/wps/wcm/connect/3aa0bc8048855992837cd36a6515bb18/4%2BConstruction%2Band%2BDecommissioning.pdf?MOD=AJPERES

prepare Site Specific COVID-19 H&S Plan following the guidelines/instruction of ADB and Government of Bangladesh before the commencement of the work.

120. 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. 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. Anticipated Impacts and Mitigation Measures-Operation and Maintenance Phase

121. Once completed, the subproject drain/canal will provide beneficial environmental impact to the Pourashava and its population. Needless to say that potential flooding will be avoided and improved aesthetic or landscape will be expected.

122. However, these beneficial impacts will not be sustained if no proper operation and maintenance is in place. Hence, Kaliakoir *pourashava* as PIU will need to undertake the following actions to ensure that the subproject operates sustainably:

- Establish a program of regular visual inspection to identify problems early, before they become critical (breakage, plugging, etc.);
- 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
- Include in the *pourashava* budget a permanent allocation for undertaking the above tasks.
- Regular cleaning and maintenance of drains and proper solid waste management.

VI. CONSULTATION, INFORMATION DISCLOSURE, AND GRIEVANCE REDRESS MECHANISM

A Consultation

123. 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.

Approach and Methodology for Consultation: The approach undertaken for information disclosure and consultation involved the following keyprocesses:

• Identification of key stakeholders such as primary (direct project influence) and secondary (indirect project influence) stakeholders;
• Undertaking expert consultations, interviews and focus group discussions (FGD) with the respective stakeholders;
• Undertaking structured on field consultations, interviews and focus group discussions (FGD) with the respective stakeholders;
• Assessing the influence and impact of the project on these stakeholder groups;
Summarizing of key findings and observations from the consultations;

124. **Preliminary Consultation.** Public consultations were conduct on 07 December 2021 which was attended by various stakeholders. The summary of consultation meeting and attendance is attached as **Appendix 5**. The following are some of the concerns discussed:

- The consultees will support the project activities;
- With the heavy traffic congestion in the town, the consultees believe that the project will bring benefit to the people residing along the roads;
- 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;
- 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;
- It was confirmed with the local stakeholders that there is no protected areas in and around the project areas; and
- 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.

125. **Future consultations during final detailed design stage**. The stakeholder consultations will continue to discuss about the subproject, including the implementation of the EMP and SEMP developed for the subproject. PMCU, Kaliakoir PIU and PDSC will ensure that consultations will be conducted as meaningful per definition of ADB SPS, 2009 (footnote 6). The Kaliakoir PIU, PDSC and contractors will ensure that public consultations will include representatives from all institutional establishments found along the subproject alignment vicinity such as schools, hospitals, religious establishments and mosques.

B Information Disclosure

126. 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:[12]

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

127. 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.

128. 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 Kaliakoir 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 Kaliakoir 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

129. Second CRDP 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. The contractor will bear the cost for resolving any grievances. The GRM will be implemented in three levels. See **Figure 11** for the outline.

130. **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 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

[12]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."

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 **Appendix 6**. The suggested format for record-keeping of grievance is in **Appendix 7.**

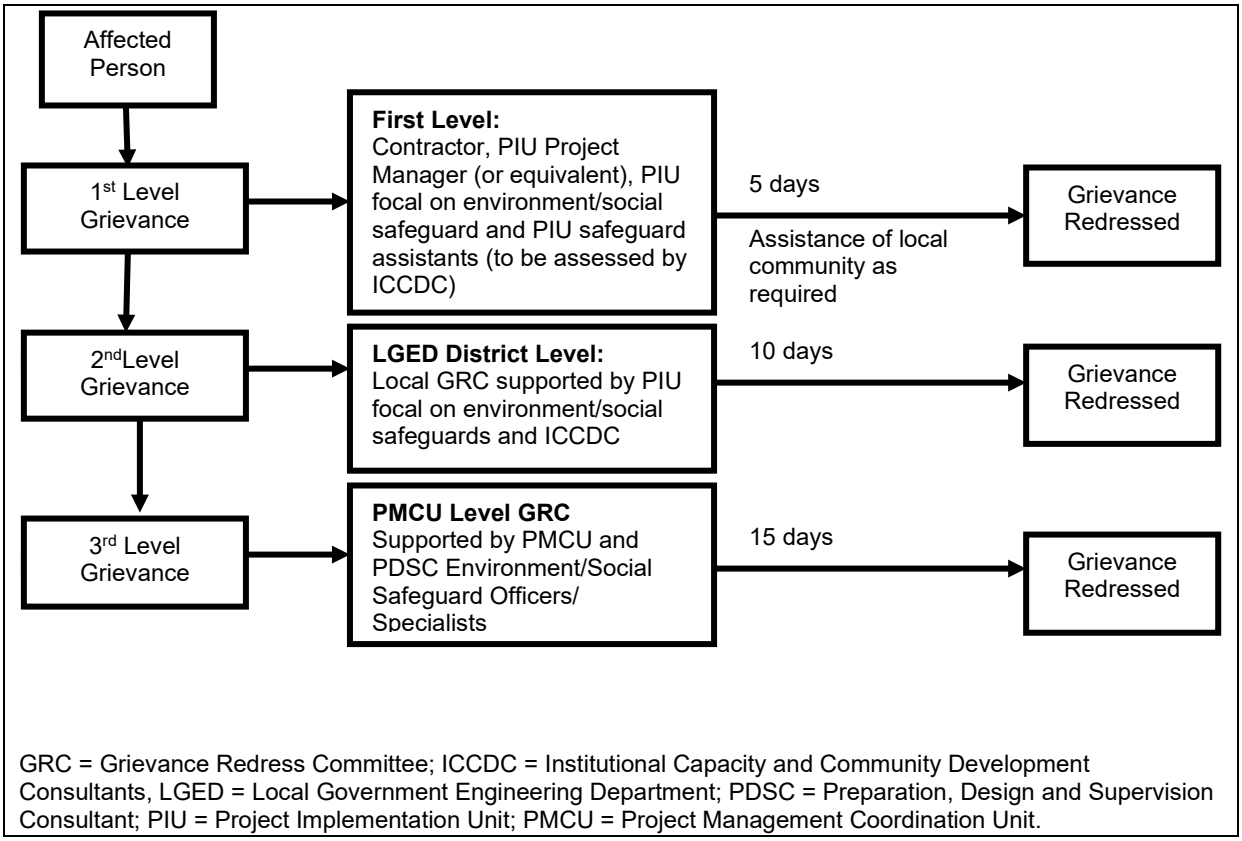
131. **Second Level**. Should the grievance remain unresolved, the PIU Project Manager (or equivalent), will activate the second level of the GRM by referring the issue (with written documentation) to the local Grievance Redress Committee (GRC) of the Pourashava or City Corporation, who will, based on 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.

132. 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.

133. **Third Level**. Should the grievance still 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.

134. 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 11: Project Grievance Redress Mechanism[13]



GRC = Grievance Redress Committee; ICCDC = Institutional Capacity and Community Development Consultants, LGED = Local Government Engineering Department; PDSC = Preparation, Design and Supervision Consultant; PIU = Project Implementation Unit; PMCU = Project Management Coordination Unit.

135. 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.

136. In the event that 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.

137. If any grievance related to environmental safeguards issues (like dust generation/pollution, hindrance to pedestrian/vehicular movement, water accumulation at places, haphazard keeping of construction materials at roadside etc.) is raised by community people, such grievances are commonly resolved quickly at the field/local level (1st Step of already established GRM under the project). These type of non-formal complaints are resolve through interaction with complainants and PIU with the help of Environmental/Social safeguard Consultants. As the lodged complaints are mostly linked to the construction works, Contractors are to rectify those and will bear the necessary cost.

[13]Outline adopted from GRM of CRDP, and revised to conform with new arrangements and nomenclatures of Second CRDP.

VII. ENVIRONMENTAL MANAGEMENTPLAN

A. Institutional Arrangements

138. **Project Management Coordination Unit**. LGED is the executing agency responsible for overall guidance of Second CRDP and implementation of urban roads and solid waste management subprojects. The PMCU, headed by a Project Director will be responsible[14] for planning, management, coordination, supervision and progress monitoring of Second CRDP 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. To ensure effective implementation of the environmental aspects, one full-time environmental safeguards officer who is a permanent employee of LGED has been assigned at PMCU. The environmental safeguards officer is primarily 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 assists the PMCU in this regard.

139. **Project Implementation Unit**.. The Kaliakoir 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. Kaliakoir PIU has already assigned one environment support 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 Kaliakoir PIU will prepare quarterly progress reports on all aspects concerning environmental assessment, management, monitoring, and report to the PMCU.

140. **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 Kaliakoir 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 Kaliakoir PIU.

141. **Contractors**. The contractors of subprojects will have specific roles in the implementation of the EMPs. Each contractor shall have at least one environmental health and safety supervisor (or equivalent) responsible for implementing applicable measures in the EMP. All these specific roles and responsibilities will be defined in the IEE reports, which shall form part of the contract documents. Kaliakoir PIU will monitor contractors’ environmental performance.

142. **Table 12** summarizes the overall roles and responsibilities of PMCU, Kaliakoir PIU, and ADB. More specific roles and responsibilities of these institutions, including the roles and responsibilities of PDSC and contractors are defined in the Project Administration Manual and in the Contract Documents.

[14]PMCU responsibilities shall include management of (i) Local Government Grant facility, (ii) Investment components under the Second CRDP, and (iii) Institutional Strengthening and Capacity building of the local governments. The Second CRDP PMCU will be advised by a Technical Advisory and Selection Committee and an Urban Management Support unit.

Table 12: Institutional Roles and Responsibilities

Project Management Coordination Unit	Project Implementation Unit	Contractor	ADB
Pre-construction stage			
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 assistthe 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 findingsinto 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 clearanceby 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	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		ADB to ensure that the clearance requirements are included in the contract provisions/EMP.

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.	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.		
Environmental officer of PMCU to ensure that the IEE containing the EMP of each subproject is included in the bid and 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 environmental support staff of PIU to ensure that: (i) each contractor prepares its SEMP based on the EMP in the subproject IEE, and (ii) budget is included in the SEMP.		
Construction stage			
PMCU to review 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.	Contractors to prepare /implement Site-specific Environmental Management Plan (SEMP) (covering haul routes, spoil sites, dust/erosion control, workers housing, Community health & safety, Workers Health & Safety etc.). Further contractors are to minimize negative impacts of construction on community environment, provide basic guarantees for construction workers. In order to implement the subproject work in an environmentally sound manner, the contractor to conduct close supervision and monitoring at regular intervals. The contractor to prepare Site-specific COVID-19 Health and Safety	ADB to review the reports and provide necessary advice/guidance needed to the PMCU.

		Plan before start of construction.	
Operation Stage			
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, MDSC = Management, Design, and Supervision Consultant, NOC = no objection certificate, PIU = Project Implementation Unit, PMCU = Project Management Coordination Unit, REA = Rapid Environmental Assessment, SPS = Safeguards Policy Statement.

B. Environmental Management Plan

143. An environmental management plan (EMP) has been developed to provide mitigation measures to reduce all negative impacts to acceptable levels. The Environmental Management Plan Matrix is presented in **Table 13**.

144. The EMP will guide the environmentally-sound construction of the subproject and ensure efficient lines of communication between PMCU, Kaliakoir PIU, 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.

145. 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. The contractor will prepare Site-specific COVID-19 Health and Safety Plan before commencement of construction following the guidelines of ADB and Government of Bangladesh.

Table 13: Environmental Management Plan Matrix

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Design and Pre-Construction Phase					
1. Consents, permits, environmental clearances, etc.	Failure to obtain necessary consents, permits, and other appropriate regulatory clearances i.e environmental Clearance Certificate (ECC) 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.	PMCU, Kaliakoir PIU, and PDSC	Incorporated in final design and communicated to contractors.	Before award of contract
2. 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. • As the improvement works of the subproject roads will take place within the vacant road width so, no existing utilities will be affected. • Require construction contractors to prepare a contingency and spoil management plan.	PMCU, Kaliakoir 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)
3. Storm water runoff and conveyance of pollutants.	Besides stormwater, silts, solid wastes, domestic wastewater and septic tank effluents from within the residential and commercial establishments may enter the subproject Khal and pollute the Bangshi River. Also, the silts and solid wastes from the community canals may be washed down to the subproject khals, which could result to heavy siltation of the Khal and obstruct flow along the khal in the medium to long term.	The design to consider the following: • The inlet design to ensure that only storm or rain water flows into the drainage system; • Prevent households from connecting outlets of septic tanks and grey water to the community canals; • Provide siltation or sedimentation chambers (or similar structures) at all outlets of community canals along the Subproject Khal to prevent accumulation of silts and solid wastes in the said canal. • This will also prevent potential pollution of the Bangshi River; and Position the outlets of community canals enough to have space for the provision of siltation or	PMCU, PDSC, Kaliakoir Pourashava	Incorporated in the drainage master plan and in the final detailed design. Testing of water quality of subproject khal	During detailed design phase During post construction phase Once in a year (Kaliakoir Pourashava will bear the cost)

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		sedimentation chambers (or similar structures), including accessibility during operation and maintenance (O&M) phase.			
4. Construction work camps, stockpile areas, storage areas, and disposal areas	Disruption to traffic flow and sensitive receptors	Determine locations before award of construction contracts.	Kaliakoir PIU and PDSC	List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas. Written consent of landowner/s (not lessee/s) for reuse of excess spoils to agricultural land.	During detailed design phase
5. Waste generation	Generation of solid waste, wastewater from labor camp and other construction waste may cause pollution	• Follow the principle of "Reduce, Reuse, Recycle, and Recover" • Prohibition of unwanted littering and discharge of waste. • Solid waste is managed and disposed through the municipal collection system. • Develop a plan for waste management prior to commencing of construction and get approval from PIU.	Contractor	Contractor's records. Visual inspection.	Visual inspection by Kaliakoir PIU on monthly basis
6. Sources of raw materials	Extraction of materials can disrupt natural land contours and vegetation resulting in	Prepare list of quarry sites and approved sources of materials.	Kaliakoir PIU and PDSC	List of approved quarry sites and sources of materials; (ii) Bid	During detailed design phase, with a discussion with

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	accelerated erosion, disturbance in natural drainage patterns, resulting water logging, and water pollution			document to include requirement for verification of quarry sites	detailed design engineers and Kaliakoir PIU on the suitability of sources and permit for additional quarry sites if necessary.
7. EMP Implementation Training	Impact to the environment, workers, and community	Project Manager and Contractor should be trained on EMP implementation, including spoils management, traffic management, community and occupational health and safety, COVID-19 health & safety, Bangladesh Labor Act, and other standard operating procedures.	PMCU, Kaliakoir 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
8. Environmental baseline data for parameters air quality, noise level, water quality etc.	Failure to establish the environmental quality benchmark for subsequent monitoring would lead to an absence of yardstick to compare to and thus analyze the magnitude of the impact from subproject construction activities	Analyze and gather baseline environmental data (Ambient air quality (PM10, PM2.5, NOx, SOx & CO); Surface water (pH, DO, Cl- BOD5d, COD, NH4/NO3, TSS, TDS & total coliform); Ground water quality (pH, DO, Cl-, EC, As, NO3 BOD5d, COD,);and Noise level	Contractor, Kaliakoir PIU, and PDSC	Testing of Ambient air quality; Surface water quality ; Ground water quality and Noise level	Once before construction activities commence (sampling will take place at the start and end part of the drains
During Construction Phase					
A. Physical Characteristics					

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
9. Topography landforms, geology, and soils and river morphology and hydrology	Sand, gravel or crushed stone will be required for this subproject. Extraction of natural aggregate materials may cause localized changes in topography and landforms (if on land) or river morphology and hydrology (if on the river).	• 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 Development Board for sand quarrying. • No new quarry sites shall be used for the subproject. • Verify suitability of all material sources and obtain approval from implementing agency. • Document all sources of materials and include in the monthly reporting to the PIU.	Contractor	Records of sources of materials.	Kaliakoir PIU on a monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
10. Construction of component of the subproject (Bridge, sluice gate, walkway etc.)	Construction related impact Dust emission Noise pollution Pedestrian and vehicle movement	• Cover exposed loose dry soil and wastes materials before disposal; • Ensure re-use of the solid wastes and other forms of the wastes materials that are suitable for re-use; • Disposal of un-used soil, unsuitable materials and construction wastes at designated dump site. • Operate the hydraulic excavator carefully; • Maintain adequate moisture content of soil and sand during transportation, and handling; • Use cover for carrying sand and soil. • Avoid prolonged exposure to noise (produced by equipment) by workers. • Avoid operation of the concrete mixer and vibrator machine at night; • Regular maintenance of the concrete mixer and vibrator machine to avoid any black smoke emission. • Inform local people about casting work and potential impacts.	Contractor	Contractor records for EMP implementation at worksites.	Kaliakoir PIU on a monthly basis
11. Water quality	Pollution of Bangshi 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.	• Dispose excess spoils as per the sample Spoil Management Plan attached in **Appendix 3** of IEE. • Locate temporary storage areas on flat grounds and away from any surface drainage routes (ideally at least 100 m from surface water). • Shield temporary storage areas with sandbags. • Provide adequate water supply and sanitation facilities at work sites. • Provide impervious bunded areas with 110% volume for storage of petroleum	Contractor	Areas for stockpile storage of fuels and lubricants and waste materials. Number of silt traps installed along trenches leading to water bodies. No visible degradation to nearby drainage, water bodies due to construction activities.	Visual inspection by Kaliakoir PIU and PDSC on weekly basis Frequency and sampling sites to be finalized.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		products used during construction, such as fuel, oils, and lubricants. • Provide orientation and training to assigned workers on the correct handling of petroleum-based products, cleanup of equipment, and response measures in case spills or emergencies. • Ensure no refueling within 100m from surface water.		Results of river water quality testing.	
12. Groundwater quality	Pollution of groundwater resource due to potential seepage of construction chemicals such as fuels and temporary latrines at construction camps.	• 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. • Provide portable toilets at construction camps and ensure handling of the septic waste will be done by authorized transporters. If pit latrine is to be used, contractors to ensure it follows the guidelines set by the government on installation of latrines and/or follow international best practice requiring latrines to be least 30 m from any receiving body of water or drinking water source depending on the type of soil in the area.	Contractors	Areas for stockpile storage of fuels and lubricants. Availability of sanitary latrines at construction camps.	Visual inspection by Kaliakoir PIU and PDSC on monthly basis
13. 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	• Confine earthworks according to excavation segmentation plan that should be part of site-specific environmental management plan (SEMP). • Consult with PIU on the designated areas for stockpiling of sand, gravel, and other construction materials. • Bring construction materials (aggregates, sand, etc.) to the construction site as and when required to avoid heavy stockpiling	Contractor	Location of stockpiles; Number of complaints from sensitive receptors; Heavy equipment and machinery with air pollution control devices; A certification that vehicles are compliant with air quality	Visual inspection by Kaliakoir PIU and PDSC on monthly basis Frequency and sampling sites to be finalized.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	from construction vehicles and burning of fuels from labor camps may contain pollutants such as carbon monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons that are dangerous to human health.	at the sites. • Damp down with water dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary. • If re-surfacing of disturbed roads cannot be done immediately, spread crushed gravel over backfilled surfaces. • During demolition, water exterior surfaces, unpaved ground in the immediate vicinity and demolition debris. • Place signage at active work sites in populated areas. • Require trucks delivering aggregates and cement to have tarpaulin cover. • Clean wheels and undercarriage of vehicles prior to leaving construction sites; • Limit speed of construction vehicles on access roads and work sites to a maximum of 30 km/h. • Prohibit burning firewood in work and labor camps (promote liquified petroleum gas for cooking purposes and electric heater for heating purposes). • Use vehicles that have government-issued permits and registrations. • Prohibit open burning of solid waste.		standards. Results of ambient air quality testing.	
14. Acoustic environment	Noise level at the construction sites and their vicinities may be elevated due to construction activities. This will 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	• Provide prior information to the local public, including institutions such as schools and hospitals, about the work schedule. • use equipment that emits the least noise, well-maintained and with efficient mufflers. Install silencers if necessary and practical; • restrict noisy activities to day time; • avoid use of noisy equipment or doing noisy works at night time; • limit engine idling to a maximum of one	Contractor	Number of complaints from sensitive receptors; Use of silencers in noise- producing equipment and sound barriers; Results of ambient noise level measurements.	Visual inspection by Kaliakoir PIU and PDSC on monthly basis. Frequency and sampling sites to be finalized.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	worship.	minute; • spread out the schedule of material, spoil and waste transport; • minimize drop heights when loading and unloading coarse aggregates; and • not use horns unless it is necessary to warn other road users or animals of a vehicle's approach.			
15. Aesthetics	Interference with the enjoyment of the area and creation of unsightly or offensive conditions	• dispose excess spoils as per the sample Spoil Management Plan attached in Appendix 3 of IEE; • avoid stockpiling of excess excavated soils as far as possible; • avoid disposal of any debris and waste soils in or near water bodies/rivers; • coordinate with PIU for beneficial uses of excess excavated soils or immediately dispose to designated areas; • recover used oil and lubricants and reuse or remove from the sites; • Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; and • Remove all wreckage, rubbish, or temporary structures which are no longer required.	Contractor	Number of complaints from sensitive receptors; Worksite clear of hazardous wastes; Worksite clear of any wastes unutilized materials, and debris; Transport route and worksite cleared of dirt	Visual inspection by Kaliakoir PIU and PDSC on monthly basis
B. Ecological Resources					
16. Terrestrial ecology including terrestrial biodiversity	Removing and damaging flora and fauna by the construction workers	• Prevent workers or any other person from removing and damaging any flora and fauna found in the subproject sites; • Prohibit employee and workers from poaching animals and cutting of trees for firewood at the subproject sites or their vicinities.	Contractor	Complaints from sensitive receptors on disturbance of vegetation, poaching fishing, etc.	Visual inspection by Kaliakoir PIU and PDSC on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
17. Aquatic ecosystem	Construction and rehabilitation works at the subproject Khal will degrade the quality of water flowing to the Bangshi River. As such, aquatic species found at the Bangshi river will be affected.	• avoid excavation and other civil works during monsoon season; • store spoils away from the canal to avoid being washed down back to the canal; and • not undertake construction works near these sites during the spawning and breeding period between June and September.	Contractor	Reports of Contractors to Kaliakoir PIU.	Visual inspection by Kaliakoir PIU and PDSC on monthly basis
18. Slope erosion and canal sedimentation	Sedimentation of surface drainage networks, biological systems disruption	• Retaining the existing plants and vegetation of canal bank and palisading, • Scheduling to avoid heavy rainfall periods • Contouring and minimizing length and steepness of slopes • Mulching to stabilize exposed areas • Re-vegetating areas promptly • Designing channels and ditches for post-construction flows • Lining steep channel and slopes (e.g. use jute matting)	Contractor	Visual Inspection	Monthly in the segment of construction.
19. Disposal of excavated spoil	Indiscriminate disposal of excavated spoil may affect the landscape and aesthetics of local environment and also may cause pollution and nuisance to surrounding environment	The negative impacts of indiscriminate disposal of excavated spoil may be mitigated by adopting the following measures: • dispose excavated spoils as per the Spoil Management Plan attached in Appendix 3; • avoid stockpiling of excess excavated spoils as far as possible;	Contractor	Visual Inspection	Visual inspection by Kaliakoir PIU and PDSC on monthly basis.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		• avoid disposal of excavated spoil/soils in in near water course bodies/watercourses/; • Dispose spoils immediately and avoid stocking for longer period to prevent potential nuisance and complaints; and • 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			
C. Socioeconomic Characteristics					
20. Traffic and disturbance to community	At some areas along the subproject 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.	• prepare and implement a traffic management plan in collaboration with local authorities; • where traffic congestion will likely occur, place traffic flagmen during working hours; • provide compensation to affected people; • manage stockpile; • manage pumped water from excavations either to drains or drums for later use; • relocate the affected power supply poles, and advise the concerned authority during accidental damage to utilities. • erect and maintain barricades if required • inform through display board about nature, duration of construction and contact for complaints • complete the work quickly nearby institution, place of worship, business, hospitals, and schools. • consult with business and institutions for work schedules.	Contractor	Traffic route during construction works, Including number of permanent signs, barricades, and flagmen on worksite; Number of complaints from sensitive receptors; Some signages placed at the subproject location; Number of walkways, signages, and metal sheets placed at subproject location	Visual inspection by Kaliakoir PIU and PDSC on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		• restore damaged properties and utilities • Traffic Management Plan to be prepared by the contractor and approved by PMU before commencement of construction.			
21. Socioeconomic status	• Opportunity for increasing local revenue.	• Engage the local workforce. • Secure construction materials from local market.	Contractor	Employment records; Records of sources of materials Records of compliance to Bangladesh Labor Act 2006	Visual inspection by Kaliakoir PIU and PDSC on monthly basis
22. Community health and safety	Construction works will impede the access of residents and business in limited cases	• 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 • Restrict work force in designated areas. • Identify stockyard areas in consultation with local administration • Work on private land requires written permission of landowners and PDSC. • Prefer small mechanical excavator for trenching • Construct gender friendly toilets for workers • Prohibit alcohol and drugs on site • Prevent excessive noise; • Code of conduct for workers includes restricting workers in designated areas, no open defecation, no littering, no firewood collection, no fire except	Contractor	The number of permanent signs, barricades, and flagmen on worksites as per Traffic Management Plan (Appendix 10); Number of complaints from sensitive receptors; Number of walkways, signs, and metal sheets placed at the subproject location; Agreement between landowner and contractors in case of using private land as work camps, storage areas, etc.	Visual inspection by Kaliakoir PIU and PDSC on weekly basis Frequency and sampling sites to be finalized

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		designated places, no trespassing, no residence at construction sites, and no obligation to potentially dangerous work • Maintain a complaint logbook in workers camp and take action promptly of complaints			
23. Workers Health & Safety	• There is invariably a safety risk when construction works such as excavation and earthmoving are conducted in urban areas. • Workers need to be mindful of the occupational hazards which can arise from working at height and excavation works. • COVID-19 hazards as well as the usual construction and transportation hazards	• Implement the occupational health 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 • Comply Labor Act 2006 • Exclude public from worksites • Provide personal protective equipment to workers and ensure their effective usage • Document procedures to be followed for site activities; and • Maintain accident reports and records • . Make first aid kits readily available • Maintain hygienic accommodation in work camps. • Ensure uncontaminated water for drinking, cooking and washing, • Assure clean eating areas • Make sure sanitation facilities are readily available • Provide medical insurance coverage for	Contractor	Equipped first-aid stations; Medical insurance coverage for workers; Number of accidents; Records of supply of uncontaminated water; Condition of eating areas of workers; Record of health and safety orientation training; Availability of personal protective equipment at construction site; Number of moving equipment outfitted with audible back- up alarms; Signage for storage and disposal areas; Condition of sanitation facilities for workers; and Records of results of noise level measurements.	Visual inspection by Kaliakoir PIU and PDSC on a weekly basis. Frequency and sampling sites to be finalized

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		workers; • Provide orientation for guest visitors; • Ensure that visitors do not enter hazard areas unescorted; • Require workers to wear high visibility clothes; • Ensure moving equipment is outfitted with audible backup alarms; • Chemical and material storage areas need to be marked clearly; • Use of earplugs enforced at work areas with high noise level caused by operating equipment or machineries at the sites. • Train all site personnel on environmental health and safety including COVID-19 health & safety			
D. Historical, Cultural, and Archaeological Characteristics					

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
24. Physical and cultural heritage	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. There are no archaeological, paleontological, or architectural sites of significance listed by Bangladesh Department of Archaeology.	• However, as a precautionary approach, the contractor will be required to: • strictly follow the protocol by coordinating immediately with Kaliakoir PIU and Bangladesh Department of Archaeology for any suspicion of chance finds during excavation works; • stop work immediately to allow further investigation if any finds are suspected; and • 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.	Contractor	Records of chance finds	Visual inspection by Kaliakoir PIU and PDSC on monthly basis.
E. Others					
25. Submission of EMP implementation Report	Unsatisfactory compliance to EMP	• Appointment of EHS supervisor • Timely monitoring reports with field photographs	Contractor	Availability and competency of appointed supervisor Monthly report	Monthly monitoring report to be submitted by Contractor to Kaliakoir PIU; Quarterly report by Kaliakoir PIU to PMCU, and Semi-annual report by PMCU to ADB.
Post-Construction &Operational Phase					
26. Post Construction Activities	27. Damage due to debris, spoils, excess construction materials	28. Remove spoils wreckage, rubbish, or temporary structures no longer required; 29. All excavated roads shall be reinstated to original condition; 30. All disrupted utilities should be restored; 31. All affected structures rehabilitated /compensated; 32. The construction camp needs to clear of	Contractor	PMCU and/or Kaliakoir 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	Before handover of completed works to Kaliakoir PIU.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		spills; e.g. oil, paint, etc. and other pollutants after dismantling; 33. All hardened surfaces shall be ripped; all imported materials shall be removed and all temporary services shall be cancelled; 34. Request PMCU/PIU in writing that worksites and camps are vacated and restored to pre-project conditions.		structures not relevant to O&M are removed, and (iv) worksite cleanup is satisfactory.	
27. Environmental legislation compliance	Lack of awareness in Kaliakoir PIU about legislations and IEE requirements	Strengthen capacity of Kaliakoir PIU staffs	PMCU, Kaliakoir PIU, PDSC	Monitoring reports and checking operations against O&M manuals and permits/clearances	Kaliakoir PIU - After completion of the drainage subproject
28. Domestic wastewater discharge	Illegal entry of waste water from buildings or households; Solid Waste disposal to the drains resulting to water pollution and clogging.	• The design includes cover slab for the proposed drain hence, it should be ensured that each drain is provided with cover slab • Prepare and implement maintenance plan. • Provision of regular monitoring. • Put into effect the local ordinance that prohibits discharge of domestic wastewater, septage and solid wastes into community canals including the subproject Khals.	Kaliakoir PIU	Water quality of discharge at outfalls	Kaliakoir PIU - Quarterly depending on the situation and capacity Kaliakoir PIU
29. Solid waste generation	Generation of solid waste from the community may cause clogging of the drainage canal/khal	Kaliakoir pourashava (PIU) shall undertake the following actions to ensure that the subproject operates sustainably: • Establish a program of regular visual inspection to identify problems early, before they become critical (plugging, clogging, blockage etc) • Prohibition of unwanted littering and discharge of waste into the canal. • Solid wastes are managed and disposed through the municipal collection system;	Kaliakoir PIU	Visual Inspection	Visual inspection by Kaliakoir PIU, and cleaning on semi-annually or as and when situation demands.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		• Ensure that all remedial action is implemented promptly, including clearing sediment and other material that could cause blockage,			

C Environmental Monitoring Program

146. Monitoring of mitigation measures during construction is the responsibility of the PIU supported by the PMCU Environment Officer and PDSC Environmental Specialist. **Table 14** shows the proposed Environmental Monitoring Plan for this subproject, which specifies the various monitoring activities, indicating location, frequency of monitoring and responsibility

Table 14: Environmental Monitoring Program

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
PRE-CONSTRUCTION					
1. Secure Environmental Compliance Certificate from Department of Environment	PMCU office	PMCU, PDSC	Copy of approved ECC	Before construction activities	PMCU, PDSC
2. IEEs and EMPs are included in bid and contract documents	PMCU office	PMCU, PDSC	Copies of bid and contract documents	Before approval tender document	PMCU, PDSC
3. Site-specific EMP (SEMP) submitted by Contractor for approval by PIU	PIU office	Contractor, PIU	Copy of approved SEMP	Before construction activities commence	PMCU, PDSC
4. Spoil Management Plan (SMP) submitted by Contractor for approval by PIU	PIU office	Contractor, PIU	Copy of approved SMP	Before construction activities commence	PMCU, PDSC
5. Traffic Management Plan (TMP) submitted by Contractor for approval by PIU	PIU office	Contractor	Copy of approved TMP	Before construction activities commence	PMCU, PDSC
6. Occupational, Health and Safety Plan (OHSP) and COV-19 H&S Management Plan submitted by Contractor for approved by PIU	PIU office	Contractor	Copy of approved OHSP and COV-19 H&S Management Plan	Before construction activities commence	PMCU, PDSC
7. Waste Management Plan (WMP) submitted by Contractor for approval by PIU	PIU office	Contractor	Copy of approved WMP	Before construction activities commence	PMCU, PDSC
8. Baseline environmental data gathering: Sampling & measurement of **Ambient air quality** (PM_{10}, $PM_{2.5}$, NOx, SOx & CO); **Surface water** (pH, DO, **Cl^-** BOD^{5d}, COD, NH^4/NO^3, TSS, TDS & total coliform); **Ground water quality** (pH, DO, Cl^-**, EC,** As, NO^3 BOD^{5d}, COD,);and **Noise leve**l	All subproject sites	Contractor	Sampling & measurement of Ambient air quality (Surface water Ground water quality and Noise level	Once before commencement of construction activities (sampling will take place at the start and end part of the drains)	PMCU, Kaliakoir PIU, PDSC
9. Secure all other necessary permits and licenses from relevant government agencies		Contractor	Copies of permits and licenses	Before construction activities commence	PMCU, Kaliakoir PIU, PDSC
CONSTRUCTION					
10. Implementation of SEMP; including implementation of community and occupational	Subproject sites	Contractor	Site visits, Contractor records,	Weekly or as needed	Kaliakoir PIU, PDSC

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
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.					
11. Implementation of SMP, Implementation of SMP, which include disposal of spoil material at a location approved to by Kaliakoir 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	Kaliakoir PIU, PDSC
12. 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	Kaliakoir PIU, PDSC
13. Implementation of Occupational, Health and Safety Plan (OHSP)	Subproject sites	Contractor	Site visits, Contractor records	Weekly or as needed	Kaliakoir PIU, PDSC
14. Conduct of analytical tests of Ambient air quality (PM10, PM2.5, NOx, SOx & CO); Surface water (pH, DO, Cl- BOD5d, COD, NH4/NO3, TSS, TDS & total coliform); Ground water quality (pH, DO, Cl-, EC, As, NO3 BOD5d, COD,);and Noise level	Subproject sites	Contractor	Contractor records, Results of laboratory analyses	Semi-annually (sampling will take place at the start and end part of the khals)	PMCU, Kaliakoir PIU, PDSC
15. Develop and apply archaeological protocol to protect chance finds	All subproject sites	Contractor, PMCU, Kaliakoir PIU, PDSC	Contractor records	Once until protocol is approved	PMCU, Kaliakoir PIU, PDSC
16. Provide EHS training for all personnel	All subproject sites	Contractor	Contractor records; Interviews to workers	Monthly	Kaliakoir PIU, PDSC
17. Keep accident reports and records	All subproject sites	Contractor	Contractor records; Interviews to workers and community people	Monthly	Kaliakoir PIU, PDSC
18. Employ workforce from communities near sites	All subproject	Contractor	Contractor records	Monthly	Kaliakoir PIU,

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
	sites				PDSC
19. Implementation of EHS measures at construction camps	Construction camp sites	Contractor	Site visits; Interviews to workers at camps	Monthly	Kaliakoir PIU, PDSC
20. Management of wastes, aquatic ecosystem, slope erosion, canal sedimentation and reinstatement of sites	All subproject sites	Kaliakoir PIU	Site observation	Monthly	Kaliakoir PIU
OPERATION AND MAINTENANCE					
21. Passage of local ordinance prohibiting discharge of wastewater, septage and solid wastes into community drains including the subproject Khal.	Pourashava Office	Kaliakoir PIU	Records of Pourashava	Start of O & M Phase	Kaliakoir PIU
22. Maintain safe passage for vehicles and pedestrians during maintenance activities	All subproject sites	Kaliakoir PIU	Site observations	Monthly	Kaliakoir PIU
23. 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.	at subproject sites	Kaliakoir PIU	Site observations	Monthly	Kaliakoir PIU
24. Provide signboards informing nature and duration of maintenance activities	at subproject sites	Kaliakoir PIU	Site observations	Monthly	Kaliakoir PIU
25. Prevent run-off/deposit of foreign materials (oil, grease, solid waste, plastics) into water courses, and clean drain periodically; dispose of materials removed from drains	at subproject sites	Kaliakoir PIU	Site observations	Monthly	Kaliakoir PIU
26. Dispose of material from blocked drain in location away from roadway and drain	at subproject sites	Kaliakoir PIU	Site observations	Monthly	Kaliakoir PIU
27. A proper traffic management plan can be introduced and strictly follow the BRTA rules;	at subproject sites	Kaliakoir PIU	Site observations	Start of O&M Phase	Kaliakoir PIU
28. Establish the speed breaker and safety sign near the bridge site to limit the speed of the vehicle and to reduce the occurrence of	at subproject sites	Kaliakoir PIU	Site observations	Start of O&M Phase	Kaliakoir PIU

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
accidents					
29. Culvert/cross-drain site should be clean properly after completion of the construction activities so that the natural drainage system may not hampered	at subproject sites	Kaliakoir PIU	Site observations	Start of O&M Phase	Kaliakoir PIU
30. Proper removal of construction camp facilities and construction wastes from the bridge site after completion of the works	at subproject sites	Kaliakoir PIU	Site observations	Start of O&M Phase	Kaliakoir PIU
31. Ensure no throwing of trashes (empty soft drink cans/bottles and any kind of solid wastes into the khal by installing/hanging trash cans/bins	at subproject sites	Kaliakoir PIU	Site observations	Weekly	Kaliakoir PIU

D. Capacity Development Training

147. The PMCU safeguards experts (environmental and social) with support from PDSC Environment Specialist and Social Safeguard Specialist will be responsible for training the Kaliakoir PIU 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 policies and guidelines 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) improved coordination within nodal departments; and
   (e) 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.

148. The proposed training project along with the frequency of sessions is presented in **Table 15.**

Table 15: 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 how the project will meet these requirements	To build the capacity of the staff for effective implementation of the designed EMPs aimed at meeting the environmental safeguard compliance of ADB and Government of Bangladesh	To share the experiences and best practices aimed at learning lessons and improving implementation of EMP
Contents	Module 1: Orientation ADB Safeguards Policy Statement Government of Bangladesh Environmental Laws and Regulations Module 2: Environmental Assessment Process ADB environmental process, identification of impacts and mitigation measures, formulation of an environmental management plan (EMP), implementation, and monitoring requirements Review of environmental assessment report to comply with ADB requirements Incorporation of EMP into the project design and contracts Module 3: COVID-19 H&S training	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 COVID-19 H&S training	Experiences on EMP implementation – issues and challenges Best practices followed
Duration	1 day	1 day	1 day on a regular period to be determined by PMCU and PDSC
Participants	PMCU and 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)

149. 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 sub-project, some items need to be incorporated in the BOQ of this sub-project. A substantial part of environmental costs shall cover under Civil Works Contract. However, environmental costs under Civil Works Contract are not included here. Costs of these items will be dealt elsewhere in the respective project component document. The environmental costs presented in **Table 16**: are tentative provisions based on experience of undertaking similar works under different LGED projects. For the details of environmental costs under civil works contract, individual contract package bid document may be consulted. It is assumed that the environmental cost under civil works contract for each contract package will be more or less same.

Table 16: Tentative EMP Budget for BOQ
(The following items need to be incorporated in the BOQ of this sub-project):

Cost Estimates for Environmental Management

Sl. No.	Description of Items	Unit	Quantity	Unit Rate (BDT)	Total Amount (BDT)	Costs covered by
1	Environmental Monitoring a) Air Quality, b) Noise level, c) Water quality, d) Sediment at work site to the entire satisfaction of the engineer-in-charge.	LS			6,00,000.00	Cost included in the BoQ as Provisional sum item (non-competitive item).
2	Dust suppression measures (excluding watering for compaction) to the entire satisfaction of the Engineer-in-charge.	LS			1,50,000.00	
3	Rehabilitation of ancillary sites including stockpile sites, brick crushing sites, borrow areas, workforce camp, to the entire satisfaction of the engineer-in-charge.	LS			1,00,000.00	
4	Proper disposal of camp site wastes to the entire satisfaction of the engineer-in-charge.	LS			1,00,000.00	
5	Maintain First aid box at camp site to the entire satisfaction of the Engineer-in-charge.	LS			20,000.00	
6	Miscellaneous	LS			30,000.00	
Sub-Total :					10,00,000.00	
7	Prevention of spillage, leakages of polluting materials to the entire satisfaction of the engineer-in-charge.					Contractor (GCC Clause 27.1 (a), 27.1(d) of Particular Conditions of Contract)
8	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 04 Nos.	Nos.	4			Contractor (GCC Clause 29.2 of General Conditions of Contract)
9	Providing and maintaining adequate sanitation facilities at camp site and work site to the entire satisfaction of engineer-in-charge. Sanitation Toilet 06 nos. (02 for women and 04 for men)	Nos.	6			Contractor (GCC Clause 29.2 of General Conditions of Contract)
10	**Traffic Management** Maintaining traffic management at worksite from time of commencement of construction activities to time of completion activities, including ensuring that the road is safe for users (this includes providing necessary barricades, warning signs/lights, guide signs, flagmen, maintaining diversion roads by cutting, filling, constructing, etc. or by any other means) in accordance with the full satisfaction of the Engineering-in-charge.					Contractor (GCC Clause 27.1 (b) of General Conditions of Contract)
11	**Spoil Management Facility**	cum	110415.1	90.29	99,69,383.90	Cost included in the BoQ

	Safe transportation and disposal of excavate spoils/ wastes generated out of subproject activities in a manner so that no environmental pollution or hazard to health of workers/local people.		5			
12	**Installation of signboards/billboards** Precautionary signboards/ danger signals/ billboards in appropriate places to notify people about the project.	sqm	2.16	15207.11	32847.36	Cost included in the BoQ
13	**Working labour shed:** Construction of Labor shed with C.I sheet Roofing, fencing and brick soling floor as per approved plan and to the entire satisfaction of the engineer-in-charge.					Contractor (GCC Clause 29.2 of General Conditions of Contract)
14	**Personal Protection Equipment for Workers** Providing and maintaining appropriate (safe design, fit and comfort) personal protection equipment (PPE) to ensure the highest possible protection for employees in establishing and maintaining a safe and healthful working environment at workplace.					Contractor (GCC Clause 27.1 (a), 29.1 of Particular Conditions of Contract)
15	**Removal of equipment/ surplus materials/ rubbish/temporary structures/fully reinstate** On completion of the Contract, Contractor shall remove the equipment, surplus materials, slope erosion, canal sedimentation, rubbish and temporary structures of all types and shall leave sites in clean condition to the entire satisfaction of the engineer-in-charge and local people					Contractor (GCC Clause 27, 40.3, 80.2 of Particular Conditions of Contract)
16	**Occupational Health and Safety** To ensure safety of health and hazards for construction workers including -Adequate housing for all workers -Safe and reliable water supply; -Hygienic sanitary facilities and sewerage system					Contractor (GCC Clause 27, 29.1 of Particular Conditions of Contract)
17	**Community Health and Safety** To ensure safety of health and hazards on local resources and infrastructures of nearby communities					Contractor (GCC Clause 27 of Particular Conditions of Contract)
18	**COVID-19 Health and Safety** Washable cloth face mask, disposable hand gloves, wash basin & water container, soap, alcohol based sanitizer, pump spray, disinfectant, tissue papers, garbage bin, plastic bag, contactless temperature reader etc.					Contractor (GCC Clause 27.1 (d) of Particular Conditions of Contract)
19	Training on Environmental Management Plan, Health& Safety and COVID-19 related thread for the contractor's workforce					PDS-2 Consultants under CRDP-2

150. The cost for Environmental Quality Tests of Various Components –Water (surface and underground), Ambient air and Noise level, and Soil quality is given in **Table 17** below.

Table 17: Indicative Costs for Environmental Quality Tests (Part of EMP Budget in BOQ)

Sl. No.	Environmental Parameters	Analytical Parameter	Unit cost (BDT)	Frequency (times) / Sampling Location	Total cost (BDT)
1	Ambient Air Quality	Suspended Particulate Matter (SPM), Particulate Matter (PM 2.5), Particulate Matter (PM 10), Oxides of Sulphur (Sox), Oxides of Nitrogen (NOx), Carbon Monoxide (CO),	40,000	6 times / (Once at two locations during pre-construction and semi-annually at two locations during construction phase)	40,000x6= 2,40,000
2	Noise Quality	*Noise Level (dB) in selected busy areas at and around the* subproject road/bridge/khal site *(under Normal Condition and with Traffic)*	10,000	12 times / (Once at two locations for day and night time during pre-construction and semi-annually at two locations for day and night time during construction phase)	10,000x12= 1,20,000
3	Groundwater Quality	pH, Total suspended solids (TSS), Total dissolved solids (TDS), Dissolved oxygen (DO), Arsenic (As), Iron (Fe), Chloride (Cl), Electrical Conductivity (EC), nitrate-N (NO_3-N)	20,000	6 times / (Once at two locations during pre-construction and semi-annually at two locations during construction phase)	20,000x6= 1,20,000
4	Surface Water Quality	pH, Total suspended solids (TSS), Total dissolved solids (TDS), Turbidity, Dissolved oxygen (DO), Biological oxygen demand (BOD_{5days}), Chemical oxygen demand (COD), Arsenic (As), Iron (Fe), Chloride (Cl), Electrical Conductivity (EC), nitrate-N (NO_3-N, fecal and total coli-form	20,000	6 times / (Once at two locations during pre-construction and semi-annually at two locations during construction phase)	20,000x6= 1,20,000
	Total Cost:				**6,00,000**

VIII. MONITORING AND REPORTING

151. 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.

152. 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 **Appendix 8**. This monitoring sheet is indicative which can be further enhanced depending on the actual situations at subproject construction sites.

153. 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 **Appendix 9**. This checklist is indicative which can be further enhanced depending on the actual situations at subproject construction sites.

154. PMCU shall consolidated quarterly reports from the PIUs including Kaliakoir 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.

155. ADB will carry out the following monitoring actions to supervise Second CRDP 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.

IX. CONCLUSION AND RECOMMENDATIONS

156. The Kaliakoir drainage subproject is designed to improve the quality of life of Kaliakoir residents by rehabilitating and improving the Kaliakoir khal. This will in turn allow uninterrupted flow of stormwater run-off from the many parts of the Kaliakoir *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.

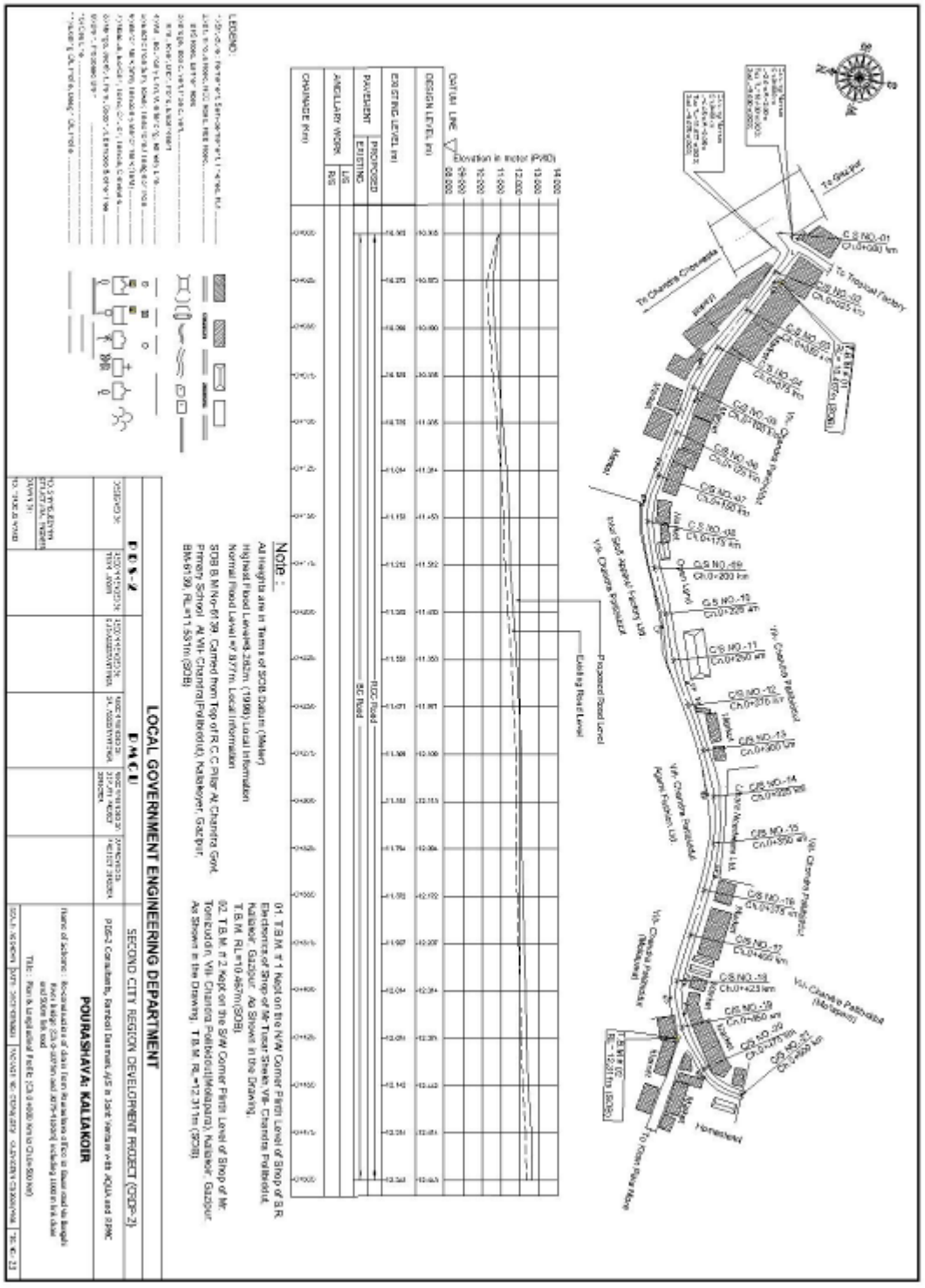
157. The proposed subproject is not an environmentally critical undertaking. IEE indicates that the proposed subproject, and its components, is not located within or adjacent to environmentallysensitive areas.

158. 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.

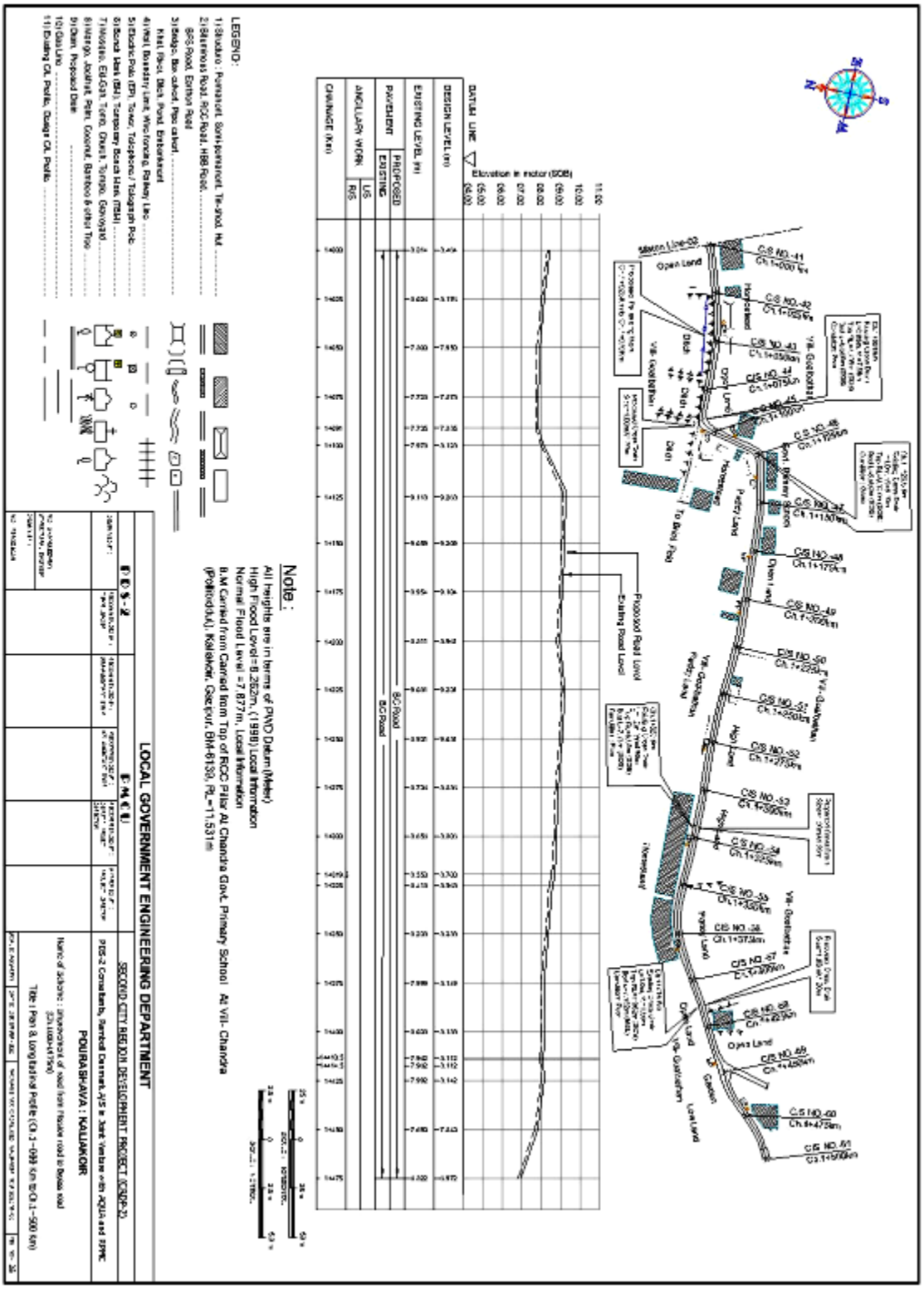
159. The few adverse impacts of moderate magnitude during construction will be temporary and short-term (i.e., most likely to occur only during peak construction activities). These will not be sufficient to threaten or weaken the surrounding resources. Mitigation measures, integral to socially and environmentally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

160. Based on the above findings, the classification of the subproject under package no. CRDP-II/LGED/KALIAKOIR/NCB/2021/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 has been updated based on final detailed designs of the subproject. Considering this IEE as the final IEE, it will be submitted to ADB for final review and disclosure. The approved IEE shall be treated as the final IEE, and shall be attached in the bid and contract documents.

Appendix 1: Strip Maps of Subproject Alignment - Scheme no. 3 (Road-1): Re-construction of drain from Pourashava Office to Bazar road via Bangshi River bridge (Ch.0-1075m & Ch. 2850-3875m) including 1000m link drain and 500m link road



Appendix 2: Strip Maps of Subproject Alignment - Scheme no. 3 (Road-1): Improvement road from Mission road to Bypass road (Ch.1000-1475m);



Appendix 3 : 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:
To minimize spoil generation where possible;
Maximize beneficial reuse of spoil from construction works in accordance with spoil management hierarchy;
Mange onsite spoil handling to minimize environmental impacts on resident and other receivers;
Minimize any further site contamination of land, water, soil; and
Manage the transportation of spoil with consideration of traffic impacts andtransport related emissions.

Structure of SMP:

Section 1: Introduction of SMP
Section 2: Legal and other requirementsSection 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 potentialfor 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 forstorage/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.

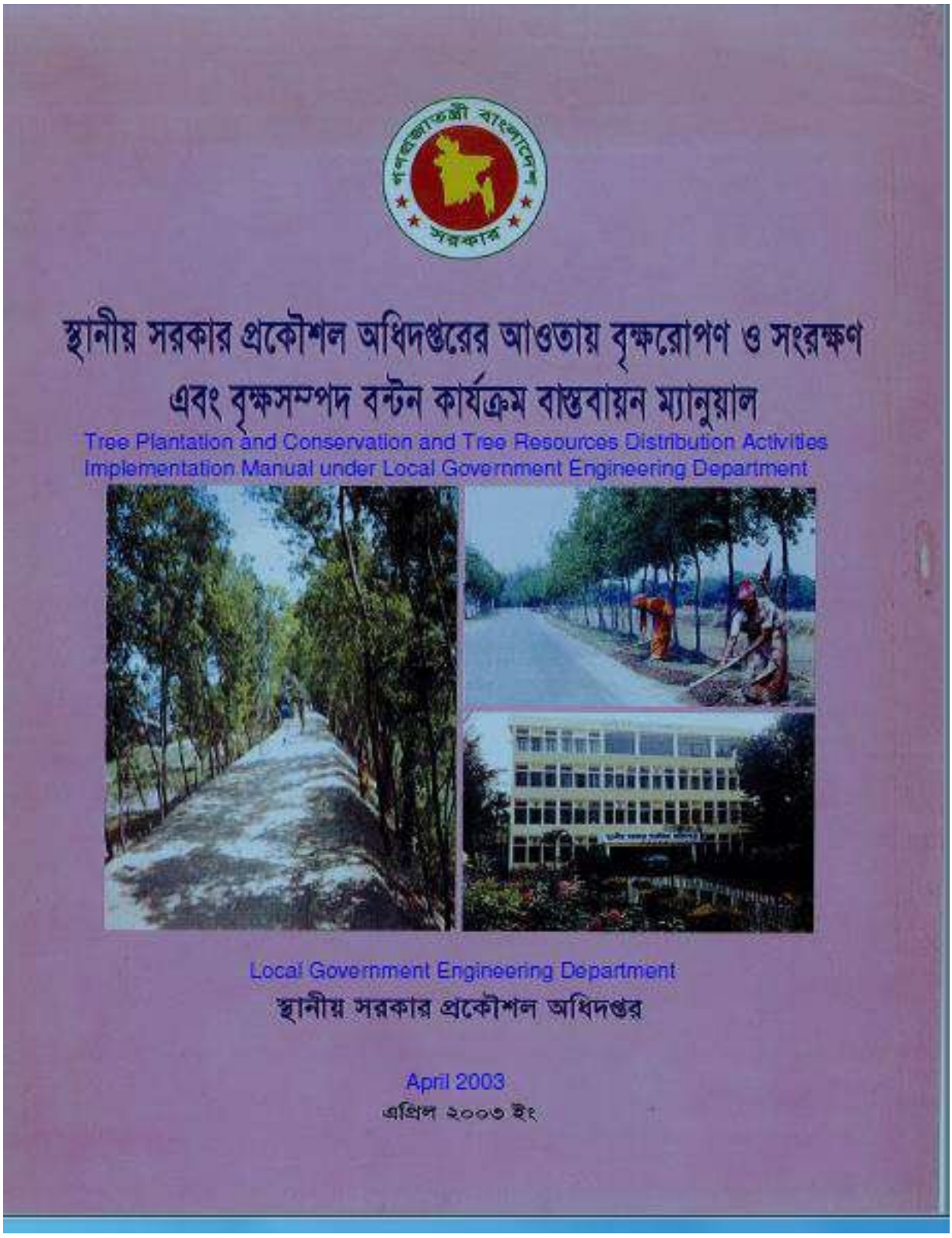
- Consideration of likely spoil characteristics
- Identification of possible reuse sites
- Screening of possible reuse opportunities

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 cliental 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 andsubmit 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

Appendix 4: 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

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

Appendix 5: RECORDS OF PUBLIC CONSULTATIONS

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

Sl.No	Date of Consultation	Road and Place of Consultation	Number and Type of Participants	Issues Discussed
1	07 December 2021	Pourashava Hall Room (Construction of drain from Kaliakoir Bus Terminal to Bangshi River at Bazar area	Total 10 (Male). (Councilors, Retired GovernmentOfficials, Local Elite, Businessperson, project beneficiaries etc.)	General perception about the projectand the awareness about the proposed project are disseminated inthe meeting. The following predefined issues are discussed in the consultation meetings: Information dissemination about the subproject possible impacts of the subproject participation of local people in different project activities Employment potential for localpeople in the project works Loss of residential/commercial structures, if any due to the project Resettlement and land acquisition (if foreseen specially on private land). Impact on social issues due to the project Protected areas (national park,protected forest, religiously sensitive sites, historical or archaeological sites), if any Any critical issue or concern bythe local people regarding the project? Grievances redress mechanismetc.
2	07 December 2021	Pourashava Hall Room (Re-construction of drain with footpath from Fulbaria road and Palpara road to Bangshi River)	Total 10, 1 Female and 9 Male. (Councilors, Retired Government Officials, Local Elite, Businessperson, project beneficiariesetc.)	
3	07 December 2021	Pourashava Hall Room (Improvement road from Mission road to Bypass road)	Total10, 1 Female and 9 Male. (Councilors, Local Elites, Businessperson, Beneficiaries Service holders etc.)	
4	07 December 2021	Pourashava Hall Room (Re-construction of drain with footpath along the Hospital road from Bypass to College road)	Total10, 1 Female and 9 Male. (Councilors, Local Elites, Businessperson, Beneficiaries Service holders etc.)	

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

List of Participants in Consultations Meetings in Different Location of Kaliakoir Drainage Schemes

Venue: *Pourashava* Hall Room

স্থানীয় সরকার প্রকৌশল অধিদপ্তর
দ্বিতীয় নগর অঞ্চল উন্নয়ন প্রকল্প
লেবেল-৪, আরডিইসি ভবন
আগারগাঁও শের-এ-বাংলানগর
ঢাকা-১২০৭

প্রকল্পের নাম: [illegible] কালিয়াকৈর পৌরসভা

Name of Sub-project: Re-construction of walkway Drain from Palpara To Bongshi River

ফোকাস গ্রুপ আলোচনায় অংশগ্রহণকারীর হাজিরা
Attendance of FGD participants

তারিখঃ- ০৭.১২.২০২১
Date 07.12.2021

ক্রমিক নং Sl no	নাম, মোবাইল নম্বর Name of participants	মোবাইল নম্বর Mobile no.	পেশা Profession	স্বাক্ষর Signature of participants
০১	[illegible]	01819-809338	শিক্ষক	[signature]
০২	মো: আবুল কাশেম (মেম্বার)	01740908859	[illegible]	[signature]
০৩	মো: [illegible]	01818635468	[illegible]	[signature]
০৪	মো: [illegible]	01825-823656	সাংবাদিক	[signature]
০৫	তাসমিন সুলতানা	01672414908	গৃহিণী	[signature]
০৬	মো: মাহবুবুল কবীর	01736311341	ইমাম	[signature]
০৭	মো: আবুল হোসেন	01720014555	কর্মচারী	[signature]
০৮	মো: [illegible]	0172610468	[illegible]	[signature]
০৯	মো: [illegible]	01723170342	কর্মচারী	[signature]
১০	মো: [illegible]	0184046408	[illegible]	[signature]

স্থানীয় সরকার প্রকৌশল অধিদপ্তর
দ্বিতীয় নগর অঞ্চল উন্নয়ন প্রকল্প
লেবেল-৪, আরডিইসি ভবন
আগারগাঁও শের-এ-বাংলানগর
ঢাকা-১২০৭

প্রকল্পের নামঃ- [illegible] কালিয়াকৌর পৌরসভা

Name of Sub-project: Re-construction of Drain from Kalia Koir Busstand to Bongshi River

ফোকাস গ্রুপ আলোচনায় অংশগ্রহনকারীর হাজিরা তারিখঃ- ০৭.১২.২০২১

Attendance of FGD participants Date: 07.12.2021

ক্রমিক নং Sl. no	নাম, মোবাইল নম্বর Name of participants	মোবাইল নম্বর Mobile no.	পেশা Profession	স্বাক্ষর Signature of participants
১/	[illegible]	01781202396	[illegible]	Anwar
২/	মো: ইসমাইল	01718161840	ব্যবসা	[illegible]
৩/	মো: [illegible]	01720096920	ব্যবসা	[illegible]
৪/	মো: ওহাব হোসেন	01704-152224	চাকুরী	[illegible]
৫/	মো: মজিবর রহমান	01921174675	চাকুরী	[illegible]
৬/	মো: জাহাঙ্গীর আলম	01713-782283	[illegible]	[illegible]
৭/	মো: বাবু আহাম্মেদ	01747-944460	[illegible]	বাবু
৮/	রঞ্জিত মন্ডল	01734323463	ক্ষৌর	রনজিত
৯/	মো: আলী আকবর	01719-182956	ব্যবসা	[illegible]
১০/	মো: বাবুল হোসেন	01827528335	ব্যবসা	বাবুল

স্থানীয় সরকার প্রকৌশল অধিদপ্তর
দ্বিতীয় নগর অঞ্চল উন্নয়ন প্রকল্প
লেভেল-৪, আরডিইসি ভবন
আগারগাঁও শের-এ-বাংলানগর
ঢাকা-১২০৭

প্রকল্পের নামঃ- মিশন রোড হইতে বাইপাস পর্যন্ত রাস্তা নির্মাণ। কালিয়াকৈর পৌরসভা
Name of sub project: Improvement of road from Mission road To Bypass.

দোকানদার অংশগ্রহণকারীর হাজিরা
Discussion with shop owner

তারিখঃ-
Date -

ক্রমিক নং	ব্যবসা মালিকের নাম Name of business owner	ব্যবসার ধরন Category of business	মোবাইল নম্বর Mobile no.	স্বাক্ষর Signature of business owner
০১।	মো: ইয়াসিন	[illegible]	০১৭৬৫৫৭৭৪ -২৮৬	ইয়াসিন
০২।	মো: আকিল আহমেদ	[illegible]	01630323555	[signature]
০৩।	মো: মিজানুর রহমান	[illegible]	01679459202	মিজানুর
০৪।	আব্দুর সবুর	সবুর স্টোর মুদির দোকান	017298687 33	সবুর
০৫।	মো: কাইয়ুম হোসেন	মুদির দোকান	01756413430	[signature]
০৬।	মো: আনোয়ার হোসেন	[illegible]	01676935 507	আনোয়ার
০৭।	মোসা: সাবিহা খাতুন	[illegible]	0163075 -6672	সাবিহা
০৮।	মো: শাহীন হোসেন	[illegible]	01633693485	[signature]
০৯।	মো: মোসলেম উদ্দিন	[illegible]	01716 7853 95	মোসলেম
১০।	মোহাম্মদ সাইফুল ইসলাম	সাইফ ইলেঃ	01812-074213	[signature]

স্থানীয় সরকার প্রকৌশল অধিদপ্তর
দ্বিতীয় নগর অঞ্চল উন্নয়ন প্রকল্প
লেভেল-৪, আরডিইসি ভবন
আগারগাঁও শেরে-এ-বাংলানগর
ঢাকা-১২০৭

প্রকল্পের নামঃ- হাসপাতাল রোড হইতে বাইপাস কলেজ রোড (ড্রেন নির্মাণ) কালিয়াকৈর পৌরসভা
Name of sub-project: Re-construction of Drain from Hospital Bypass to Collage road.

দোকানদার/ব্যবসায়ীদের হাজিরা — তারিখঃ- 07.12.2021
Discussion with shop owner — Date - 07.12.2021

ক্রমিক নং	ব্যবসা প্রতিষ্ঠানের নাম / Name of business owner	ব্যবসার ধরন / Category of business	মোবাইল নম্বর / Mobile no	স্বাক্ষর / Signature of business owner
১/	মো: আলাউদ্দীন আলম	[illegible] ইলেকট্রিক	01718847729	[illegible]
২/	মো: আহামাদ -	আমাদ হার্ডওয়্যার	016333029[illegible]	[illegible]
৩/	মো: আমান হোসেন	আয়েশা মোবাইল [illegible]	01793370188	[illegible]
৪/	মো: সিরাজুল হোসেন	[illegible]	01775144343	[illegible]
৫/	মোঃ মমিনুল হক	মমিন [illegible]	01728[illegible]	[illegible]
৬	মোঃ জনি মণ্ডল	J.F.H [illegible]	01720471362	JANI
৭/	মো: মেহেদী হাসান	[illegible]	01780[illegible]	[illegible]
৮/	মোঃ নজরুল ইসলাম	[illegible]	01913119416	[illegible]
৯/	নূর মোহাম্মদ	নীরব ইলেঃ	01744839181	[illegible]
১০/	মো: হুমায়ুন [illegible]	[illegible]	01770304953	[illegible]

Appendix 6 : 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 clarificationand 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.

Date		***Place of registration***			
Contact Information/Personal Details					
Name		**Gender**	**Male Female**	**Age**	
Home Address					
Village/Town					
District					
Phone no.					
E-mail					
Complaint/Suggestion/Comment/Question Please provide the details (who, what, where and how) ofyour grievance below: If included as attachment/note/letter, please tick here:					
How do you want us to reach you for feedback or update on your comment/grievance?					

FOR OFFICIAL USE ONLY

Registered by: (Name of Official registering grievance)	
Mode of communication:Note/Letter **E-mail Verbal/Telephonic**	
Reviewed by: (Names/Positions of Official(s) reviewing grievance)	
Action Taken:	
Whether Action Taken Disclosed:	**YesNo**
Means of Disclosure:	

Appendix 7: SUGGESTED TEMPLATE FOR RECORD-KEEPING OF GRIEVANCES

S. No.	Date of receipt of grievance	Name and contact details of complainant	Description of complaint	Nature of complaint	Decisions taken	Response given to complainant and date	Whether closed/ resolved

Appendix 8: SAMPLE DAILY MONITORING SHEET FOR CONTRACTORS

Second City Region Development ProjectContractor 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**
1. Compliance with Local PermitRequirements	**(Secured / Application Submitted / Not Applicable)**	
Location/zoning permits		
Permit to construct		
Building permit		
Transport / hauling permits		
2. Compliance with IEE Requirements	**(Approved / Under Preparation / Submitted to PIU for Approval)**	
Site-specific EMP (SEMP)		
Corrective Action Plan, if any		
3. Compliance with SEMP		
Construction Site	**(Satisfactory / Needs Improvement / Not Implemented)**	
- 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		
Construction Workers' Camp Site	**(Available / Needs Improvement / Not Available)**	
- 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		
4. Implementation of GRM	**(Yes / No or None / Under Resolution)**	
Complaints		
Complaints resolution		
5. Environmental Quality Measurement	**(Passed / Failed / Not Applicable)**	
Ambient air quality sampling		
Noise level measurement		
Receiving water quality sampling		

Other Issues: _____

_____

_____

_____

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

Prepared by: _____ Name, Designation and Signature

Appendix 8: SAMPLE INSPECTION REPORT FOR PROJECT MANAGEMENT COORDINATION UNIT AND PROJECT IMPLEMENTATION UNITS

Second City Region Development ProjectSite Inspection Checklist
Subproject:___ Date:__ Location: ____
Chainage (for linear works): _

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

Appendix 10: 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:

- the safety of pedestrians, bicyclists, and motorists travelling through the construction zone;
- protection of work crews from hazards associated with moving traffic;
- mitigation of the adverse impact on road capacity and delays to the road users;
- maintenance of access to adjoining properties
- 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.

- Make traffic safety and temporary traffic control an integral and high-priority element of every project from planning through design, construction, and maintenance.
- Inhibit traffic movement as little as possible.
- Provide clear and positive guidance to drivers, bicyclists, and pedestrians as they approach and travel through the temporary traffic control zone.
- Inspect traffic control elements routinely, both day and night, and make modifications when necessary.
- Pay increased attention to roadside safety in the vicinity of temporary traffic control zones.
- Train all persons that select, place, and maintain temporary traffic control devices.
- Keep the public well informed.
- 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

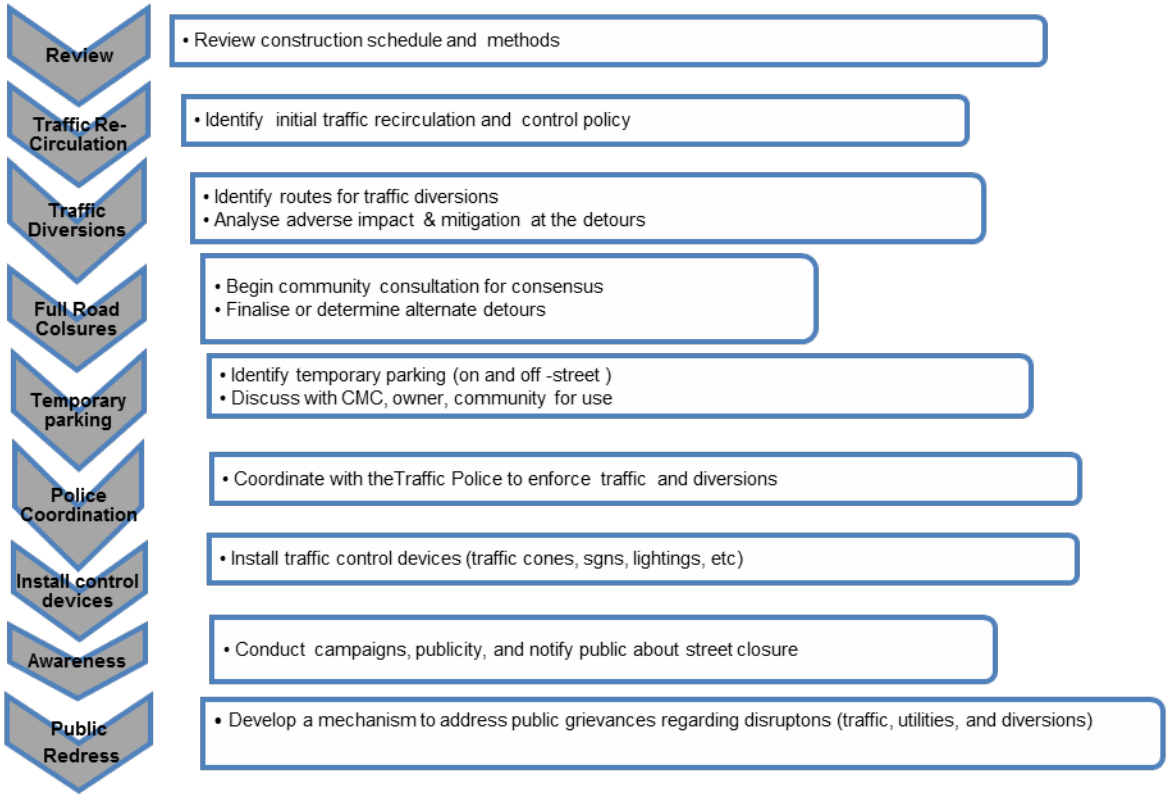
3. Apart from the capacity analysis, a final decision to close a particular street and divert the traffic should involve the following steps:

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

Figure: Policy Steps for the TMP



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:

- traffic control devices in place at the work zones (signs, traffic cones, barriers, etc.);
- defensive driving behavior along the work zones; and
- 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:

- Explain why the brochure was prepared, along with a brief description of the project;
- Advise the public to expect the unexpected;
- Educate the public about the various traffic control devices and safety measures adopted at the work zones;
- Educate the public about the safe road user behavior to emulate at the work zones;
- 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
- 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:

- Driver will follow the special code of conduct and road safety rules of Government of Bangladesh.
- Drivers to ensure that all loads are covered and secured drivers to ensure operation equipment can’t leak materials hauled
- 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:

- Signs
- Pavement Markings
- Channelizing Devices
- Arrow Panels
- 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”).

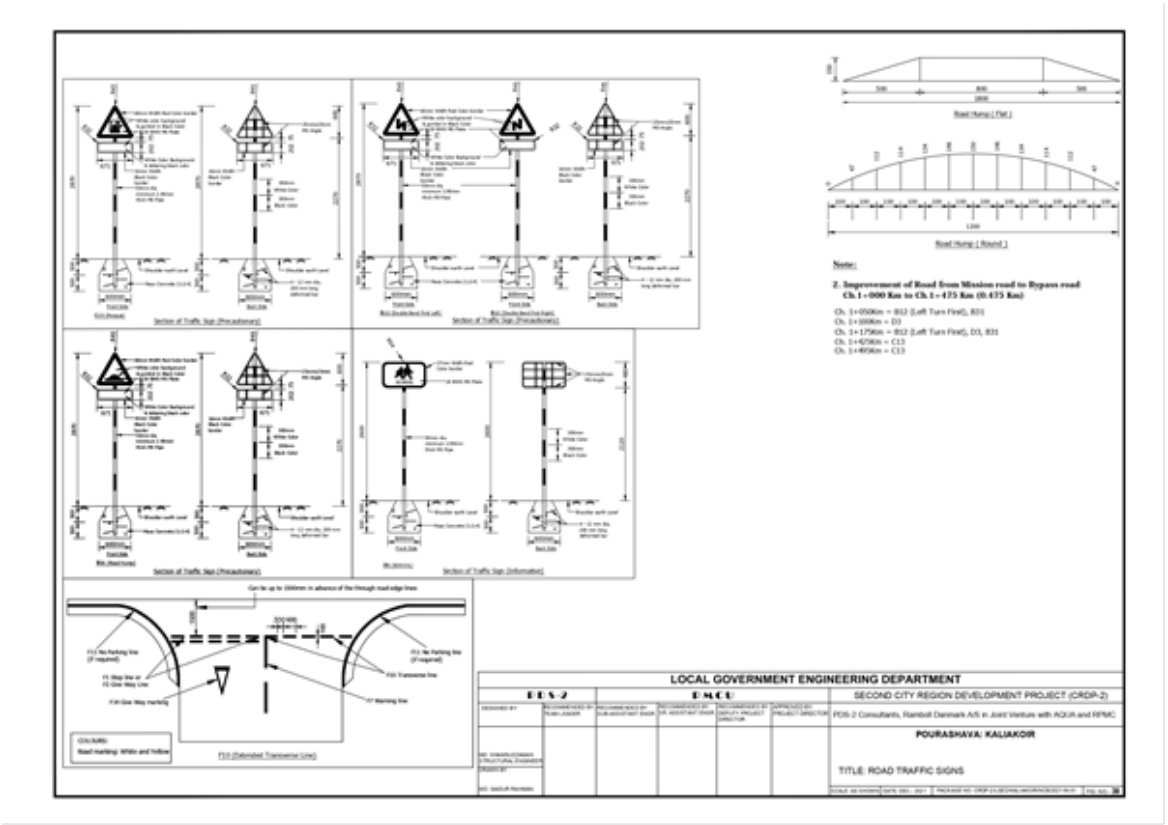
13. The work zone should take into consideration the space required for a buffer zone between the workers and the traffic (lateral and longitudinal) and the transition space required for delineation, as applicable. For the works, a 30 cm clearance between the traffic and the temporary STOP and GO signs should be provided. In addition, at least 60 cm is necessary to install the temporary traffic signs and cones.

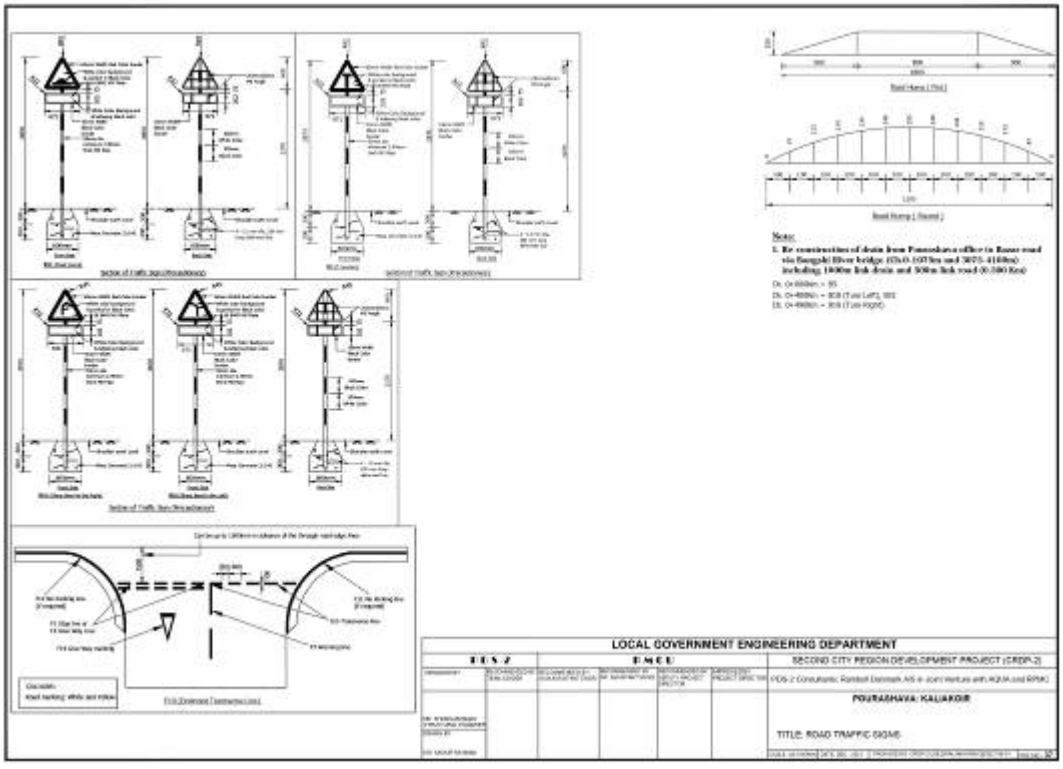
14. Traffic police should regulate traffic away from the work zone and enforce the traffic diversion result from full street closure in certain areas during construction. Flaggers/ personnel should be equipped with reflective jackets at all times and have traffic control batons (preferably the LED type) 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.

More information on road safety measures (structural and non-structural) considered for 2 candidate roads in the IEE.





Appendix 11: Environmental Clearance Certificate (ECC)

Government of the People's Republic of Bangladesh
Department of Environment
Head Office, Paribesh Bhaban
E-16 Agargaon, Dhaka-1207
www.doe.gov.bd

Memo No: DOE/Clearance/5194/2013/53 Date: 10 /02/2019

Subject: Environmental Clearance for City Region Development Project-II (CRDP-II).

Ref: Your application on 30/08/2018 and 27/12/2018.

Please refer to your letter and the captioned subject mentioned above, I have the pleasure to convey the approval of Environmental Clearance for City Region Development Project-II (CRDP-II).

A copy of the said Environmental Clearance Certificate is attached herewith for your kind information and necessary action at your end.

10.02.2019

(Syed Nazmul Ahsan)
Director (Environmental Clearance)
Phone # 8181673

Project Director
City Region Development Project-II (CRDP-II)
Local Government Engineering Department
RDEC LGED Bhaban (Level-4), Agargaon, Sher-e-Bangla Nagar, Dhaka.

Copy Forwarded to :

1) PS to Secretary, Ministry of Environment, Forest and Climate Change, Bangladesh Secretariat, Dhaka.
2) Director, Department of Environment, Dhaka Regional Office, Dhaka.
3) Assistant Director, Office of the Director General, Department of Environment, Head Office, Dhaka.

Government of the People's Republic of Bangladesh
Department of Environment
Paribesh Bhaban, E-16, Agargaon
Sher-e-Bangla Nagar, Dhaka-1207
www.doe.gov.bd

Environmental Clearance Certificate

Section 12 of the Environment Conservation Act, 1995 (Amended 2010)

Clearance Certificate Number: 53

File number: DOE/Clearance/5194/2013/

Clearance Certificate Issue Date: 10 February 2019

Renewal date not later than: 09 February 2020

A. Clearance Certificate Type
Environmental Clearance Certificate

B. Clearance Certificate Holder
Project Director City Region Development Project-II (CRDP-II) Local Government Engineering Department RDEC LGED Bhaban (Level-4), Agargaon, Sher-e-Bangla Nagar, Dhaka.

C. Premises to which this Clearance Certificate Applies
Construction and Rehabilitation of Roads and associated Drainage subprojects in Dhaka region comprise 9 roads in Gazipur City Corporation, 31 roads in Savar Upazila and Municipality, 10 roads in Rupganj Upazila and 23 roads in Araihazar Upazila of Narayanganj District.

D. Activities for which this Clearance Certificate Authorizes and Regulates
Construction and Rehabilitation of Roads and associated Drainage Network. These roads and associated drainage subprojects in Dhaka region comprise 9 roads in Gazipur City Corporation, 31 roads in Savar Upazila and Municipality, 10 roads in Rupganj Upazila and 23 roads in Araihazar Upazila of Narayanganj District.

E. Terms and Conditions for Environmental Clearance Certificate

1. **Limit Condition for Discharges to Air and Water**: The Environmental Clearance Certificate must comply with schedule 2 and 10, rule 12 of the Environment Conservation Rules, 1997.

2. **Noise Limit**: The Environmental Clearance Certificate must comply with the Noise Pollution (Control) Rules, 2006.

In case of non-coverage of ECR 1997 the World Bank Environment, Health and Safety Guideline shall be adhered to.

3. Operating conditions:

3.1 Activities must be carried out in a competent manner. This includes:
(a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and
(b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.

3.2 All plant and equipment installed at the premises or used in connection with the Environmental Clearance activity:
(a) must be maintained in a proper and efficient condition; and
(b) must be operated in a proper and efficient manner.

3.3 Construction works shall be restricted to day time hours so as to avoid/mitigate the disturbance of local lives as well as implementation schedules of the works shall be notified in advance to nearby residents.

3.4 Storage area for soils and other construction materials shall be carefully selected to avoid disturbance of the natural drainage.

3.5 This shall be ensured that soil is obtained from nearby areas, which are free of invasive plants. Re-vegetation and replanting shall be undertaken if rehabilitation works involve extensive vegetation clearance.

3.6 Vegetation clearance shall be minimizing at the construction phase as to minimize soil erosion. Soils for embankments shall be properly tested and compacted to ensure stability.

3.7 Proper construction practices shall be followed that minimize loss of habitats and fish breeding, feeding & nursery sites.

3.8 Proper and adequate sanitation facilities shall be ensured in labor camps throughout the proposed project period.

3.9 In order to control noise pollution, vehicles & equipment shall be maintained regularly; working during sensitive hours and locating machinery close to sensitive receptor shall be avoided.

3.10 No solid waste can be burnt in the project area. An environment friendly solid waste management should be in place during whole the period of the project in the field.

3.11 Proper and adequate on-site precautionary measures and safety measures shall be ensured so that no habitat of any flora and fauna would be demolished or destructed.

3.12 All the required mitigation measures suggested in the IEE report are to be strictly implemented and kept operative/functioning on a continuous basis.

3.13 Any heritage sight, ecological critical area, and other environmentally and/or religious sensitive places shall be avoided during project construction phase.

3.14 Resettlement plan should be properly implemented and people should be adequately compensated, where necessary.

3.15 Construction material should be properly disposed off after the construction work is over.

3.16 The Environmental Management Plan included in the IEE report shall strictly be implemented and kept functioning on a continuous basis.

4.1 Monitoring and Recording conditions:

4.1.1 The results of any monitoring required to be conducted by this Clearance Certificate must be recorded.

4.1.2 The following records must be kept in respect of any samples required to be collected for the purposes of this Clearance Certificate:
(a) the date(s) on which the sample was taken;
(b) the time(s) at which the sample was collected;
(c) the point at which the sample was taken; and
(d) the name of the person who collected the sample.

4.2 Requirement to monitor concentration of pollutants discharged

For each monitoring, the Clearance Certificate holder must monitor (by sampling and obtaining results by analysis) the following parameter: air quality, water quality and Noise.

5. **Reporting Conditions:** Environmental Monitoring Reports shall be made available simultaneously to Head quarters and respective Regional office of the Department of Environment on a quarterly basis during the whole period of the project.

6. **Notification of environmental harm:** The Clearance Certificate holder or its employees must notify the Department of Environment of incidents causing or threatening material harm to the environment as soon as practicable after the person becomes aware of the incident.

F. <u>Recording of pollution complaints</u>

The certificate holder must keep a legible record of all complaints made to the certificate holder or any employee or agent of the certificate holder in relation to pollution arising from any activity to which this Environmental certificate applies. The record must include details of the following:

(a) the date and time of the complaint;
(b) the method by which the complaint was made;
(c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
(d) the nature of the complaint;
(e) the action taken by the certificate holder in relation to the complaint, including any follow-up contact with the complainant; and
(f) if no action was taken by the certificate holder, the reasons why no action was taken.

The record of a complaint must be kept for at least 4 years after the complaint was made. The record must be produced to any authorized officer of the DOE who asks to see them.

G. **Validity of the Clearance Certificate**

This Environmental Clearance is valid for one year from the date of issuance and Project Director shall apply for renewal to the Dhaka Regional Office with a copy to Head Office of DOE in Dhaka at least 30 days ahead of expiry.

Violation of any of the above conditions shall render this clearance void.

This Environmental Clearance Certificate has been issued with the approval of the appropriate authority.

10.02.2019

(Syed Nazmul Ahsan)
Director (Environmental Clearance)
Phone # 8181673

Appendix 9: Renewal of Environmental Clearance Certificate (ECC)

Government of the People's Republic of Bangladesh
Department of Environment
Head Office, Paribesh Bhaban
E-16 Agargaon, Dhaka-1207
www.doe.gov.bd

Memo No: DoE/Clearance/5194/2013/61 Date: 24/03/2021

Subject: Renewal of Environmental Clearance Certificate for "Second City Region Development Project (CRDP-2), Local Government Engineering Department, LGED Bhaban, Agargaon, Sher-E-Bangla Nagar, Dhaka"

Ref: Your application dated 24/02/2021.

With reference to your above application, the Department of Environment hereby renews the Environmental Clearance Certificate in favor of the Second City Region Development Project (CRDP-2) subject to fulfilling the terms and conditions stated in Environmental Clearance Certificate issued on 10.02.2019 vide memo no. DoE/Clearance/5194/2013/53.

2. This renewal is valid upto 09 February, 2022. An application for further renewal along with a) the renewal fees (as per the ECR, 1997) b) VAT on renewal fees (in separate Treasury Chalan) and c) all associated documents shall be submitted to the Head Office of DoE with a copy to Dhaka Regional/Khulna Divisional Office at least 30 days ahead of expiry date.

24.03.2021

(Masud Iqbal Md. Shameem)
Director (Environmental Clearance)
Phone: 8181673

Project Director
Second City Region Development Project (CRDP-2)
Local Government Engineering Department,
LGED Bhaban, Agargaon
Sher-E-Bangla Nagar, Dhaka.

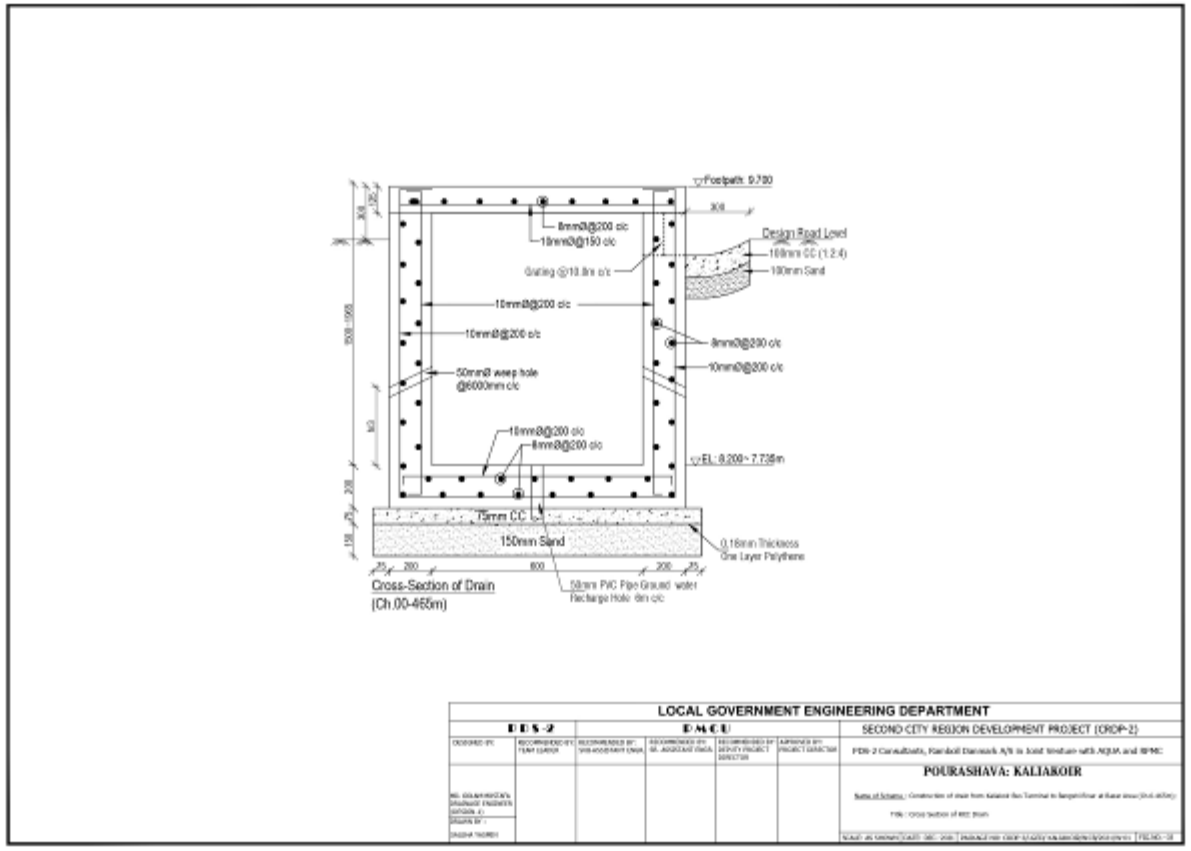
Copy Forwarded to :

1) PS to Secretary, Ministry of Environment, Forest and Climate Change, Bangladesh Secretariat, Dhaka.
2) Director, Department of Environment, Dhaka Regional Office, Dhaka.
3) Director, Department of Environment, Khulna Divisional Office, Khulna.
4) Assistant Director, Office of the Director General, Department of Environment, Head Office, Dhaka.

Appendix 13: Cross Sections of the Subproject Interventions

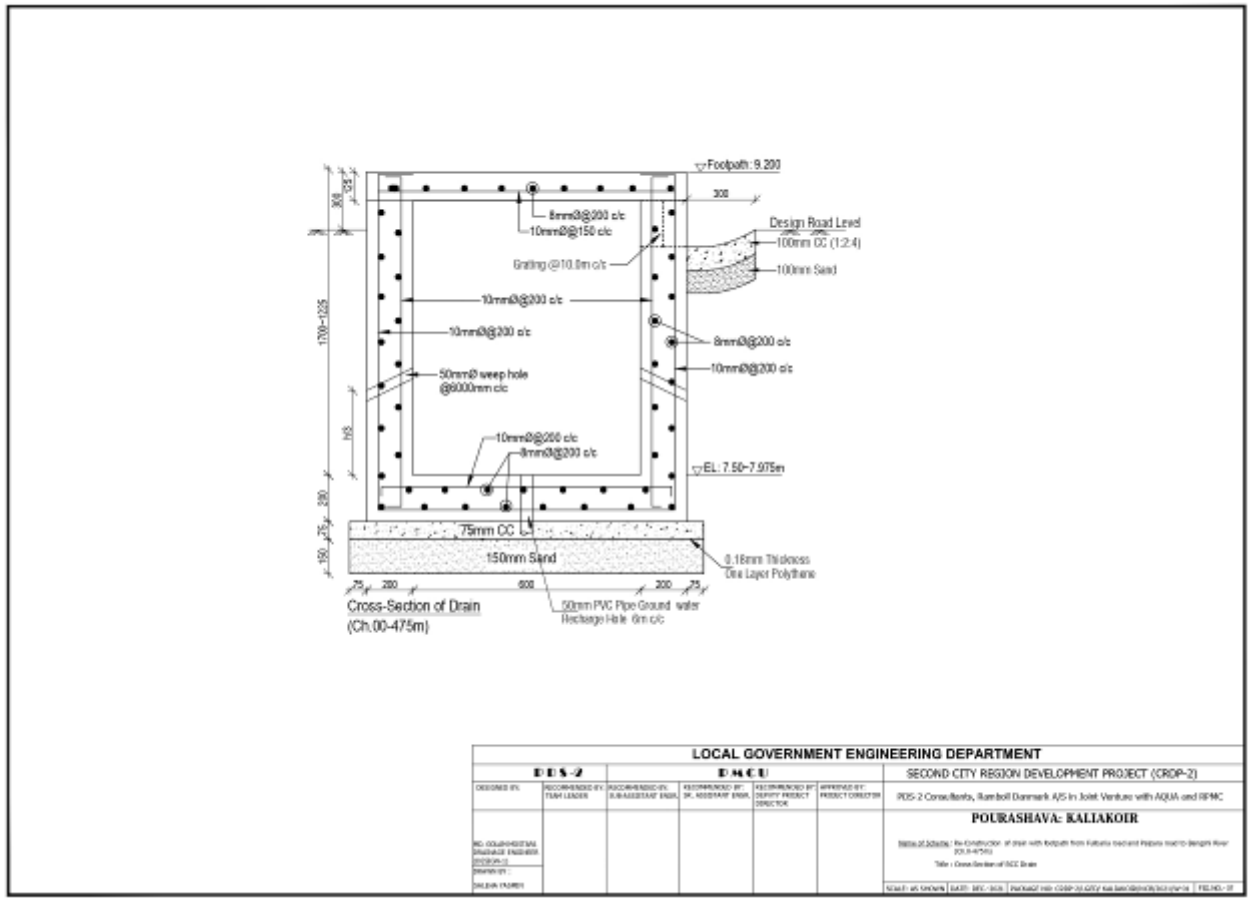
Scheme 1 (Drain-1): Construction of drain from Kaliakoir Bus Terminal to Bangshi River at Bazar area (Ch.0-465m)

Cross section of the RCC Box Drain (Ch.00-465m)



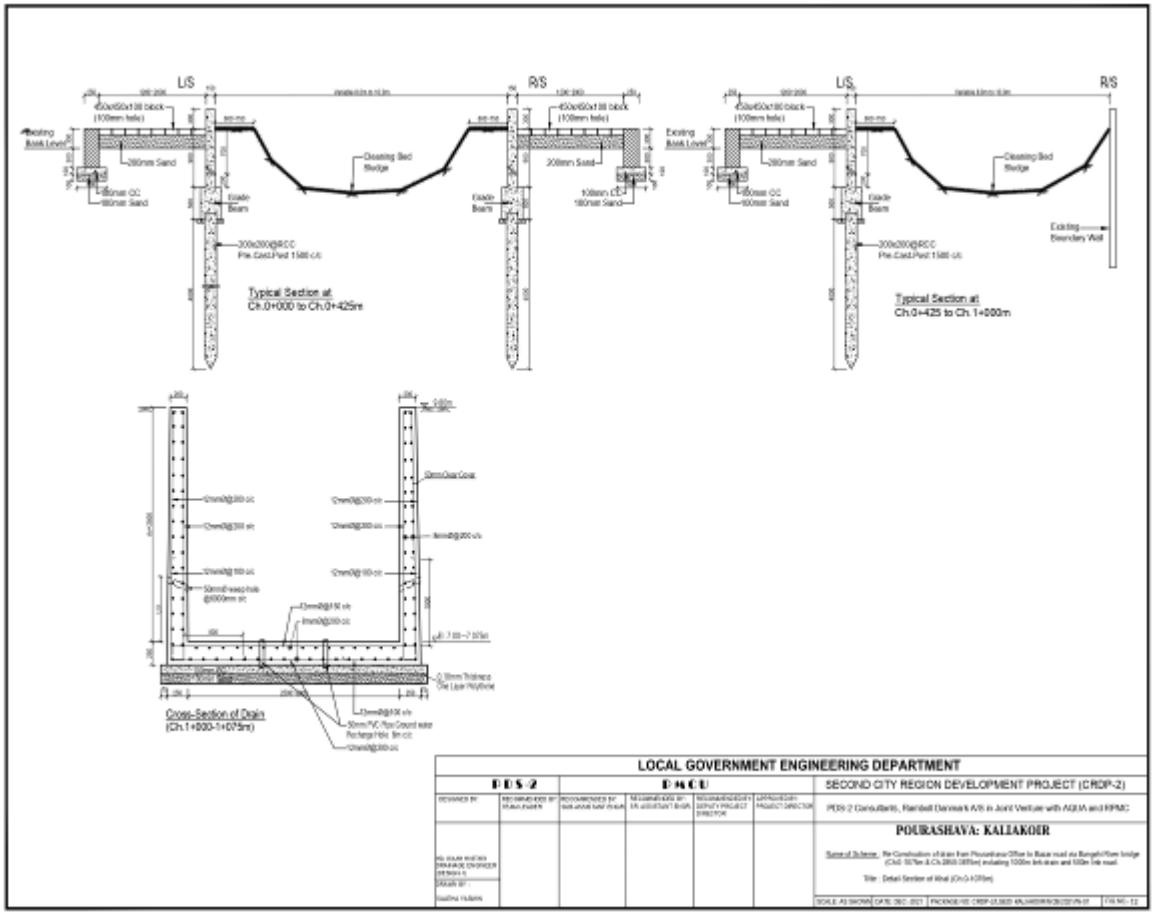
Scheme 2 (Drain-2): Re-construction of drain with footpath from Fulbaria road and Palpara road to Bangshi River (Ch.0-475m)

Cross section of the RCC Box Drain (Ch.00-475m)

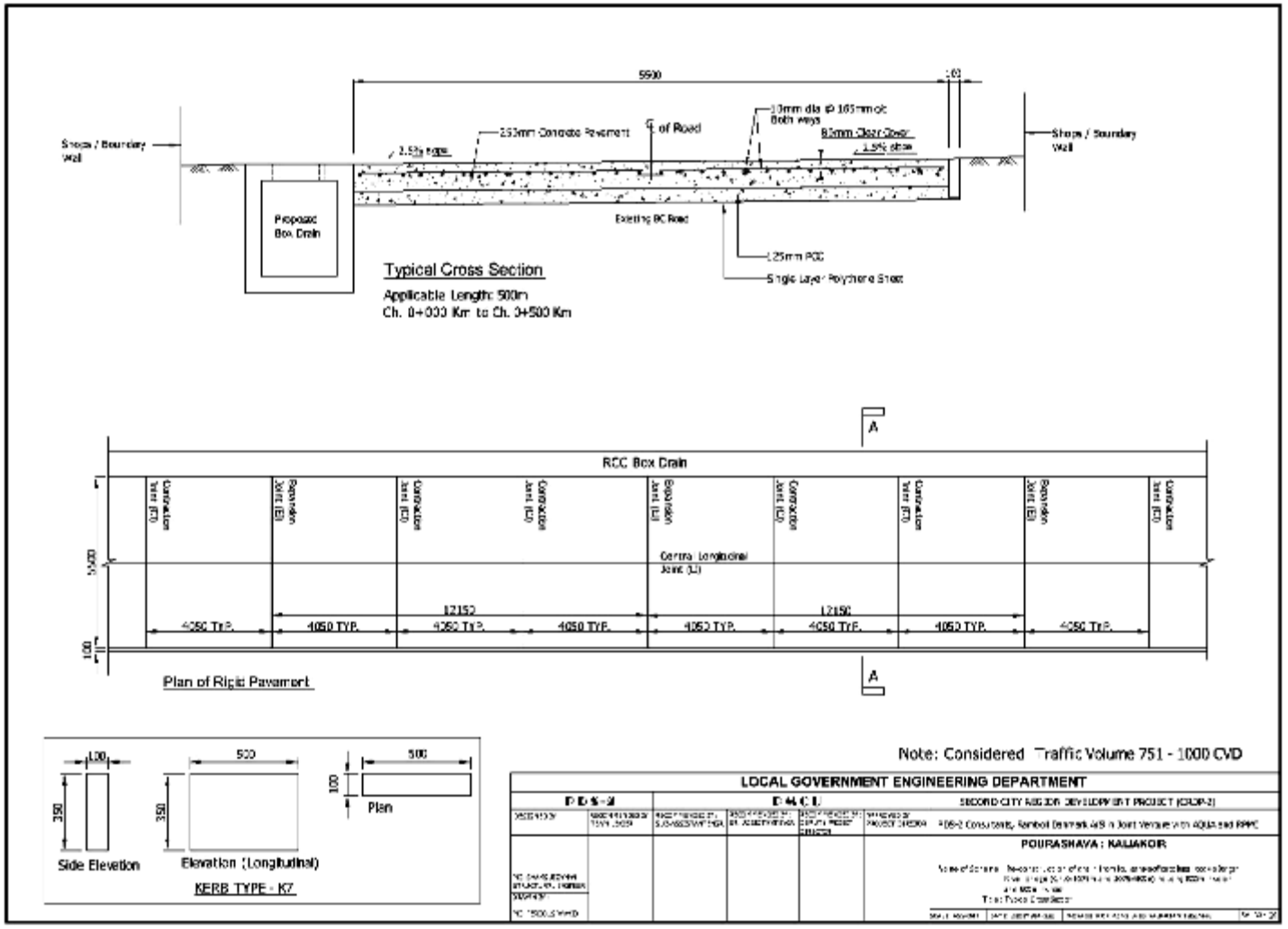


Scheme 3 (Drain-3 plus Road-1): Re-construction of drain from Pourashava Office to Bazar road via Bangshi River bridge (Ch.0-1075m & Ch. 2850-3875m) including 1000m link drain and 500m link road

A sample cross-section of RCC Open Drain

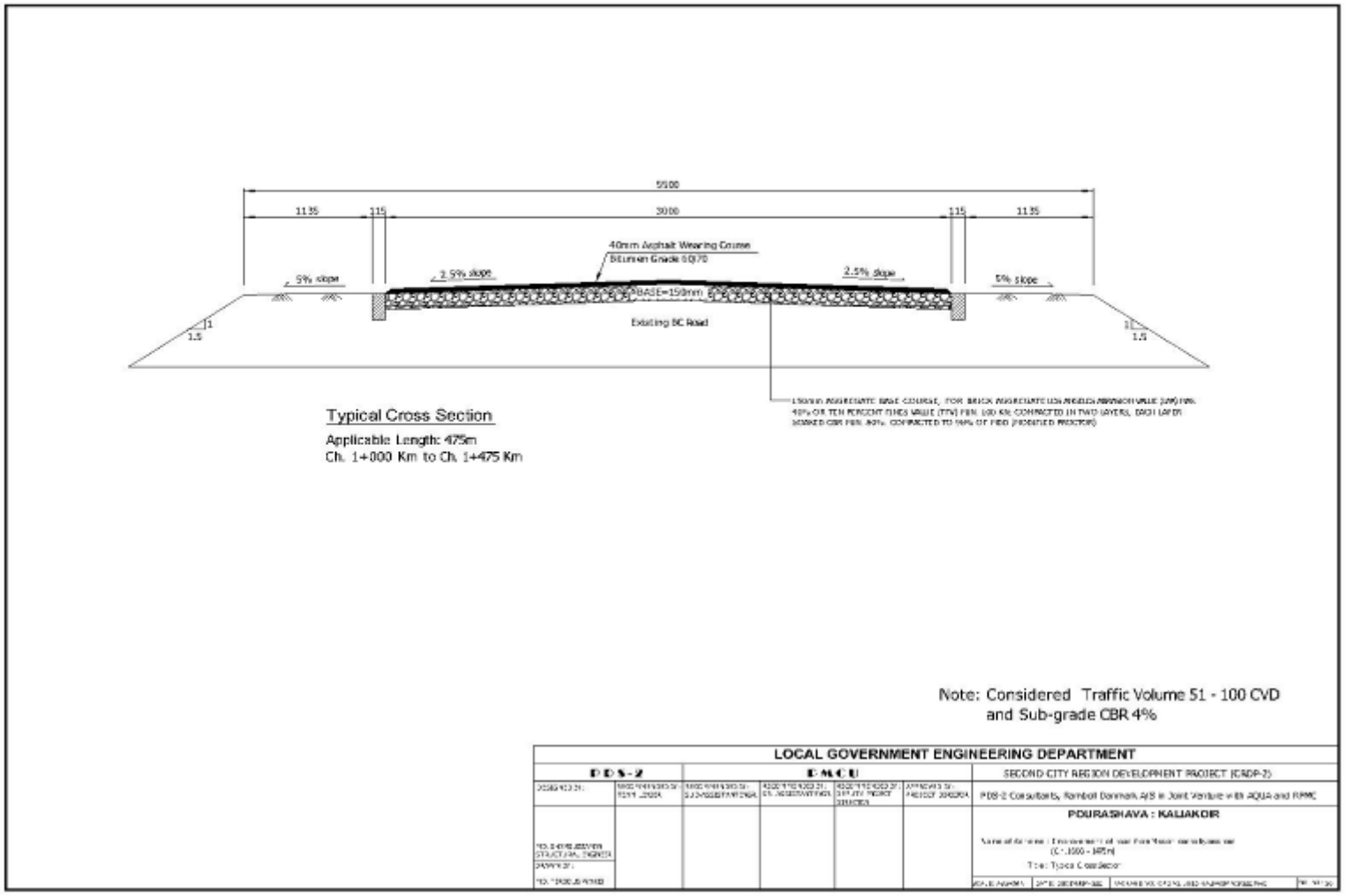


The typical cross section of the proposed road is presented in the figure below:

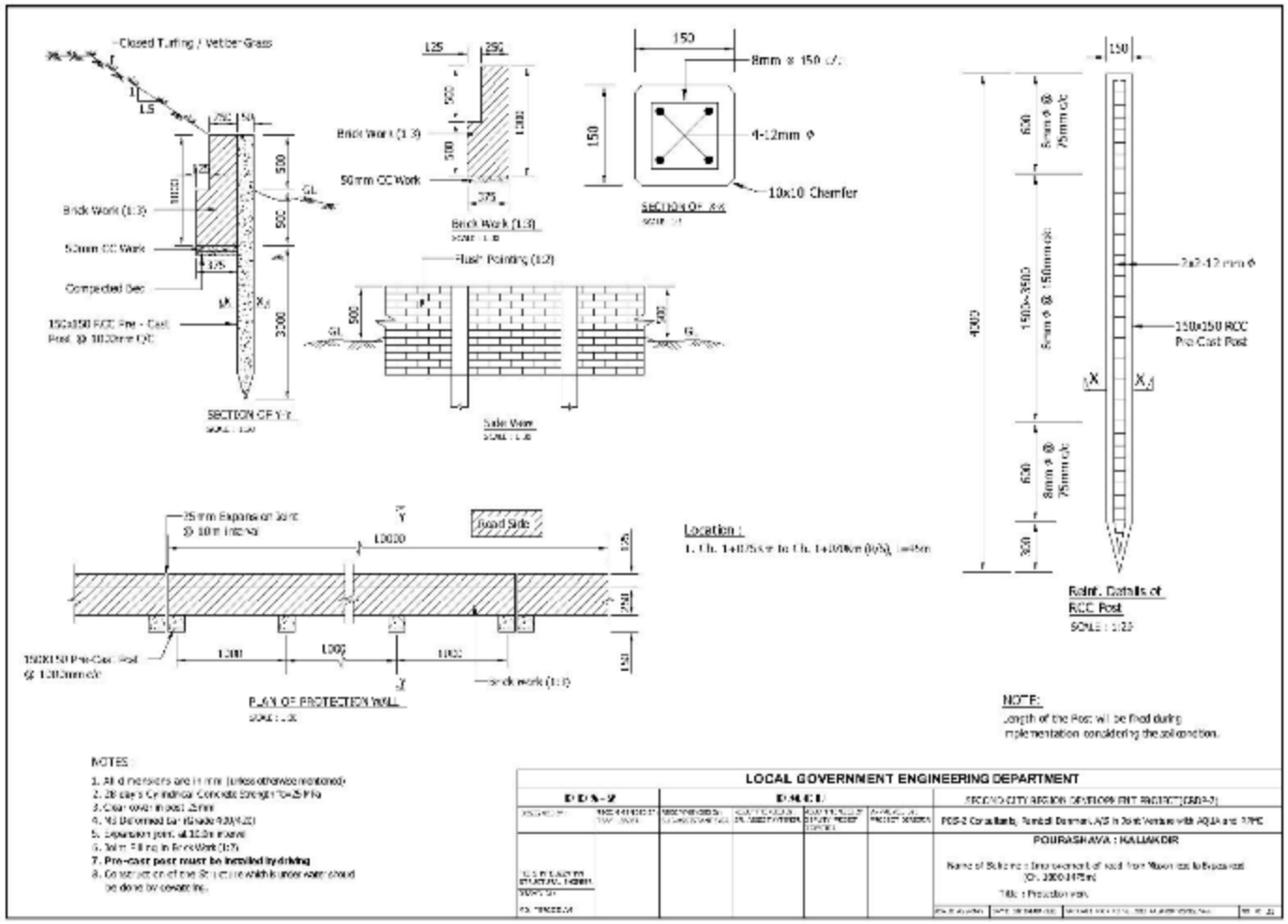


Scheme 4 (Road-2): Improvement road from Mission road to Bypass road (Ch.1000-1475m)

The typical cross section of the proposed road is presented in the figure here below:

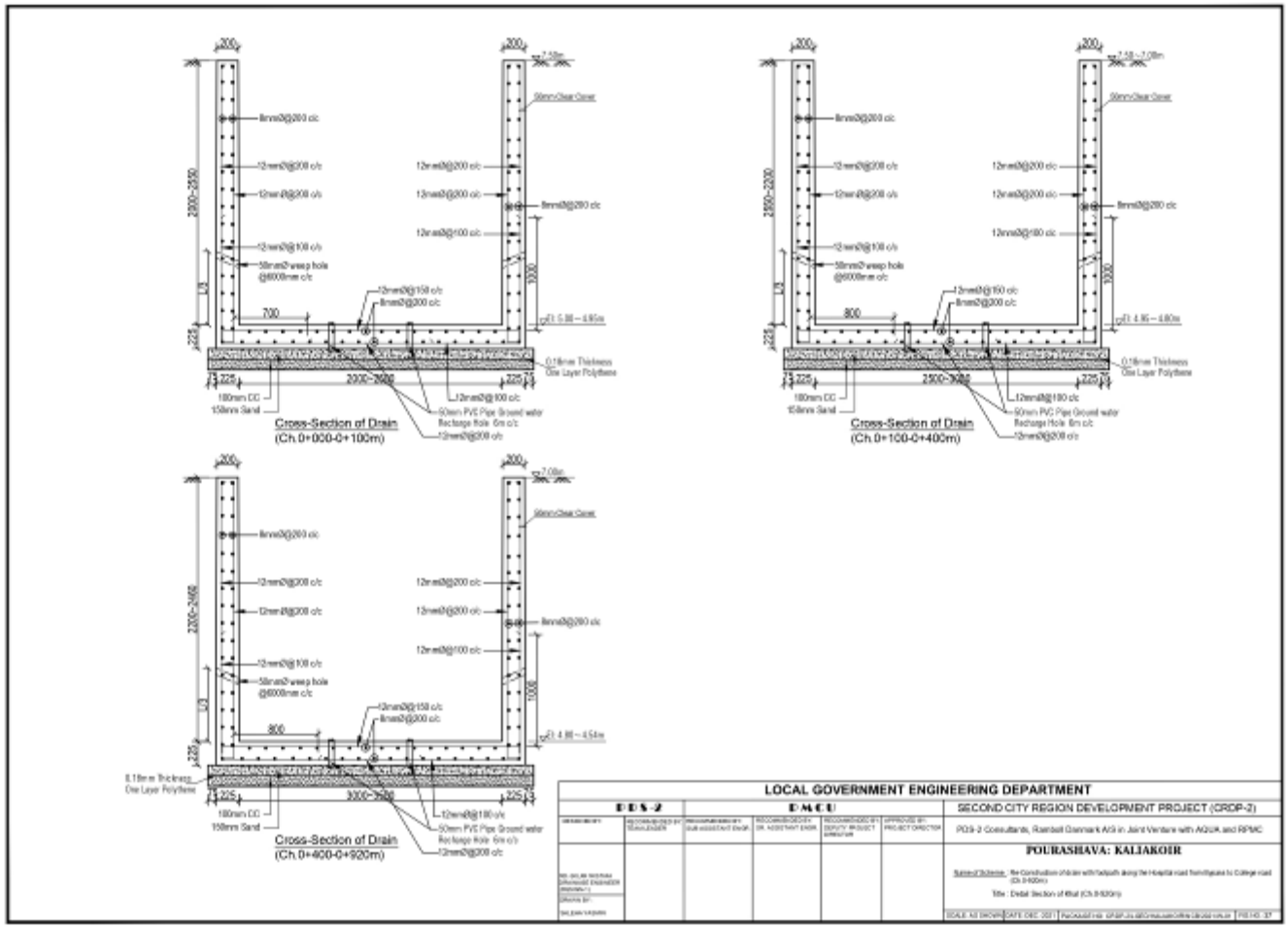


Details of typical design of protection work



Scheme 5 (Drain-4): **Re-construction of drain with footpath along the Hospital road from Bypass to College road (Ch.0-920m)**

Cross-section of RCC Open Drain



Appendix 14: A Draft Sample Site-specific Environmental Management Plan (SEMP)

SECOND CITY REGION DEVELOPMENT PROJECT

Package No. CRDP-II/LGED/Kaliakoir/NCB/2021/W-01

Contractor:

Table of Contents

Attachments

Attachment 1: Site-Specific Environmental Management plan (SEMP)

Attachment 2: Site-Specific Workers Health Hazard and Risk Assessment with subproject construction Activity

Attachment 1: Site-specific Environmental Management Plan

Sl. No	Environmental Issues/Aspects	Actions to be taken	Implementationn Period	Responsible Party	Supervised by	Implementation Status (Yes/No/ NA)
A.	**Before Construction**					
1.	All approvals/ Consents, permits, clearances, etc. shall be obtained prior to the commencement of improvementworks	The Contractor shall obtain permissions in writing from all private landowners / concerned parties whose land will be temporary utilized for borrow pits, CC block casting, materials storage, workforce camps, construction site office etc.	Prior to the commencementof improvementworks	Contractor	PMCU, Kaliakoir PIU, PDSC,	
2.	Commencement of Work	The contractor shall adequately record the condition of roads, agricultural land and other infrastructure prior to the start of transporting materials, goods and equipment, and construction. ***(Ref. GCC Sub Clause 40.3)***	Prior to the commencementof improvementworks	Contractor	PMCU, Kaliakoir PIU, PDSC,	
3.	Compliance of all applicable national and local environmental laws and regulations	Following all applicable national and local environmental laws and regulations, the Contractor shall establish an operational system for managing environmental impacts and monitoring works as set forth in IEE and EMP. ***(Ref. GCC Sub Clause 27.1)***	Prior to the commencementof improvementworks	Contractor	PMCU, Kaliakoir PIU, PDSC,	
4..	Installation of Project Signboard	The Contractor shall erect signboard atlocation of clear visibility showing all information on the followings: a) Name of the Construction Firm, b) Descriptionof the contracted works, c) Contract value of the works, d) Name of the supervising authority etc. (Information on the signboard	Prior to the commencementof improvementworks	Contractor	PMCU, Kaliakoir PIU, PDSC,	
5.	Establishment of Contractor's site office, Workforce campand other ancillary sites	The Contractor shall arrange location and establish Contractor's site office,Workforce camp with proper accommodation and other ancillary sites above flood level and at least 50 m away from any drainage line or watercourse. ***(Ref. GCC Sub Clause 29.2)***	Prior to the commencementof improvementworks	Contractor	PMCU, Kaliakoir PIU, PDSC,	
6.	Installation of Regulatory safety signs and signals	The Contractor shall install the requiredRegulatory safety signs and signals during the construction works of the project at appropriate locations of campsite and construction areas. ***(Ref. GCC Sub Clause 27.1)***	Prior to the commencementof improvementworks	Contractor	PMCU, Kaliakoir PIU, PDSC,	

Sl. No	Environmental Issues/Aspects	Actions to be taken	Implementationn Period	Responsible Party	Supervised by	Implementation Status (Yes/No/ NA)
7.	Firefighting arrangements at Contractor's site office, Workforce camp and other ancillary sites	The Contractor shall provide sufficient wall-mounted hand Fire-Extinguishers, Buckets of sands and water at locations around Contractor's site office, Workforce camp and other ancillary sites (fuel storage, workshop, site laboratory etc)	During pre-workstage	Contractor	PMCU, Kaliakoir PIU, PDSC,	
B. During Construction						
8.	Vegetation clearance	The contractor shall avoid tree cutting or minimize if total avoidance is not possible. In case of unavoidable tree cutting, replacement of 3 trees per tree cut and follows the LGED tree plantation program to implement this measure	Throughout the construction period	Contractor	PMCU, Kaliakoir PIU, PDSC,	
9.	Stockpiling	The contractor shall stockpile construction materials (like bricks, cement, soils and other materials) to prevent any loss of materials, and stockpiled materials shall be stored onnon-hazardous sites, away from both habitation and drainage lines.	Throughout the construction period	Contractor	PMCU, Kaliakoir PIU, PDSC,	
10.	Restoration of disrupted existing utilities	The contractor shall take necessary measures to prevent unnecessary disruption of existing utilities during construction	Throughout the construction period	Contractor	PMCU, Kaliakoir PIU, PDSC,	
11.	Provision of First Aid Facility	The contractor shall make provision ofadequate first-aid facilities including essential medications of emergency needs for workers. ***(Ref. GCC Sub Clause 29.2)***	During construction workand to be replenished as and when needed	Contractor	PMCU, Kaliakoir PIU, PDSC,	
12.	Supply of safe drinking water	The Contractor will supply/provide safedrinking water to the workers for healthsafety. This supply may include tube- well water, bottled water. ***(Ref. GCC Sub Clause 29.2)***	Throughout the construction period	Contractor	PMCU, Kaliakoir PIU, PDSC,	
13.	Provision of sanitation facilities	The contractor will provide sanitation facilities to the workers and field office staff by installing sanitary latrine, urinaland bathroom (separate for Male and Female). ***(Ref. GCC Sub Clause 29.2)***	Throughout the constructionperiod	Contractor	PMCU, Kaliakoir PIU, PDSC,	
14.	Use of Personal Protective Equipment (PPE)	The Contractor shall ensure the use ofPPE (gloves, masks, helmets, gum boots, goggles etc.) mandatory for workers, and shall make provision of adequate number of PPEs for workers. ***(Ref. GCC Sub Clause 27.1)***	Throughout the construction period	Contractor	PMCU, Kaliakoir PIU, PDSC,	

Sl. No	Environmental Issues/Aspects	Actions to be taken	Implementationn Period	Responsible Party	Supervised by	Implementation Status (Yes/No/ NA)
15.	Community Health and Safety	The contractor shall ensure the following: • Members of the community adjacent	Throughout the construction period	Contractor	PMCU, Kaliakoir PIU, PDSC,	
		• to the construction area will be notified of construction activities in order to limit unnecessary disturbance or interference • Dedicated/alternative pathways for pedestrians will be developed to ensure safe passage aroundconstruction activities. • Construction activities will be undertaken according to during daylight working hours between the hours of 07:00 – 17:00 on weekdays • Construction vehicles will avoid public roads during peak hours	Throughout the construction period	Contractor	PMCU, Kaliakoir PIU, PDSC,	
16.	Occupational Health & Safety	The contractor shall provide training toall construction workers in basic sanitation and health care issues and safety matters and on the specific hazards of their work. The following services will be enabled at the construction sites: • Fire extinguishers clearlysign posted. • First aid facility clearly signposted. • Stock of medicines at site. • Personal Protective Equipment ***(Ref. GCC Sub Clause 27.1)***	Throughout the construction period	Contractor	PMCU, Kaliakoir PIU, PDSC,	
17.	Child Labour	The Contractor must not employ any child to perform any work, including work that is economically exploitative, or is likely to be hazardous to, to interfere with, the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development. ***(Ref. GCC Sub Clause 30.1)***	Throughout the construction period	Contractor	PMCU, Kaliakoir PIU, PDSC,	

Sl. No	Environmental Issues/Aspects	Actions to be taken	Implementationn Period	Responsible Party	Supervised by	Implementation Status (Yes/No/ NA)
18.	Waste management	The Contractor shall provide adequatenumber of garbage bins at site office and workforce campsite to collect the generated solid wastes and debris of these areas, and organize safe disposal of these wastes. The Contractor shall also ensure safe disposal of liquid wastes generated atcamp site	Throughout the construction period	Contractor	PMCU, Kaliakoir PIU, PDSC,	
19.	Interference with the enjoyment of the area and creationof offensive conditions	The contractor shall ensure thefollowings: • Prepare a waste disposal plan • Avoid stockpiling of excess spoils • Clear wastes regularly • Cover delivery trucks during transportation • Clean worksite regularly	Throughout the constructionperiod	Contractor	PMCU, Kaliakoir PIU, PDSC,	
20.	Chance finding (archaeological, paleontological, architectural sites of significance)	The contractor shall stop workimmediately if any findings are suspected, and shall bring the matter into the notice of concerned authority	Throughout the construction period	Contractor	PMCU, Kaliakoir PIU, PDSC,	
21.	Deployment of Environment and Safety Supervisor	The Contractor shall employ one full-time Environment and Safety Supervisor for compliance monitoringof EMP.	Prior to start of construction work	Contractor	PMCU, Kaliakoir PIU, PDSC,	
22.	Dust Pollution Control	In order to suppress dust pollution, the Contractor shall make arrangement for spraying water on dry surfaces of roads, construction and ancillary sites	As and whenneeded	Contractor	PMCU, Kaliakoir PIU, PDSC,	
23.	Noise Pollution Control	The Contractor shall ensure that construction vehicles and machineriesand construction activities as well do not generate unacceptably high level of sound/noise	Throughout the construction period	Contractor	PMCU, Kaliakoir PIU, PDSC,	
24.	Monitoring of ground water quality	The Contractor shall perform the ground water quality test from any recognized laboratory for *pH, DO, Cl-, EC, As, NO3 BOD5d, COD* etc.	At start of work and semi-annually	Contractor	PMCU, Kaliakoir PIU, PDSC,	

Sl. No	Environmental Issues/Aspects	Actions to be taken	Implementationn Period	Responsible Party	Supervised by	Implementation Status (Yes/No/ NA)
25	Monitoring of Surface Water Quality	The Contractor shall perform the surface water (river, khal and pond)quality test from any recognized laboratory for parameters *pH, DO, Cl- BOD5d, COD, NH4/NO3, TSS, TDS & total coliform* etc.	At start of work and semi-annually	Contractor	PMCU, Kaliakoir PIU, PDSC,	
26.	Monitoring of Air Quality	The Contractor shall perform the airquality tests of selected sites for parameters *PM10, PM2.5, NOx, SOx & CO* etc.	At start of work and semi-annually	Contractor	PMCU, Kaliakoir PIU, PDSC,	
27.	Monitoring of Noise Quality	The Contractor shall undertake monitoring of noise level (dB) of selected busy areas inside the subproject site (under normal condition and with traffic) calibrating the Field Noise Meter at dB for 40 – 90.	At start of work and semi-annually	Contractor	PMCU, Kaliakoir PIU, PDSC,	
28.	Training	To help improve the understanding of environmental management of projectworks, the Contractor with the help of PMCU, Kaliakoir PIU, PDSC shall arrange required environmental training on EMP for his Construction Field supervisors / Environment & Safety Supervisors.(***Ref. GCC Sub Clause 27.2***)	Throughout the construction period	Contractor	PMCU, Kaliakoir PIU, PDSC,	
29.	Reporting and Documentation	The Contractor is required to keep the following records at the site, and these include: a) Environmental Monitoring Results b) Contractors self-assessmentrecord/results c) Register of non-compliance d) Register of corrective actions e) Monthly Environmental Reports withfield photographs	Throughout the constructionperiod	Contractor	PMCU, Kaliakoir PIU, PDSC,	
C. During Post Construction						
30.	Post construction site clearing (removal of equipment / surplus materials/debris/temporary structures) and full reinstatement	Upon completion of construction, the contractor shall fully reinstate pathways, other local infrastructure, and agricultural land to at least their pre-project condition as recorded by the Contractor in consonance with its obligation. ***(Ref. GCC Sub Clause 40.3./ GCC Sub Clause***	Before handover of the completed subproject works to the PIU	Contractor	PMCU, Kaliakoir PIU, PDSC,	

Sl. No	Environmental Issues/Aspects	Actions to be taken	Implementationn Period	Responsible Party	Supervised by	Implementation Status (Yes/No/ NA)
		80.2)				

Attachment 2: Site-specific Worker Health Hazard and Risk Assessment associated with subproject construction Activity

Sl. no.	Activity	Hazard Associated with the activity	Condition	Impact	Control	Use of PPE
1	Mobilization, Clearing and grubbing	Injury during falling from height, materials handling, electric shock, slip & trip, vehiclemovement etc.	Routine	Human injury &construction hampered	Awareness build up,cleaning and daily checkup.	Hand gloves, Helmet, visible vestand boot
2	Earth / Sand Filling work	Injury during falling from height, materials handling, electric shock, slip & trip, vehiclemovement etc.	Routine	Human injury & construction hampered	Awareness build up, Cleaning and dailycheckup.	Hand gloves, Helmet, visible vestand boot
3	Excavation	Injury during falling from height, materials handling, slip & trip, vehicle movement, edgecollapse etc.	Routine	Human injury &construction hampered	Awareness build up,cleaning and daily checkup.	Hand gloves, Helmet, visible vestand boot
4	Concrete Mixing /setting, carrying etc.	Chemical Hazard, Injury during materials handling, falling, electric shock, slip & trip,vehicle movement etc.	Routine	Human injury & Constructio nhampered.	Follow SOP, Awareness build up,cleaning & daily	Hand gloves, Helmet, visible vestand boot
5	Electrical switchboard, wiring etc.	Noise, injury during materials handling, falling from high, electric shock, slip & trip, vehiclemovement etc. during performing work.	Routine	Human injury & Constructio nhampered.	Follow SOP, Awareness build up, cleaning & daily checkup.	Hand gloves, Helmet, visible vestand boot
6	Steel bar cutting, bending,welding etc.	Noise, injury during materials handling, fallingfrom high, electric shock, slip & trip, vehicle movement etc. during performing work.	Routine	Human injury &construction hampered.	Follow SOP, Awareness build up,cleaning & daily checkup.	Hand gloves, Helmet, visible vestand boot
7	Wood / steel shutter making,erection, handling etc. work	Injury during materials handling, falling fromhigh, electric shock, slip & trip, vehicle movement etc. during performing work.	Routine	Human injury &construction hampered.	Follow SOP, Awareness build up,cleaning & daily checkup.	Hand gloves, Helmet, visible vestand boot
8	Asphalt / Prime Coat / TackCoat laying, Dense Bituminous Surfacing, Scarify & hard bed preparation painting works	Injury during materials handling, slip & trip, vehicle movement, fire etc. during performingwork.	Routine	Human injury &construction hampered.	Follow SOP, Awareness build up,cleaning & daily checkup.	Hand gloves, Helmet, visible vestand boot
9	Plant, equipment, Vehicles movement.	Noise, stuck by, slip & trip, Injury during performing work.	Routine	Human injury & Constructio nhampered.	Traffic management; follow SOP, Awarenessbuild up, cleaning & daily checkup.	Hand gloves, Helmet, visible vestand boot
10	Materials handling	Injury during falling from high, materials falling, electric shock, slip & trip, platform Collapse etc.	Routine	Human injury &construction hampered.	Awareness build up,cleaning and daily checkup	Hand gloves, Helmet, visible vestand boot

11	Fire safety	Fire due to electric short circuit, asphalt laying &welding works	Routine	Human injury / fatality & construction Hampered.	Awareness build up & training, cleaning anddaily checkup	Hand gloves, Helmet, visible vestand boot
12	Plaster / Brick on End Edgingwork, Sand blinding, Flush Pointing etc.	Stuck by, contact with chemicals, slip & trip,materials falling, etc.	Routine	Human injury / fatality & construction hampered.	Awareness build up, supervision & training.	Hand gloves, Helmet, visible vestand boot
13	Shutter Dismantling	Falling from high, shutter collapse, electric shocketc.	Routine	Human injury & product hampered	Awareness build up, supervision & training.	Hand gloves, Helmet, visible vestand boot

Appendix 15: Sample outline of OHS, COVID-19 H&S Plan and Waste Management Plan

Sample outline of OHS Plan: (Appendix 2 of SEMP)

Sl no	Activity	Hazard Associated with the activity	Condition	Impact	Control	Use of PPE
1	Mobilization, Clearing and Grub binging.	Injury during falling from height, materials handling, electric shock, slip & trip, vehicle movement etc.	Routine	Human injury &construction hampered	Awareness build up, cleaning and daily checkup.	Hand gloves, Helmet, visible vest and boot
2	Earth / Sand Filling work	Injury during falling from height, materials handling, electric shock, slip & trip, vehicle movement etc.	Routine	Human injury & construction hampered	Awareness build up, Cleaning and daily checkup.	Hand gloves, Helmet, visible vest and boot
3	Excavation	Injury during falling from height, materials handling, slip & trip, vehicle movement, edge collapse etc.	Routine	Human injury &construction hampered	Awareness build up, cleaning and daily checkup.	Hand gloves, Helmet, visible vest and boot
4	Concrete Mixing /setting, carrying etc.	Chemical Hazard, Injury during materials handling, falling, electric shock, slip & trip, vehicle movement etc.	Routine	Human injury & Construction hampered	Follow SOP, Awareness build up, cleaning & daily	Hand gloves, Helmet, visible vest and boot
5	Electrical switchboard, wiring etc.	Noise, injury during materials handling, falling from high, electric shock, slip & trip, vehicle movement etc. during performing work.	Routine	Human injury & Construction hampered	Follow SOP, Awareness build up, cleaning & daily checkup.	Hand gloves, Helmet, visible vest and boot
6	Steel bar cutting, bending, welding etc.	Noise, injury during materials handling, falling from high, electric shock, slip & trip, vehicle movement etc. during performing work.	Routine	Human injury &construction hampered.	Follow SOP, Awareness build up, cleaning & daily checkup.	Hand gloves, Helmet, visible vest and boot
7	Wood / steel shutter making, erection, handling etc. work	Injury during materials handling, falling from high, electric shock, slip & trip, vehicle movement etc. during performing work.	Routine	Human injury &construction hampered	Follow SOP, Awareness build up, cleaning & daily checkup.	Hand gloves, Helmet, visible vest and boot

8	Asphalt / Prime Coat / Tack Coat laying, Dense Bituminous Surfacing, Scarify & hard bed preparation painting works	Injury during materials handling, slip & trip, vehicle movement, fire etc. during performing work.	Routine	Human injury &construction hampered	Follow SOP, Awareness build up, cleaning & daily checkup.	Hand gloves, Helmet, visible vest and boot
9	Plant, equipment, Vehicles movement.	Noise, stuck by, slip & trip, Injury during performing work.	Routine	Human injury & Construction hampered	Traffic management; Follow SOP, Awareness build up, cleaning &daily checkup.	Hand gloves, Helmet, visible vest and boot
10	Materials handling	Injury during falling from high, materials falling, electric shock, slip &trip, platform Collapse etc.	Routine	Human injury &construction hampered	Awareness build up, cleaning and daily checkup	Hand gloves, Helmet, visible vest and boot
11	Fire safety	Fire due to electric short circuit, asphalt laying &welding works	Routine	Human injury /fatality &construction Hampered.	Awareness build up &training, cleaning and daily checkup	Hand gloves, Helmet, visible vest and boot
12	Plaster / Brick on End Edging work, Sand blinding, Flush Pointing etc.	Stuck by, contact with chemicals, slip & trip, materials falling, etc.	Routine	Human injury /fatality &construction hampered.	Awareness build up, supervision training.	Hand gloves, Helmet, visible vest and boot
13	Shutter Dismantling	Falling from high, shutter collapse, electric shocked.	Routine	Human injury &product hampered	Awareness build up, supervision training.	Hand gloves, Helmet, visible vest and boot

Sample outline of COVID-19 H&S plan

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Appendix 16: Dust Suppression Log sheet

LOCAL GOVERNMENT ENGINEERING DEPARTMENT
City Region Development Project-II
LGED Headquarters, Dhaka

Dust Suppression Log Chart

(ধুলা নিয়ন্ত্রন কার্যক্রমের লগ চার্ট)

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উপ- প্রকল্পের স্কিম নামঃ	
জেলাঃ	উপজেলাঃ

মাসঃ

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