Initial Environmental Examination

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Bangladesh: Coastal Towns Climate Resilience Project – Construction and Improvement of Roads and Roadside Drains in Kalaroa Pourashava, District Satkhira

Package Nos.: e-GP/CTRCP/KALA/RD 01, and e-GP/CTRCP/KALA/RD 02

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

CURRENCY EQUIVALENTS
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Currency Unit	=	Bangladesh Taka (BDT)
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$1.00	=	BDT 109.40

ABBREVIATIONS

ADB	Asian Development Bank
DOE	Department of Environment
EA	Executing Agency
EIA	Environmental Impact Assessment
ECA	Environmental Conservation Act
ECR	Environmental Conservation Rules
ECC	Environmental Clearance Certificate
EMP	Environmental Management Plan
GOB	Government of Bangladesh
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
IBAT	Integrated Biodiversity Assessment Tool
IEE	Initial Environmental Examination
MOEFCC	Ministry of Environment and Forests, and Climate Change
NGO	Nongovernment Organization
O&M	Operation and Maintenance
PIU	Project Implementation Unit
PMU	Project Management Unit
ROW	Right-of-way
SPS	Safeguard Policy Statement
WHO	World Health Organization

WEIGHTS AND MEASURES

ha	–	hectare
km	–	kilometer
m	–	meter
mg/l	–	milligram per liter
MLD	–	million liters per day
mm	–	millimeter
km/h	–	kilometer per hour

NOTE

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

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EXECUTIVE SUMMARY

Bangladesh is one of the most vulnerable countries in the world with high exposure to a multitude of climate-related hazards. The natural hazards interact with physical and socioeconomic factors, including its low-lying delta and coastal areas, high population density, poverty levels, and lack of resilient infrastructure, resulting in high disaster risk with widespread impacts on both rural and expanding urban areas. The coastal towns are the most vulnerable to increasing climate risks.

Proposed Coastal Towns Climate Resilience Project (CTCRP). The ADB supported the Coastal Towns Climate Resilience Project (CTCRP) which will strengthen climate resilience and disaster preparedness in 22 (twenty-two) vulnerable coastal pourashavas (project towns) of Bangladesh. The towns were selected based on their vulnerability, population size, density, and level of past investments. The project takes a holistic and integrated approach to urban development and will (i) provide climate-resilient municipal infrastructure, and (ii) strengthen institutional capacity, local governance, and knowledge-based public awareness, for improved urban planning and service delivery considering climate change and disaster risks. Investments will benefit the poor and women. Municipal infrastructure will include (i) elderly (older persons), women, children, and persons with disabilities (EWCD) friendly cyclone shelters constructed with early warning system; (ii) roads including emergency access roads and roads with stormwater drainages, footpath, bridges and culverts rehabilitated, or constructed for improved connectivity, and access to emergency services in the event of disasters triggered by natural hazard, including footpath, drains bridges and culverts which are critical for accessing emergency services; (iii) climate-resilient infrastructure for improved urban flood risk management including stormwater drains, nature-based solutions, water bodies restoration, and integrated waste management (IWM) developed; (iv) gender-responsive and socially inclusive urban public spaces improved; and (v) slum improvement programs for basic service improvement implemented in each pourashava following poverty reduction action plan and (vi) EWCD-friendly sanitation facilities constructed for poor households. Slum improvement models currently being implemented in ADB projects, such as the Third Urban Governance and Infrastructure Improvement Project, will be replicated with necessary improvements.[1] Output 1 will also support development of EWCD-friendly socio-economic infrastructures including (i) development of gender responsive markets; (ii) bus terminals; and (iii) other priority roads, bridges, culverts, and boat landing stations.

The project will cover and prioritize the following 22 towns as beneficiaries: Bagerhat, Bhedarganj, Morelganj, Mehendiganj, Paikgacha, Kalaroa, Patharghata, Gouranadi, Charfasson, Borhanuddin, Betagi, Jhalokathi, Muladi, Chalna (Dacope), Bhedarganj, Bhedarganj, Swarupkathi, Lalmohon, Nalchity, Janjira, Kuakata and Banaripara. The Ministry of Local Government, Rural Development and Cooperatives (MLGRDC) acting through its Local Government Engineering Department (LGED) will be the Executing Agency. Pourashavas are the implementing agencies of the project.

Subproject and Scope. The construction and improvement of roads and roadside drains in Kalaroa Pourashava subprojects involves the rehabilitation of five roads under two different packages (e-GP/CTCRP/KALA/RD-01 and e-GP/CTCRP/KALA/RD-02) with total length of 6.650 km. There will be works for two roads with a length of 3.750 km under e-GP/CTCRP/KALA/RD-01, and three roads under e-GP/CTCRP/KALA/RD-02 with a length of 2.900 km. Specifically, the works will include the following: (i) dismantling, (ii) earth work, (iii) sand filling; (iv) earth cutting (BC and SGC); (v) reinforced cement concrete (RCC) work.

[1] ADB. 2014. *Third Urban Governance and Infrastructure Improvement Project*. Manila.

Categorization. The proposed subproject is classified as Environmental Category "B" per the ADB Safeguard Policy Statement (SPS), 2009 as no significant impacts are envisioned and accordingly this Initial Environmental Examination (IEE) has been prepared. Based on the Environmental Conservation Rules of Bangladesh (ECR, 2023 latest amendment of ECR, 1997), roads construction or extension with length of 5 km to 10 km fall under Orange category while roads construction or extension with length of more than 10 km fall under Red category, and therefore, are required to obtain environmental clearance. For this subproject, only rehabilitation/improvement of existing roads and no new roads will be constructed. Further, none of the roads under the subproject have a length of 5 km or more. On 4 March 2024, PMU submitted a letter to DoE to request the issuance of ECC for CTCRP subprojects. Based on the scope and nature of road subprojects works of CTCRP, DOE confirmed through a letter dated 04 April 2024 that CTCRP is not required to obtain ECC for such subprojects.

Description of the Environment. Kalaroa Pourashava is the study area for this IEE. Available baseline data from various secondary and primary sources were used in the assessment, while other data were collected during the detailed design phase. A summary of baseline conditions is in the following table.

Parameters	Description
Topography and Geology	Kalaroa Pourashava is a land of mixed topography. According to Kalaroa Pourashava Master Plan (2011-2031), the lowest spot height of the Pourashava area is 0.45 m(PWD), the highest spot height is 6.28 m(PWD) and average spot height is 2.226 m (PWD). Except wards no. 3 and 7, all other wards have been found to have the highest elevation. The lowest elevation is found on natural features (canal, pond and khal) in different wards of the Pourashava. Alluvium, stream deposits, delta plain deposits, and flood plain deposits are the main topographic base forming calcareous to non-calcareous alluvium, with grey and dark grey soils and no or little effects from salinity (SRDI 1997). The soil of the region are highly valued for agricultural production. The soil of Kalaroa consists of active natural levee, flood plain, and sand bar, point bar sediments composed of naturally low to medium compact sandy silt, sandy clay, organic clay, loose sand, depression, and abandoned channel sediments.
Climate and meteorology	The annual average temperature varies from a maximum of 31.6°C to a minimum of 21.4°C. The long-term trend in average maximum temperature shows a decline over the period of 1976–2005. It has, on average, reduced by 0.009°C per annum over the period. The average annual minimum temperature in the Satkhira region has also declined, on average, by 0.001°C over the period (1976–2005). The monsoon season (June–October) receives more than 80% of the total annual rainfall (average 1800 mm, range 1400–2600 mm). The annual rainfall increased by 9.5 mm over the period of 1990–2005. The pattern of total rainfall of different years of the last decade was quite irregular. Pre-monsoon rainfall followed a decreasing pattern (sharp and gradual) from 1997 to 2005. On the other hand, the monsoon of 2002 received the highest (1271 mm) rainfall compared to other years of the last decade.
Hydrology	Water bodies in Kalaroa Pourashava mainly consists of river, ponds, ditches, khals, irrigation canals, etc. It covers 383.44 acres. Ward 7 has the highest percentage (26.64%) of water body in the Pourashava. Ward 1 has the least amount of water body compared with other wards of the Pourashava. The river Betraboti (Betna) (length 6.03 and occupies an area of 53.19 acres) touches ward no. 2, 5, 6, 7, 8 and 9. Hydrology of Kalaroa Pourashava area is due to the river Betraboti (Betna) flowing towards north-south direction, 3 canals, 1019 pond and ditches within the Pourashava area and influence its surface water hydrological state.

Parameters	Description
Drainage and Flood Control	There is one river situated within the Pourashava area, but there are three canals situated within the Pourashava area. Besides, there is only 10.03 km of pucca drain in the Pourashava and the natural canals cover 7.02 km. This network is not enough to support the present need and will not be suitable to support in the future. In addition, secondary and tertiary drains are manmade brick drains. These drains are constructed by Pourashava from their Annual Development Program fund. Within the Pourashava area, a total of 10.909 km drains have been so far constructed.
Ambient air quality	While there is no available data on ambient air quality in the area, it is perceived that quality is within the standards. There are no undue air emission sources in the area except for limited vehicular emissions from inter-pourashava traffic which are occasional and limited to a 3-5-meter width on both sides of the market bound roads.
Ambient Noise	The enroute area is peri-urban to urban within the location of the proposed works. The noise levels in the Pourashava are similar to that of any small urban area. In the respective locations of the works, noise is due to vehicles, machinery, and other related activities, and is normally in the range of 55 to 75 dB(A). No primary survey data of ambient noise is available at the project site. Secondary data indicate that noise level is within the standard.
Groundwater and Surface Water	Quality Ground water quality in the Kalaroa area is influenced by salinity and iron. Water in most shallow aquifer is somewhere saline, and all are contaminated with iron, not suitable for drinking purposes and arsenic contamination to them are also found. Water is collected from rivers, canal and ponds for irrigation purposes. The lower deep aquifer is found at a depth of around 70-100 m. The sources of surface water of Kalaroa Pourashava like ponds, ditches and khals are being contaminated from improper sanitation, solid waste disposal, improper treatment and disposal of hospital waste, use of chemical fertilizers, poisonous insecticides, etc.
Natural hazards	Cyclone, river erosion, earthquake, water logging, fire etc. are hazards which occasionally affect the land of Kalaroa Pourashava with minimum scale.
Socio-economic conditions	In 2011, the population of the Pourashava was 27,250; the population density is 1,830 persons per km^2. In the area, employed population is engaged in different occupations. Average monthly income per household is Tk.7,483.00. Agriculture is the dominating occupation of the people followed by small business, private service, treatment, etc.
Land use	In this Pourashava, residential development occupies 14.13% of total land. Agriculture land occupies 31.08%, commercial activities occupy 17.04%, waterbody occupies 26.64% and rest of the land is occupied by circulation networks, education and research institute, industrial use, etc.
Physical cultural resources	The common property resources and/or community facilities in the area are different social amenities which are mosques, graveyards, schools, madrasha, playgrounds, open water bodies and Eidgahs (place for offering Eid prayers). The local people use these for the purposes of religious, social, and cultural gatherings.
Biological environment	Per the Integrated Biodiversity Assessment Tool (IBAT), there are no protected or key biodiversity areas within 10 km of the subproject site. This is also confirmed in the IUCN Wildlife Distribution Map for Bangladesh and the Bangladesh Forest Department's map of protected areas.

Assessment of Potential Environmental Impacts and Mitigation Measures. Potential negative environmental impacts during the pre-construction, construction, and operation phases of the subproject were identified. The road subprojects will involve straightforward construction and are unlikely to cause significant adverse impact. Usual construction-related impacts such as noise, dust generation, vegetation clearing/tree felling, silt generation, soil and water contamination from chemicals spills and leaks, construction waste generation, and occupational and community health and safety risks including the spread of communicable/infectious diseases, such as COVID-19, among others, will be localized, temporary and avoidable with the implementation of mitigation measures as per the Environmental Management Plan (EMP). Design measures for climate change risks such as flooding are also incorporated in the EMP. Management including proper disposal of construction materials is included in the EMP. Detailed design ensured that private and common properties, and local physical cultural resources will not be significantly impacted by the subproject through either re-alignment or institution of appropriate measures. All works will be confined within existing Right-of-ways (ROWs). These are all general impacts of construction in urban areas, and there are well-developed methods of mitigation that are suggested in the EMP.

Environmental Management Plan. An EMP has been developed and included as part of this IEE, which outlines 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. In accordance with this EMP, the Contractor will be required to prepare a site-specific environmental management plan (SEMP). Contractor will submit its SEMP for approval to the project implementation unit (PIU) or regional project management unit (Divisional/Regional Office). The EMP and SEMP 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. Copies of the EMP and SEMP shall be kept on-site during the construction phase. The Contractor will be responsible for the organization, direction, and execution of environmental management related activities during construction of the proposed subproject. The Contractor will also undertake all activities in accordance with the relevant environmental requirements, including consent documentation and other regulatory and/or statutory and contractual requirements.

Implementation Arrangement. The Ministry of Local Government, Rural Development and Cooperatives (MLGRDC) through the Local Government Engineering Department (LGED) will be the executing agency. The Pourashavas that will be the recipients of the project are the implementing agencies. LGED has established a project management unit (PMU) comprising officials including an Environmental Safeguard Officer/Focal Person who is a permanent employee of LGED. The PMU will be strengthened by a project management and supervision consultant (PMSC) team composed of external experts or consultants in environmental and social safeguards, including experts on finance, procurement, technical areas, and contract management. Divisional/Regional Office and project implementation units (PIUs) will be established at the Divisional Level and Pourashava Levels, respectively. For the subproject, Kalaroa Pourashava will serve as the PIU. The PMU, Divisional/Regional Office for Khulna Division and PIU will have responsibility for overseeing subproject management, including overseeing EMP implementation. The PMU will also have the responsibility for obtaining environmental clearance of the subproject (or the overall CTCRP) from the Department of Environment.

The Contractor will be required to (i) obtain all other 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 or Divisional/Regional Office for approval; (iv) carry out all of the monitoring and mitigation measures set forth in the approved EMP; and (v) implement any corrective or preventative actions set out in safeguards monitoring reports that the PMU 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.

Grievance Redress Mechanism. The subproject will adopt the common grievance redress mechanism (GRM) of the overall CTCRP, which has been 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 subproject, as well as readily accessible to all segments of the affected people. 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. Procedurally, every grievance or complaint will be resolved at the first tier or Pourashava level. Any unresolved grievances at the first level will be automatically elevated to second-tier or at the Divisional/Regional Office level (or at the Division level) for resolution. Then any unresolved grievances at the second level will be automatically elevated to the third-tier or PMU level for final resolution. The GRM, notwithstanding, an aggrieved person or complainant 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.

Information Disclosure and Consultation. The subproject has undertaken meaningful consultations[2] during the project preparatory stage. During the feasibility phase, focus group discussion (FGD) and public consultations were conducted with the representatives, officials and community people for site selection and construction of cyclone shelter at the proposed location. Their views were incorporated into the IEE and in the planning and development of the subproject. The IEE and/or the executive summary translated in the local language (Bangla) understandable to affected people and other stakeholders will be made available in an accessible place (e.g., community bulletin boards, offices of PMU, Divisional/Regional Office, PIU and Contractor, including any satellite office of Contractor at the subproject site) and will be disclosed to a wider audience via the ADB and project websites. Disclosure will be made locally at prior to scheduled consultation/s in order to provide stakeholders time to read and consult with expert/s if needed. The consultation process will be continued and expanded during project implementation, including design period, to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation.[3]

Monitoring and Reporting. PMU, with support from PMSC, will be responsible for monitoring the project implementation and compliance with EMP requirements. The Contractor will submit monthly reports to the PIU/Divisional/Regional Office with jurisdiction over the subproject. The

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

[3] 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."

PIU/Divisional/Regional Office will submit quarterly environmental monitoring reports to PMU. The PMU shall consolidate quarterly reports from the PIUs/Divisional/Regional Offices and prepare semi-annual environmental monitoring reports (SEMRs) which shall be submitted to ADB. PMU and ADB will post the cleared SEMRs on the project website and ADB website, respectively. ADB will monitor the project on an ongoing basis until project completion.

Conclusion and Recommendations. The Construction/Improvement of Roads in Kalaroa Pourashava will result in significant socio-economic benefits. The subprojects are unlikely to cause significant adverse impacts to environment and people, and potential negative environmental impacts associated with construction can be mitigated to standard levels without difficulty through proper engineering practice, and the incorporation or application of recommended mitigation measures and procedures in the EMP and SEMP. Consequently, the potential adverse impacts that are associated with the operation of the roads can be mitigated upfront through incorporation of environmental requirements in the detailed engineering design, including climate change adaptation measures.

This IEE has been prepared in accordance with ADB SPS's requirements for projects classified as Category B for the environment. No further special study or detailed environmental assessment needs to be undertaken to comply with ADB SPS.

This IEE has been prepared based on detailed designs of the roads. However, detailed design of the roadside drains is yet to be completed and will be included in the updated IEE for submission to ADB for review and clearance prior to award of contract, or latest, prior to the start of construction. If the design is revised or modified during implementation, the PMU, with support from PMSC, shall update this and submit it to ADB for review and disclosure. No work can commence until the final IEE is approved by ADB and provided to the Contractor, and the SEMP is approved by the PIU or Divisional/Regional Office.

I. INTRODUCTION

A. Background

1. The ADB supported the Coastal Towns Climate Resilience Project (CTCRP) which will strengthen climate resilience and disaster preparedness in 22 (twenty-two) vulnerable coastal pourashavas (towns) of Bangladesh. The towns were selected based on their vulnerability, population size, density, and level of past investments. The project takes a holistic and integrated approach to urban development and will (i) provide climate-resilient municipal infrastructure, and (ii) strengthen institutional capacity, local governance, and knowledge-based public awareness, for improved urban planning and service delivery considering climate change and disaster risks. Investments will benefit the poor and women. Municipal infrastructure will include (i) elderly (older persons), women, children, and persons with disabilities (EWCD) friendly cyclone shelters constructed with early warning system; (ii) roads including emergency access roads and roads with stormwater drainages, footpath, bridges and culverts rehabilitated, or constructed for improved connectivity, and access to emergency services in the event of disasters triggered by natural hazard, including footpath, drains bridges and culverts which are critical for accessing emergency services; (iii) climate-resilient infrastructure for improved urban flood risk management including stormwater drains, nature-based solutions, water bodies restoration, and integrated waste management (IWM) developed; (iv) gender-responsive and socially inclusive urban public spaces improved; and (v) slum improvement programs for basic service improvement implemented in each pourashava following poverty reduction action plan and (vi) EWCD-friendly sanitation facilities constructed for poor households. Slum improvement models currently being implemented in ADB projects, such as the Third Urban Governance and Infrastructure Improvement Project, will be replicated with necessary improvements.[4] The Ministry of Local Government, Rural Development and Cooperatives (MLGRDC) acting through its Local Government Engineering Department (LGED) will be the Executing Agency (EA). Pourashavas are the implementing agencies of the project.

2. Coastal towns are particularly at risk from the impacts of climate change due to high levels of poverty and limited capacity of Pourashavas (urban local governments) to invest in resilience. The Pourashavas lack resilient infrastructure, clubbed with haphazard urbanization, lack of stormwater drains, poor solid waste management system further worsens the condition of these towns. Most of the coastal towns are situated on the riverbanks of low-lying tidal zones at an average elevation of 1.0–1.5 meters (m) from the sea level[5] and coastal flooding is a key hazard faced by these towns. Inadequate basic municipal infrastructure to respond to increasing climate risk threatens both quality of life and the economic growth of coastal towns. This calls for an integrated approach for coastal town development that promotes risk-informed planning and investment for building resilience.

B. Coastal Towns Climate Resilience Project

3. The project will be aligned with the following impacts: higher and sustainable growth trajectories achieved in the face of the various weather-related natural hazards and risks, and improved livability of coastal towns.[6] The outcome of the project will be climate and disaster resilience of coastal towns strengthened including benefiting the poor and women. The project directly supports achieving project outcomes through three outputs.

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[4] ADB. 2014. *Third Urban Governance and Infrastructure Improvement Project*. Manila.

[5] Sowmen Rahman and Mohammed Ataur Rahman. Climate Extremes and Challenges to Infrastructure Development in Coastal Cities in Bangladesh. Volume 7, March 2015, Pages 96–108

[6] Government of Bangladesh, General Economics Division, Bangladesh Planning Commission Ministry of Planning. 2020. Making Vision 2041 a Reality – Perspective Plan of Bangladesh, 2021–2041. Dhaka.

4. **Output 1: Municipal infrastructure for resilience improved**. Municipal infrastructure will include (i) 25 elderly, women, children, and persons with disability friendly cyclone shelters with early warning system; (ii) 247.7 kms roads with drainage, bridges, and culverts rehabilitated or constructed for improved connectivity and access to emergency services in the event of disasters caused by natural hazards including access to cyclone shelter; (iii) climate-resilient infrastructure including 201.0 stormwater drainages, at least 3 nature-based solutions, water bodies restoration, and 4 integrated waste management (IWM) developed rehabilitated or constructed for improved urban flood risk management including; (iv) gender-responsive and socially inclusive urban public spaces improved; (vi) slum improvement program implemented; and (vi) EWCD-friendly sanitation facilities constructed for poor households. Output 1 will also support development of EWCD-friendly socio-economic infrastructures including (i) local markets; (ii) bus terminals; and (iii) other priority roads, bridges, culverts, and boat landing stations.

5. **Output 2: Resilient livelihood improved**. Output 2 includes: (i) climate vulnerable households covered in the graduation program in six project towns; (ii) women, including person with disabilities, reported increased skills for resilient livelihood; and (iii) inventory of productive assets of vulnerable households documented and insured. The Graduation Approach and Program will be adopted to ensure livelihood resilience.[7]

6. **Output 3: Institutional capacity, governance, and climate-awareness strengthened**. Output 3 includes: (i) risk-informed urban development plans and poverty reduction action plans of project towns submitted to Pourashavas council; (ii) staff of LGED and Pourashavas including 90% eligible women staff reported increased knowledge on climate and disaster risk assessment to inform the urban development plans and to enforce development control regulations linked with natural hazards; (iii) knowledge and capacity of LGED and Pourashavas' staff including 90% of women staff on nature-based solutions and green solution application developed;[8] (iv) disaster management committee on disaster preparedness measures, cyclone shelter management committees, and standing committees on women and children affairs, poverty reduction and slum improvement in project Pourashavas operationalized for improving municipal governance and sustainable service delivery;[9] (v) revenues enhancement plan adopted by each project Pourashava to improve municipal finance systems; (vi) computerized tax records and billing systems made functional; (vii) annual gender responsive operation and maintenance (O&M) plans approved and at least 75% of the required annual budget is allocated and spent; and (viii) gender responsive urban space guidelines developed. Output 3 supports to enhance public awareness, behavior change, and community mobilization in light of emergencies such as coronavirus disease (COVID-19) and cyclone Amphan in 2020. It will also support training and capacity building of LGED and Pourashavas to institutionalize information technology-based remote monitoring through strengthening LGED's geographic information systems section, monitoring and evaluation unit, and project management unit.

[7] The graduation program originated in Bangladesh and has since been adopted in several countries as a holistic, time-bound interventions to lift households from poverty through: (i) social assistance to support immediate needs; (ii) livelihood promotion; (iii) financial inclusion; and (iv) social empowerment.

[8] Nature-based solutions promote actions to protect, sustainably manage and restore natural and modified ecosystems in ways that address societal challenges effectively and adaptively, to provide both human well-being and biodiversity benefits. (Source: IUCN (2020). Guidance for using the IUCN Global Standard for Nature-based Solutions. A user-friendly framework for the verification, design and scaling up of Nature-based Solutions. First edition. Gland, Switzerland: IUCN).

[9] A risk-informed performance-based budget allocation strategy will be adopted to promote governance-led infrastructure improvement to ensure sustainable urban services. The paurashava will need to fulfil a set of performance criteria to receive fund for infrastructure improvement. Performance criteria is elaborated in project administration manual (footnote 27).

7. The proposed CTCRP is to be implemented in 22 Pourashavas (local governments). District wise location of the CTCRP towns is summarized in Table 1.

Table 1: District wise Pourashavas where Project (CTCRP) will be implemented

District	Town (Pourashava)	District	Town (Pourashava)
Barishal	Banairapra	Bhola	Charfasson
	Mehendiganj		Lalmohan
	Bhedarganj		Borhanuddin
	Muladi	Jhalokathi	Jhalokathi
	Gouranadi		Nalchity
Bagerhat	Bagerhat	Satkhira	Kalaroa
	Morelganj	Khulna	Paikgacha
Bhedarganj	Bhedarganj		Chalna (Dacope)
	Kuakata	Pirojpur	Swarupkathi
Shariatpur	Janjira	Barguna	Patharghata
	Bhedarganj		Betagi

C. Purpose of the Initial Environment Examination

8. The objective of the IEE is to provide guidance to LGED, its consultants and contractors on how to design and construct the subproject in an environmentally responsible manner, ensuring that all negative effects are prevented or mitigated, and positive impacts are enhanced.

D. Methodology

9. This IEE report was prepared following the requirements of the ADB SPS, 2009. Site visits, stakeholder consultations, and primary and secondary data collection were conducted to assess the existing environmental conditions of the project site and the potential environmental impacts that may occur during project implementation. Baseline environmental monitoring for air quality, noise level, surface water quality and groundwater quality will be conducted before the start of construction activities. The IBAT was used to screen potential risks on the protected areas or critical habitat that may exist around the project sites.

10. During the feasibility phase, focus group discussion (FGD) and public consultations were conducted with the representatives, officials and community people for site selection and construction and improvement of roads and roadside drains at the proposed locations. Their views were incorporated into the IEE and in the planning and development of the subproject.

11. The following summarizes the activities conducted in relation to the preparation of this IEE report:

(i) Review of project- and subproject-related documents and literature;
(ii) Site visits to the subproject site to review the existing environmental conditions and develop baseline information including stakeholder consultations for the subprojects area;
(iii) Consultation with executing and implementing agencies to discuss subproject components, benefits, and impacts;
(iv) Analysis of typical environmental impacts of subproject components and identification of suitable measures to mitigate potential impacts; and
(v) Review and develop institutional arrangements and capacity building needs for implementation of environmental management and monitoring.

E. Structure of IEE Report

12. The report has been structured in compliance with ADB SPS, 2009.

I. **Executive Summary.** This chapter describes concisely the critical facts, significant findings, and recommended actions.

II. **Introduction.** Presents a brief overview of the assignment along with its background, objectives, scope of work and methodology etc.

III. **Policy, Legal, and Administrative Framework.** This chapter discusses the national and local legal and institutional framework within which the environmental assessment is carried out. It also identifies project-relevant international environmental agreements to which the country is a party.

IV. **Analysis of Alternative**. Analyzes the environmental situation “With and Without project”.

V. **Description of the Subproject.** This chapter describes the proposed project; its major components; and its geographic, ecological, social, and temporal context, including any associated facility required by and for the project.

VI. **Description of Baseline Environment.** This chapter describes relevant physical, biological, and socioeconomic conditions within the study area. It also looks at current and proposed development activities within the project's area of influence, including those not directly connected to the project. It indicates the accuracy, reliability, and sources of the data.

VII. **Anticipated Environmental Impacts and Mitigation Measures.** This chapter predicts and assesses the project's likely positive and negative direct and indirect impacts to physical, biological, socioeconomic (including occupational health and safety, community health and safety, vulnerable groups and gender issues, and impacts on livelihoods through environmental media, and physical cultural resources in the project's area of influence, in quantitative terms to the extent possible; identifies mitigation measures and any residual negative impacts that cannot be mitigated; explores opportunities for enhancement; identifies and estimates the extent and quality of available data, key data gaps, and uncertainties associated with predictions and specifies topics that do not require further attention; and examines global, transboundary, and cumulative impacts as appropriate.

VIII. **Information Disclosure, Consultation, and Participation**. This chapter (i) describes the process undertaken during project design and preparation for engaging stakeholders, including information disclosure and consultation with affected people and other stakeholders; (ii) summarizes comments and concerns received from affected people and other stakeholders and how these comments have been addressed in project design and mitigation measures, with special attention paid to the needs and concerns of vulnerable groups, including women, the poor, and Indigenous Peoples; and (iii) describes the planned information disclosure measures (including the type of information to be disseminated and the method of dissemination) and the process for carrying out consultation with affected people and facilitating their participation during project implementation.

IX. **Grievance Redress Mechanism.** This chapter describes the grievance redress framework (both informal and formal channels), setting out the time frame and mechanisms for resolving complaints about environmental performance.

X. **Environmental Management Plan.** This chapter deals with the set of mitigation and management measures to be taken during project implementation to avoid, reduce, mitigate, or compensate for adverse environmental impacts (in that order of priority). It may include multiple management plans and actions (mitigation, monitoring and performance indicators).

XI. **Monitoring and Reporting.** Outlines the environmental monitoring program and reporting system including the cost of implementing the EMP.

XII. **Conclusion and Recommendations.** Presents the conclusion and recommendations of the IEE study.

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

13. Alongside the ADB SPS, 2009, each component of the project must comply with the relevant legal and policy framework of Government of Bangladesh, such as the Environment Conservation Act 1995 (ECA, 1995) with amendments in 2000, 2002 and 2010, and the Environment Conservation Rules 1997 (ECR, 1997) and latest ECR, 2023 which are the primary environmental law and rules of the country.

A. ADB Safeguard Policy Statement 2009

14. ADB SPS,2009 provides guidance on the environment category of projects based on the degree of anticipated environmental impacts. 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.

15. ADB environmental safeguards are triggered if a project is likely to have potential environmental risks and impacts. The initial process of categorization involves filling out a sector-specific rapid environmental assessment (REA) checklist. A project is classified based on the most environmentally sensitive component, and assigned with one of the four environmental categories (A, B, C, or FI) defined in the SPS. These categories are as follows:

(i) **Category A:** Project that is likely to have significant adverse environmental impacts which 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 (EIA), including an environmental management plan (EMP), is required.
(ii) **Category B:** Project with potential adverse environmental impacts that 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 (IEE), including an EMP, is required.
(iii) **Category C:** Project that is likely to have minimal or no adverse environmental impacts. An EIA or IEE is not required, although environmental implications need to be reviewed.
(iv) **Category FI:** Project is classified as category FI if it involves the investment of ADB funds to, or through, a financial intermediary.

16. **Screening and Categorization**. Subprojects are to be screened for their expected environmental impacts and are assigned to a specific category. Categorization is to be based on the most environmentally sensitive component. However, for subproject(s) with component(s) that can trigger Category A or with potentially significant adverse impacts that are diverse, irreversible, or unprecedented, project management unit (PMU) 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 also be considered.

17. Initial screening using ADB REA checklist for road subprojects was conducted for the construction and upgradation of roads subproject in Kalaroa Pourashava, 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 SPS. See Appendix 1 for the filled REA Checklist. Thus, this IEE report has been prepared following ADB SPS requirements for project with Category B classification.

18. **Environmental Assessment.** Environmental assessment shall include a description of environmental and social baselines 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.

19. **Environmental Planning and Management**. The PMU shall prepare an 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.

20. **Public Disclosure**. The PMU shall submit the following to ADB for review and disclosure on ADB website upon receipt of acceptable reports and endorsement from the PMU, so affected people, other stakeholders, and the public can provide meaningful inputs into the subproject design and implementation:[10]

(i) Updated/final IEE upon receipt;
(ii) environmental monitoring reports submitted during subproject implementation upon receipt.

21. **Consultation and Participation.** The PMU and PIU shall carry out meaningful consultation11 with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. The consultation process and its results are to be documented and reflected in the environmental assessment report.

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

23. **Monitoring and Reporting.** The PMU shall monitor, measure and document the progress of implementation of the EMP. If necessary, PMU will identify the necessary corrective actions, and reflect them in a corrective action plan. PMU 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

[10] 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." Upon its receipt of acceptable safeguard documents and endorsement by PMU, ADB discloses the same on ADB website.

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

subprojects likely to have significant adverse environmental impacts during operation, reporting will continue until project completion.

24. **Unanticipated Environmental Impacts.** Where unanticipated environmental impacts become apparent during subproject implementation, PMU 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.

25. **Pollution Prevention and Control Technologies**. During the design, construction, and operation of the subproject the PMU and 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 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 PMU will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

26. **Occupational Health and Safety.** The PMU[12] shall ensure that workers[13] 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. PMU 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.

27. **Community Health and Safety.** The PMU 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 project, and will establish preventive measures and plans to address them in a manner commensurate with the identified risks and impacts.

28. PMU shall ensure to apply preventive and protective measures for both occupational and community health and safety consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines.[14] PMU shall also adhere to necessary protocols in response to emerging infectious diseases such as the corona virus disease (COVID-19) consistent with the guidelines of relevant government healthcare agencies and the World Health Organization.

[12] In case where responsibility is delegated to subproject contractors during construction phase, PMU shall ensure that the responsibilities on occupational health and safety as described herein are included in the contract documents.

[13] 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.

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

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

30. **Environmental Audit.** When the subproject involves existing activities or facilities, PMU 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.

31. **Bidding and Contract Documents.** IEE, which contains the EMP, shall be included in bidding and contract documents and verified by PIU. The PMU and PIU shall also ensure that bidding and contract documents include specific provisions requiring contractors to (i) comply with all other conditions required by ADB,[15] and (ii) to submit to PIU, for review and approval, a site-specific environmental management plan (SEMP), including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per EMP; and (iv) budget for SEMP implementation, among others as may be required. No work can commence prior to approval of SEMP. A copy of the EMP and/or approved SEMP will always be kept on site during the construction period. 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.

32. **Conditions for Award of Contract and Commencement of Work.** PMU 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 final design and PMU has obtained ADB's clearance of such updated IEE; and (iii) DOE-approved IEE (i.e., IEE in compliance with ECR, 2023) and other necessary permits from relevant government agencies have been obtained. For "design, build, and operate" type contracts, PMU 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 PMU has obtained ADB's clearance for such updated IEE.

B. National Environmental Legislations

33. **Environmental Conservation Act (ECA), 1995.** Provides for the conservation of the 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;

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

(v) power to make rules and standards with reference to environment; and (vi) penalty for non-conformance to environment act under the various sections.

34. **Environmental Conservation Rules (ECR), 2023 (superseded 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) yellow, (iii) orange, and (iv) red. The rules specify the procedures for issuing ECC for the various categories of projects. Table 2 summarizes the requirements for environmental clearance application for each category.

Table 2: Summary Environmental Clearance Application Requirements Per Category

Category	Requirements
Green	(i) Completed Application for Environmental Clearance Certificate (ECC); (ii) Payment of the appropriate fee based on Schedule of Environmental Conservation Rules (ECR), 2023; (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.
Yellow	(i) Completed Application for ECC; (ii) Payment of the appropriate fee based on Schedule of ECR, 2023; (iii) General information about the project; (iv) Exact description of the raw materials to be used and the product to be manufactured (where relevant); (v) No objection certificate from the local authority; (vi) Prior issued location clearance certificate (LCC) from Department of Environment (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	(i) Completed Application for ECC; (ii) Payment of the appropriate fee based on Schedule of ECR, 2023; (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 environmental management plan (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 of ECR, 2023; (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 environmental impact assessment (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;

Category	Requirements
	(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.

35. ECR, 2023 provides the classification for industrial projects and types of development that are common in Bangladesh. Table 3 indicates the categories for roads. Based on the Environmental Conservation Rules of Bangladesh (ECR, 2023 latest amendment of ECR, 1997), roads with length of 5 km to 10 km fall under "Orange" category while roads with length of more than 10 km fall under "Red" category, and therefore, are required to obtain environmental clearance. None of the roads under the subproject have a length of 5 km or more. On 4 March 2024, PMU submitted a letter to DoE to request the issuance of ECC for CTCRP subprojects. On 18 March 2024, PMU consulted with the DoE regarding the requirement to obtain ECC for CTCRP components. Per DoE, small civil works packages having no potential or adverse impacts to environment are not required to obtain ECC. An official response from the DoE will be issued soon. Environmental clearance, if required, will be obtained prior to the award of contract/construction.

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Table 3: Government of Bangladesh Classification of the Subproject

No.	Subproject	Equivalent in Schedule I of Environmental Conservation Rules	Department of Environment Classification
1.	Road construction and improvement	Road construction or extension, 5-10 km (ORANGE) Road construction or extension, >10 km (RED)	None of the roads under Kalaroa roads subproject have length of 5 km to 10 km

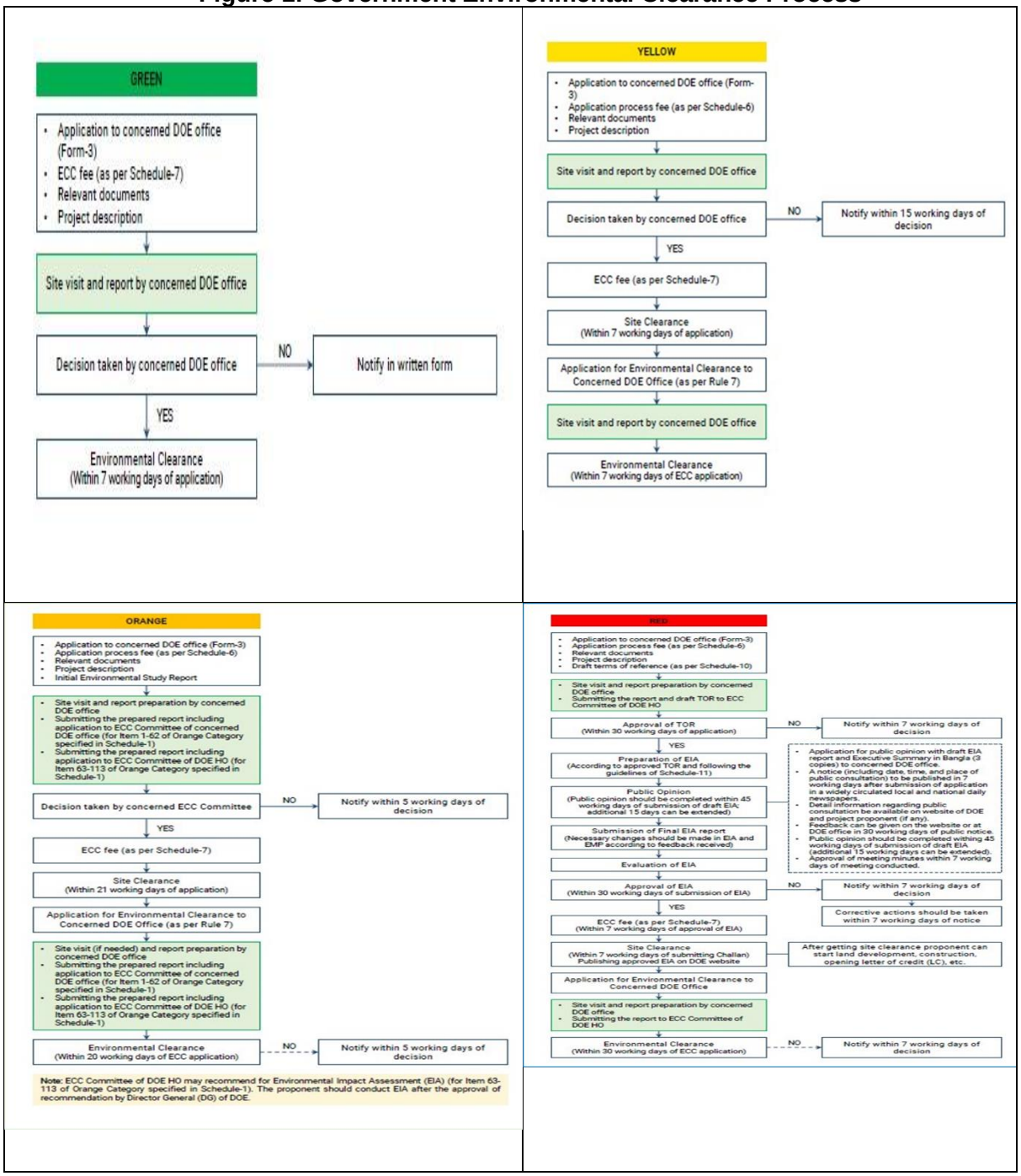
36. **Application for ECC.** The application and requirement for issuance of ECC are described in the ECR, 2023 and summarized in Table 2. This involves the completion and submission of an application using a form available from the DOE website,[16] which is revised from time to time. The accomplished application form is submitted to DOE together with requirements as enumerated in Table 2. The proponent is also required to pay equivalent application fee prescribed in ECR, 2023.

37. Usually, the ECC is issued within 30 days from receipt of the application by DOE. Such ECC is required to be renewed every year for orange category and red category, every two years for yellow category and every five years for green category from the date of its effectivity.

38. **Figure 1** shows the summary of review process and timelines set under ECR, 2023, leading to the issuance of environmental clearance certificate (ECC) by DOE.

[16] Government of Bangladesh. Department of Environment.

Figure 1: Government Environmental Clearance Process



DOE = Department of Environment, ECC = environmental clearance certificate, EIA = environmental impact assessment, EMP = environmental management plan, IEE = initial environmental examination, TOR = terms of reference.

39. **Other relevant government laws and regulations.** The implementation of subprojects proposed under the project will be governed by government environmental acts, rules, policies, and regulations. Table 4 summarizes the applicable national and local laws, regulations, and standards for environmental assessment and management, including applicable international environmental agreements.

Table 4: Relevant Government Laws and Regulations

Laws, Regulations, and Standards	Details	Relevance to the Project
National Environmental Policy, 2018	The central theme of the policy is to ensure protection and improvement in environment. The policy gives a thrust to sustainable development and long-term use of natural resources. The National Environment Policy contains policy statements and strategic options with regard to population and land-use management, management and utilization of natural resources and other socio-economic sectors, as well as the necessary arrangements for the implementation of the policy.	Subproject will have site-specific impacts and will require implementation of mitigation measures to ensure protection and improvement of the environment.
Environment Court Act, 2000 and subsequent amendments in 2003	Establishment of Environment Court for trial of an offence or for compensation under environmental law, such as environment pollution.	Option to affected persons for grievances related to environmental safeguards.
National Safe Drinking Water Supply and Sanitation Policy of 1998	Ensures access to safe water and sanitation services at an affordable cost	Pourashava and water sanitation authorities will take actions to prevent wastage of water. They will take necessary steps to increase public awareness to prevent misuse of water. Pourashava shall be responsible for solid waste collection, disposal, and their management
National Water Act 2013 Water Rule 2018	Ensures Bangladesh water sources are free from any type of pollution. Pollution from water in urban outfalls and reservoirs, e.g., lakes, canals, ponds and ditches may result in amenity losses, fisheries depletion, health problems and fish and aquatic species contamination.	The subproject will implement measures (e.g. septage treatment) to ensure that water source pollution is avoided.
Wetland Protection Act 2000	Advocates protection against degradation and resuscitation of natural waterbodies such as lakes, ponds, beels, khals, tanks, etc. affected by man-made interventions or other causes. Prevents the filling of publicly owned water bodies and depressions in urban areas for preservation of the natural aquifers and environment. Prevents unplanned construction on riverbanks and indiscriminate clearance of vegetation on newly accreted land.	The related works for subproject may impact natural water bodies. The subprojects' EMPs ensure measures are in place to protect natural water bodies and prevent draining or filling into these water bodies during construction.
National Land Use Policy, 2001	Sets out guidelines for improved land-use and zoning regulations. The main objective of this policy is to ensure criteria-based uses of land and to provide guidelines for usage of land for the purpose of agriculture, housing, afforestation, commercial and industrial	Compliance with land use and zoning regulations.

Laws, Regulations, and Standards	Details	Relevance to the Project
	establishments, rail and highway and for tea and rubber gardens.	
Bangladesh Labor Law, 2006	It is a comprehensive law covering labour issues such as: conditions of service and employment, youth employment, benefits including maternal benefits, compensation for injuries, trade unions and industrial relations, disputes, participation of workers in company's profits, regulation of safety of dock workers, penalty procedures, administration and inspection. This Act pertains to the occupational rights and safety of factory workers and the provision of a comfortable environment for working. It also includes rules on registration of labourers, misconduct rules, income and benefits, health and fire safety, factory plan	Compliance to provisions on employment standards, occupational health and safety, welfare and social protection, labor relations and social dialogue, and enforcement. Prohibition of employment of children and adolescents.
Bangladesh Labor Rules, 2015	Includes rules on registration of laborers, misconduct rules, income and benefits, health and fire safety, factory plan	Contractors to implement occupational health and safety measures Contractor will be liable for compensation for work-related injuries
The Pourashava Act 2009 / Ordinance issued for the amendment of local government (municipality) ordinance, 2009 and 2010; The Pourashava Ordinance, 1977; Municipal Administration Ordinance, 1960	Provides guidance for subproject integrated community and workers health and hygiene at the construction and operation and maintenance stages of the project	Coordinate with Pourashava committees on disaster management measures, water and sanitation and waste management
Bangladesh Climate Change Strategy and Action Plan of 2009	Enhances the capacity of government ministries, civil society and private sector to meet the challenges of climate change	Integrate adaptation measures for buildings in consideration of extreme climatic events
Building Construction (Amendment) Act and Building Construction Rules, Bangladesh National Building Code	Regulates technical details of building construction and to maintain standards of building construction	Follow specifications to ensure structural integrity of buildings
National Disaster Management Act of 2012	Establishes a framework for managing disasters in a comprehensive way.	Setting-up emergency response procedures

Laws, Regulations, and Standards	Details	Relevance to the Project
Public Health (Emergency Provisions) Ordinance, 1994	The ordinance calls for special provisions with regard to public health. Whereas an emergency has arisen, it is necessary to make special provision for preventing the spread of human disease, safeguarding public health and providing them adequate medical service and other services essential to the health of respective community and workers in particular during the construction related work.	Relevant especially during the construction phase
The Employees State Insurance Act, 1948	It must be noted that health, injury and sickness benefit should be paid to people, particularly respective workers at workplace under the Act.	Relevant to the welfare of workers under the project.
Solid Waste Management Rules 2021	The Solid Waste Management (SWM) Rules provides a comprehensive set of rules based on national 3R strategy and other national and international policies and guidelines pertaining to solid waste management. It defines the roles and responsibilities of relevant government ministries and agencies, including local government authorities and other stakeholders in implementing solid waste management undertakings. It also includes the environmental requirements necessary for these undertakings, provision of incentives for the promotion of sustainable waste management practices, etc.	The subproject will generate solid wastes and will implement measures to comply with the IWM rules.
Wildlife (Conservation and Security) Act, 2012	This Act provides for the conservation and safety of biodiversity, forest and wildlife of the country by repealing the previous laws i.e., Wildlife (Preservation) Act of 1973. The Department of Forest (BFD) has the primary responsibility for implementing this Act. The key features of this Act are: i)Prohibition made in relation to wild animals and plants that no person can hunt any wild animal without a license or willfully pick, uproot, destroy or collect any plant; ii) Determination of vulnerable, endangered and critically endangered species of wild animals and plants; iii) Declaration of sanctuary for the conservation of forest and habitat of wildlife and prohibitions made on such sanctuary; iv) Requirement of license to cultivate, extract, manufacture, rear, export or import any wild animal or part of its body, meat, trophy, uncured trophy or any plant; and v) Restriction on import,	Proposed roads construction/improvement are within the Pourashava. The subproject will not have an impact on wildlife. EMP will be implemented for any impact on trees and associated fauna (e.g. birds).

Laws, Regulations, and Standards	Details	Relevance to the Project
	export and re-export of wild animals and plants.	
Air Pollution Control Rules (APCR), 2022	APCR, 2022 contains air quality standards based on WHO Guidelines (Interim Goals); emissions limits and technical specifications for key sectors; mandates and coordination mechanisms among relevant line ministries to control both household and outdoor air pollution. The rules elevated the air quality management (AQM) dialogue and leadership beyond the environment sector, by establishing the National Committee on Air Pollution Control (NCAPC), a muti-sector decision-making body presided by the Cabinet Secretary to coordinate the APCR implementation and instruct relevant agencies on specific interventions to comply with the new rules. The NCAPC is mandated, for example, to impose emergency measures depending on the levels of air pollution, such as restricting activities of industries or projects, vehicles, or any source of air pollution in a certain area, and closure of educational institutions. APCR also envisage the objectives and minimum requirements of its implementation management tools, such as a National Air Quality Plan (also covering HAP interventions and targets); degraded airsheds declaration and management plan; publication of list of highly air polluting industries and activities; prevention plans; monitoring and control systems. Other relevant regulatory development for AQM refers to the 2019 Amendment of the Brick Manufacturing and Kiln Installation Act, 2013. The amendment set phased targets to reduce the use of clay-fired bricks in public works from 2019 to 2025, except for the construction of base/sub-base of the high-ways. However, implementation of this phased reform is delayed.	These rules are applicable to this project as it will involve emissions (primarily dust and exhaust emissions) during construction.
Antiquities Act, 1968	Preservation and protection of cultural resources are within the Antiquities Act, 1968. As per this act, (1) No person shall transport an antiquity from one place in Bangladesh to another with the object of exporting it in contravention of section 22. (2) Whoever contravenes the provisions of sub-section (1) shall be punishable with imprisonment for a term which may extend to three months, or with fine, or with both.	The subproject components are not immediately located near historical, cultural and archaeological sites, no excavation works will be conducted in the vicinities of such sites.

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

C. International Environmental Agreements

40. Table 5 below lists the relevant international environmental agreements that the government is party to, and their relevance to the subproject.

Table 5: International Environmental Agreements Relevant to the Subproject

International Environmental Agreement	Signed/Year Ratified	Details	Relevance
United Nations Framework Convention on Climate Change (UNFCCC)	22.10.2001 13.11.2003 (amended)	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 the impact of climate change. Engineering designs of the subprojects consider climate change impacts, such as flooding and temperature rise. A climate change assessment is a part of the project processing, which covers all subprojects.
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 subproject location is not an archaeological or historical site. However, the related works with the subproject may impact undiscovered cultural and natural heritage relics during construction phase. The environmental management plans (EMPs) of subprojects ensure measures for chance finds.

41. **Gaps in the ADB SPS, 2009 requirements and government laws and regulation on environmental assessment.** There are no major gaps between the ADB SPS, 2009 requirements and the GoB's requirements on environmental assessment. Screening, categorization, environmental assessment and environmental management plan preparation, implementation and compliance monitoring are required. However, analysis of alternatives and public consultation and disclosure are not mandatory under the GoB's ECR, 2023.

42. **Applicable Environmental Standards.** The ECR, 2023, Air Pollution (Control) Rules, 2022 and Noise Pollution (Control) Rules, 2006 provides the environmental standards applicable to the project. Schedule 2 of the ECR, 2023 presents the national standards for water quality, Noise (Control) Rules, 2006 presents the national standards for ambient noise and Air Pollution (Control) Rules, 2022 presents the air quality standards. 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 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 PMU will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS, 2009.

43. The tables below show the comparison of the national standards and internationally recognized standards, including the applicable standards to be followed under the project per ADB SPS, 2009 requirements.

Table 6: Applicable Ambient Air Quality Standards for Bangladesh Projects

Parameter	Bangladesh Ambient Air Quality Standard (µg/m³)[a]	WHO Air Quality Guidelines (µg/m³)	
		Global Update[b] 2005	Global Update[c] 2021
TSP	200 (8-h)	-	-
PM_{10}	50 (1-year) 150 (24-h)	15 (1-year) 45 (24-h)	15 (1-year) 45 (24-h)
$PM_{2.5}$	15 (1-year) 65 (24-h)	5 (1-year) 15 (24-h)	5 (1-year) 15 (24-h)
SO_2	80 (1-year) 365 (24-h)	40 (24-h)	40 (24-h)
NO_2	100 (1-year)	10 (1-year) 25 (24-h)	10 (1-year) 25 (24-h)
CO	10,000 (8-h) 40,000 (1-h)	4,000 (24-h)	4,000 (24-h)
Lead	0.5 (1-year)	-	-
Ozone (O_3)	235 (1-h) 157 (8-h)	100 (8-h) 60 (peak season, average 6 months)	100 (8-h) 60 (peak season, average 6 months)

ADB = Asian Development Bank, CO = carbon oxide, h = hour, µg/m³ = microgram per cubic meter, min = minute, NO_2 = nitrogen dioxide, $PM_{2.5}$ = particulate matter 2.5, PM_{10} = particulate matter 10, SO_2 = sulfur dioxide, TSP = total suspended particle, WHO = World Health Organization.

[a] Air Pollution Control Rules, 2022.

[b] IFC World Bank Group. 2007. *Environmental, Health and Safety General Guidelines*. Washington, D.C.

[c] WHO. 2021. *WHO global air quality guidelines: particulate matter (*PM2.5 and PM10(*, ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide*. Geneva. 24-h standards are 99%iles.

Table 7: Ambient Noise Quality Standards

Receptor/ Source	National Noise Standard[a] (dB)		WHO Guidelines Value For Noise Levels Measured Out of Doors[b] (One Hour LA_q in dBA)	
	Day	Night	07:00 – 22:00	22:00 – 07:00
Industrial area	75	70	70	70
Commercial area	70	60	70	70
Mixed Area	60	50	55	45
Residential Area	55	45	55	45
Silent Zone	50	40	55	45

[a] The Noise Pollution (Control) Rules 2006 (dBA) (Schedule 1).

[b] WHO. 1999. Guidelines for Community Noise**;** World Bank Group. 2007. Environmental, Health and Safety General

Table 8: Applicable Standards for Sound Originating from Motor Vehicles or Mechanized Vessels

Category of Vehicles	Unit	Standards	Remarks
*Motor Vehicles (all types)	dBa	85	As measured at a distance of 7.5 meters from exhaust pipe.
		100	As measured at a distance of 0.5 meter from exhaust pipe.
Mechanized Vessels	dBa	85	As measured at a distance of 7.5 meters from the vessel which is not in motion, not loaded and is at two thirds of its maximum rotating speed.
		100	As measured at a distance of 0.5 meter from the vessel which is in the same condition as above.

* At the time of taking measurement, the motor vehicle shall not be in motion and its engine conditions shall be as follows:-

(a) Diesel engine – maximum rotating speed.

(b) Gasoline engine –at two thirds of its maximum rotating speed and without any load.

(c) Motorcycle – If maximum rotating speed is above 5000 rpm; two-thirds of the speed, and if maximum rotating speed is less than 5000 rpm, three-fourth of the speed.

(Source: Schedule 2 of Noise Pollution Control Rules of Bangladesh, 2006)

Table 9: Applicable Drinking Water Quality Standards for Bangladesh Projects

A. Drinking Water Quality Standards (Selected Parameters Only)				
Sl No	**Parameter**	**Unit**	**Bangladesh Standard for Drinking Water (Schedule 02, Rule 31, ECR 2023)**	**WHO Guidelines for Drinking Water Quality 4th Edition incorporating the first addendum, 2017**
1.	Fecal Coliform	NFU/100ml	0	0
2.	Total Coliform	NFU/100ml	0	0
3.	Free Residual Chlorine	mg/L	0.20	0.2[a]
4.	Boron	mg/L	1.0	2.4
5.	Nitrate (NO_3^-)	mg/L	45	50
6.	Arsenic (As)	mg/L	0.05	0.01
7.	Cadmium (Cd)	mg/L	0.003	0.003
8.	Total Chromium (Total Cr)	mg/L	0.05	0.05
9.	Hardness as $CaCO_3$	mg/L	500	-
10.	Iron (Fe)	mg/L	0.3-1.0	-
11.	Lead (Pb)	mg/L	0.01	0.01
12.	Manganese (Mn)	mg/L	0.4	-
13.	Oil and Grease	mg/L	0.01	-

A. Drinking Water Quality Standards (Selected Parameters Only)

Sl No	Parameter	Unit	Bangladesh Standard for Drinking Water (Schedule 02, Rule 31, ECR 2023)	WHO Guidelines for Drinking Water Quality 4th Edition incorporating the first addendum, 2017
14.	pH	---	6.5-8.5	-
15.	Total Dissolved Solids (TDS)	mg/L	1000	-

[a] For effective disinfection, there should be residual concentration of free chlorine of ≥ 0.5 mg/l after at least 30min contact time at pH < 8.0. A chlorine residual should be maintained throughout the distribution system. At the point of delivery, the minimum residual concentration of free chlorine should be 0.2 mg/l.

B. Standard for Inland Surface Water (ECR, 2023, Schedule 2, Rules- 31, A (1))

SL No	Way of Usage	Parameter											
		pH	DO mg/L	BOD mg/L	NO_3-N mg/L	NH_4-N mg/L	PO_4-P mg/L	Total Cr mg/L	Pb mg/L	Hg mg/L	Total Coliform CFU/100ml	TDS mg/L	COD mg/L
1.	Sources of Drinking Water for Supply only after Disinfecting	6.5-8.5	≥6	≤2	7.0	0.1	0.1	0.02	0.03	0.001	≤100	1000	10
2.	Water Usable for Recreational Activity	6.5-8.5	≥5	≤3	7.0	0.3	0.5	0.2	0.05	0.001	≤50	1000	10
3.	Sources of Drinking Water for Supply after Conventional Treatment	6-9	≥5	≤3	7.0	0.3	0.5	0.02	0.03	0.001	≤5000	1000	25
4.	Water Usable by Fisheries	6-9	≥5	≤6	7.0	0.3	0.5	0.05	0.1	0.004	≤5000	1000	50
5.	Water usable by various Process and Cooling Industries	6.5-8.5	≥1	12	-	2.7	------	0.1	0.1	0.05	----------	1000	100
6.	Water Usable for Irrigation	6.5-8.5	---	≤12	5.0	1.5	2.0	0.1	0.1	0.002	≤50000	1000	100

Note: Electrical Conductivity for Irrigation Water-2250 µS/cm (at a temperature of 25°C: Sodium less than 26%: Boron less than 0.2%

Source: ECR 2023, Schedule 2, Rules-31, A (1)-Standard for Inland Surface Water

III. DESCRIPTION OF THE SUBPROJECTS

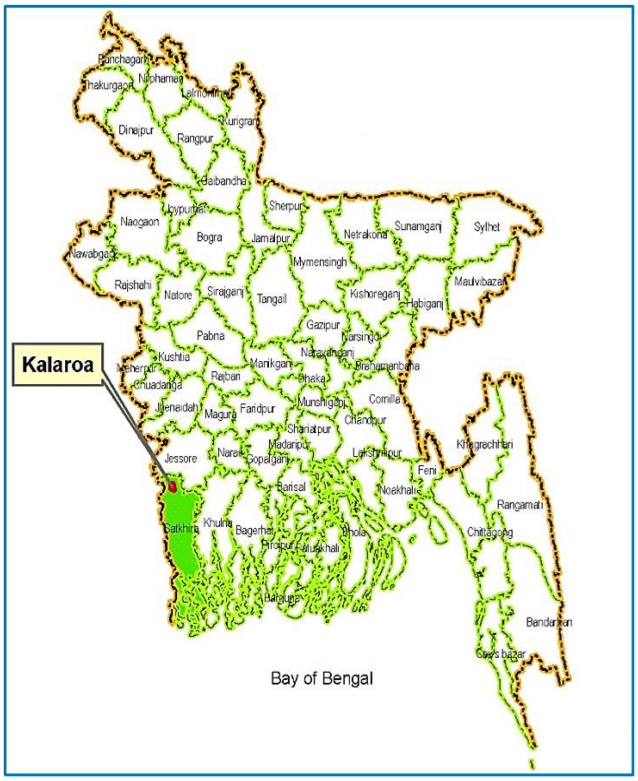
A. Subproject Location and Area

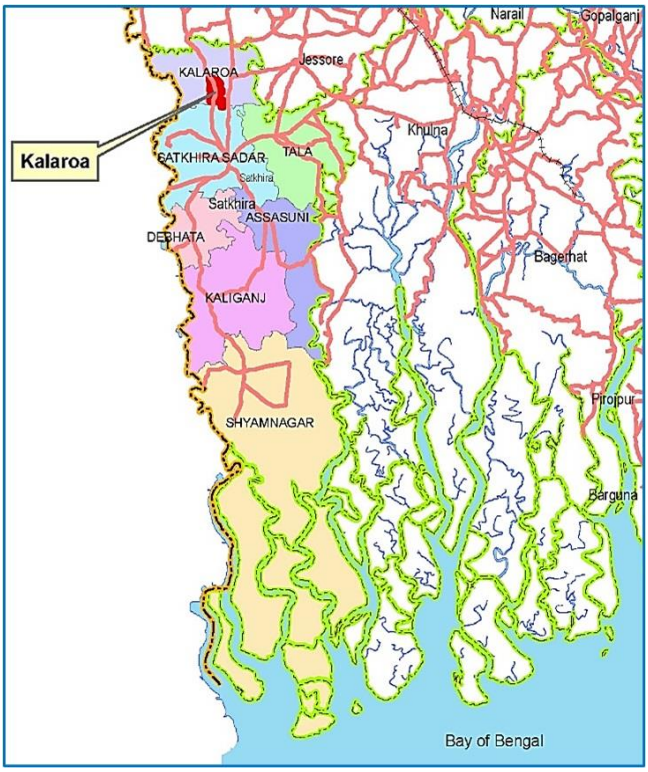
44. The proposed construction and improvement of roads and roadside drains subproject will be in Kalaroa Pourashava which is also a coastal under Satkhira district. The Pourashava is located at southwestern region of Bangladesh and about 236 km (through Maowa) away from the Dhaka City and 18 km away from the Satkhira District Headquarter. The Pourashava was established in the year 1990, which is located between $22^0$52' north latitudes and east longitudes. The Pourashava is categorized as 'Kha' (the term 'Kha' is the Bengali word means second category or 'B' category). It occupies an area of 15.07 km^2 and consists of 9 wards and 9 mouzas.

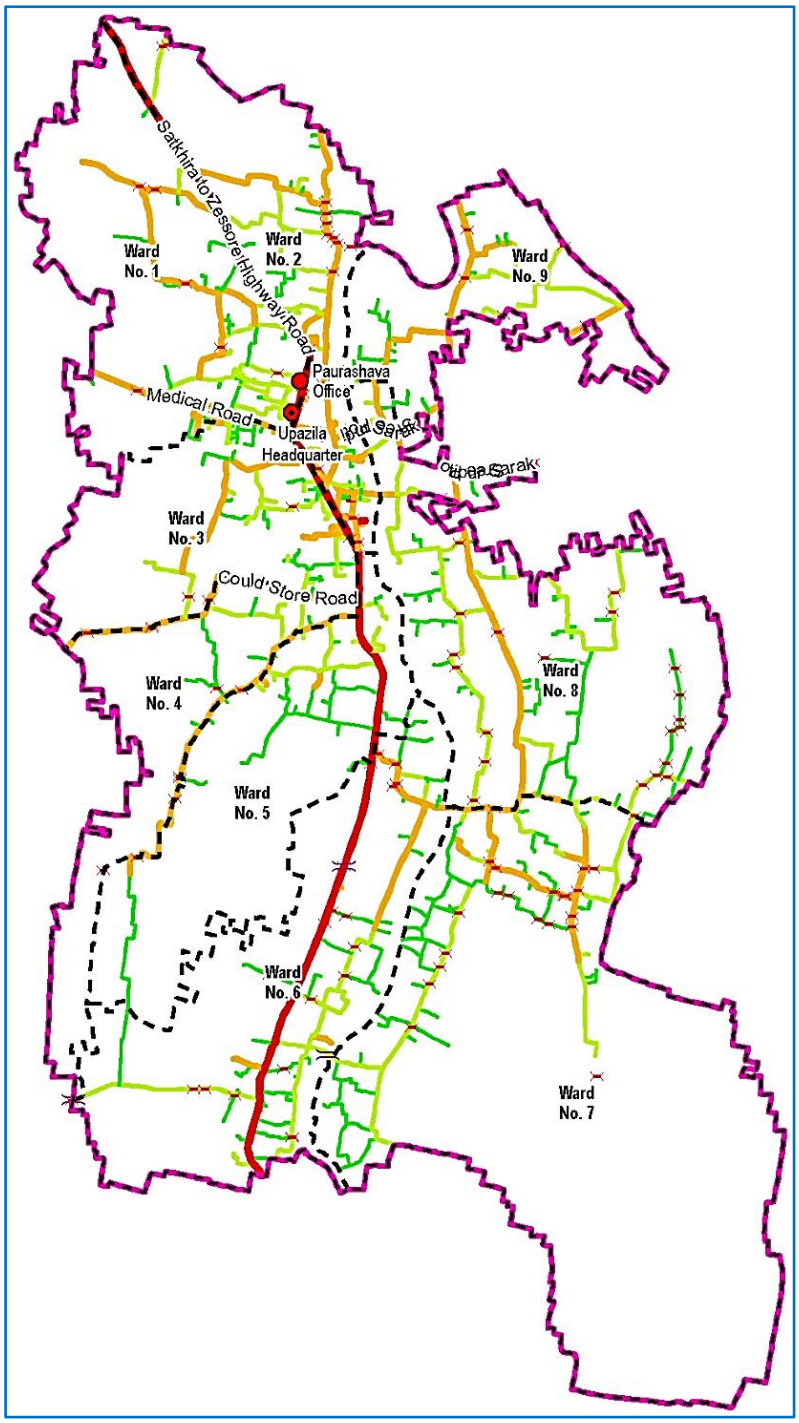
45. The topography Kalaroa Pourashava is mostly flat. Physiographically, Kalaroa Pourashava is same as other Pourashavas which are on floodplain land) in Bangladesh. The subprojects fall under the residential and commercial areas of the Kalaroa Pourashava. Screening with Integrated Biodiversity Assessment Tool (IBAT) confirms that there is no ecologically sensitive area within or adjacent to the proposed subproject's location. There is no natural habitat left at this site. There are, as well, no protected areas, wetlands, mangroves, or estuaries in or near the subproject location. There are no forest areas either, within or near the locations.

Figure 2: Location Map of Kalaroa Pourashava (A), Poursahava Ward Map and Existing Road Alignments (B)and Proposed Construction and Improvement of Roads and Roadside Drains (C)

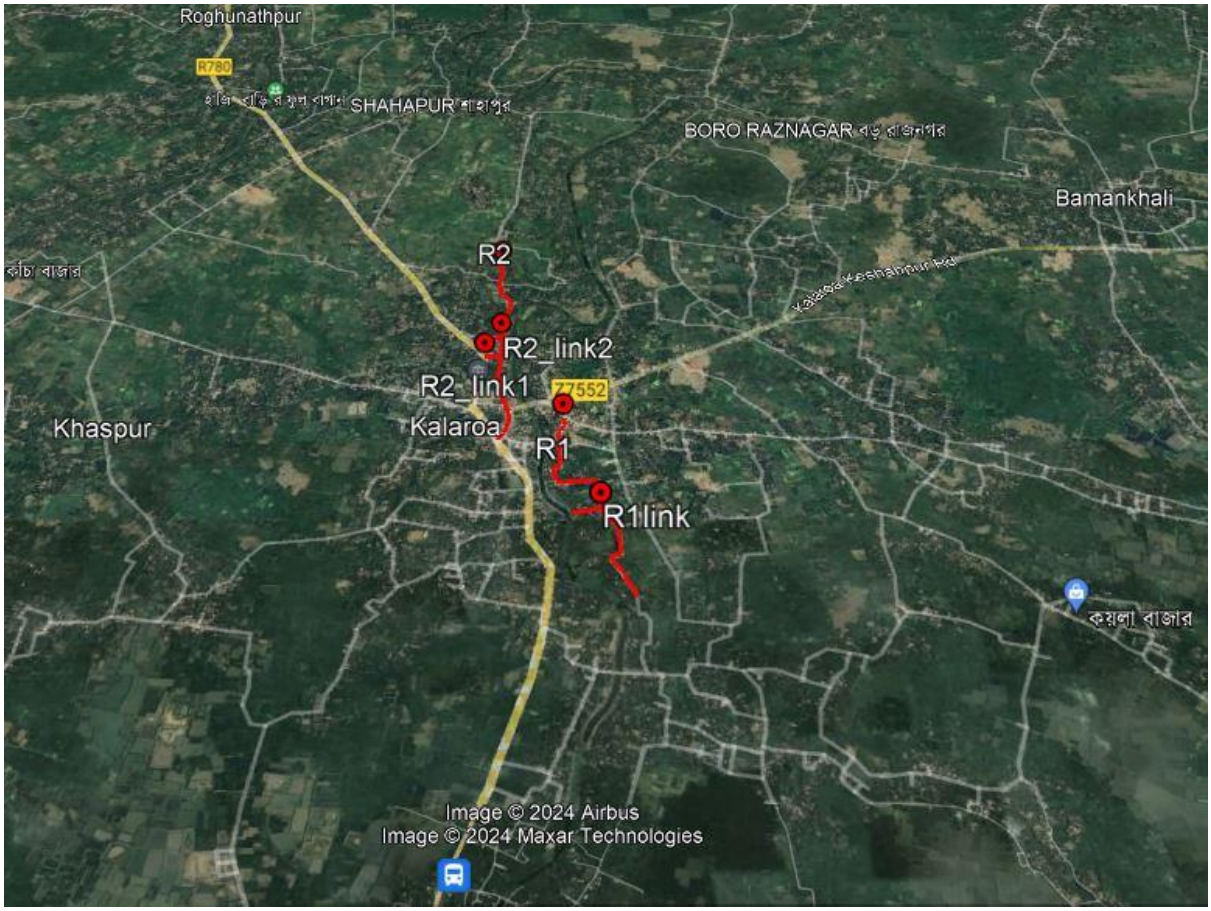
A. Location Map of Kolaroa Pourashava







B. Ward map of Kolaroa Pourashava showing existing roads



C. Location of Proposed Construction and Improvement of Roads and Roadside Drains

B. Existing Condition of Roads and Roadside Drains

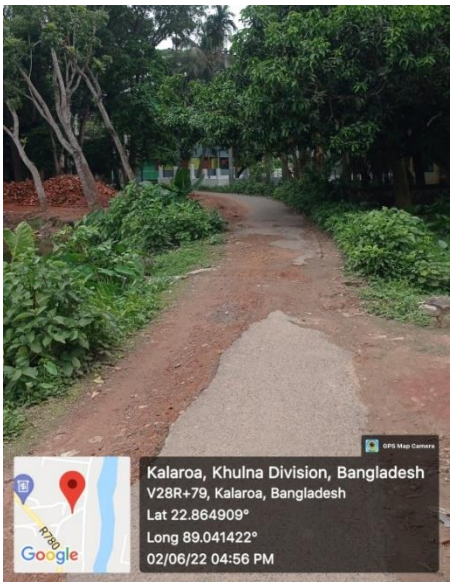
46. The existing roads for improvement in Kalaroa are either BC or Kacha (earthen) road and are mostly damaged. At present the width of these roads varies from 2.00 m to 4.00 m. Currently there are no existing side drains in these five roads.

47. Figure 3 shows on-ground photographs of the existing conditions of roads.

Figure 3: Photographs of Existing Condition of the Selected Roads of Kalaroa Pourashava

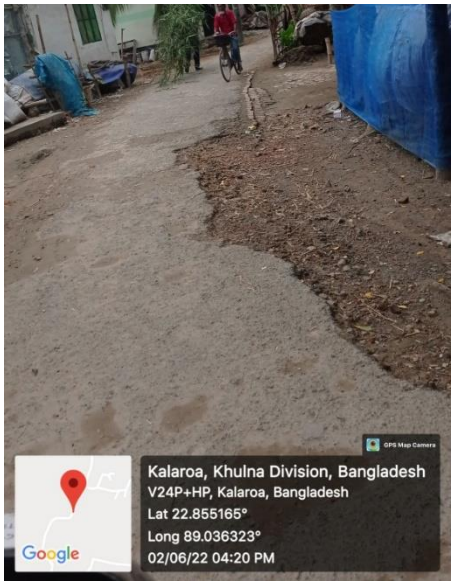
Road-1

Road-2



Road-3

Road-4



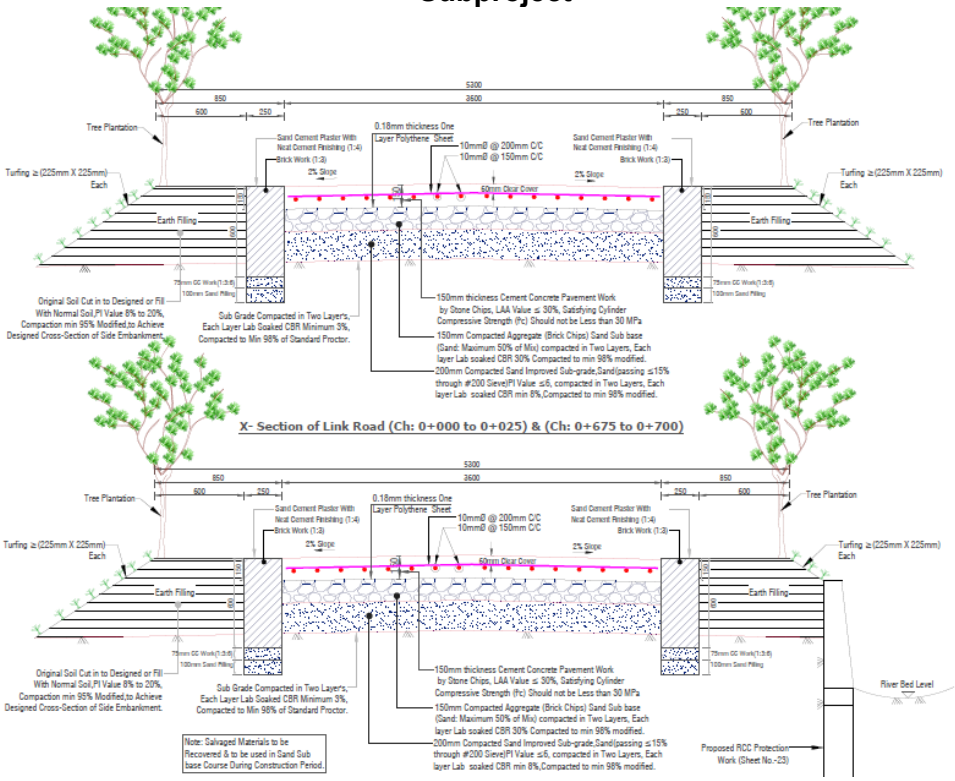
Road-5

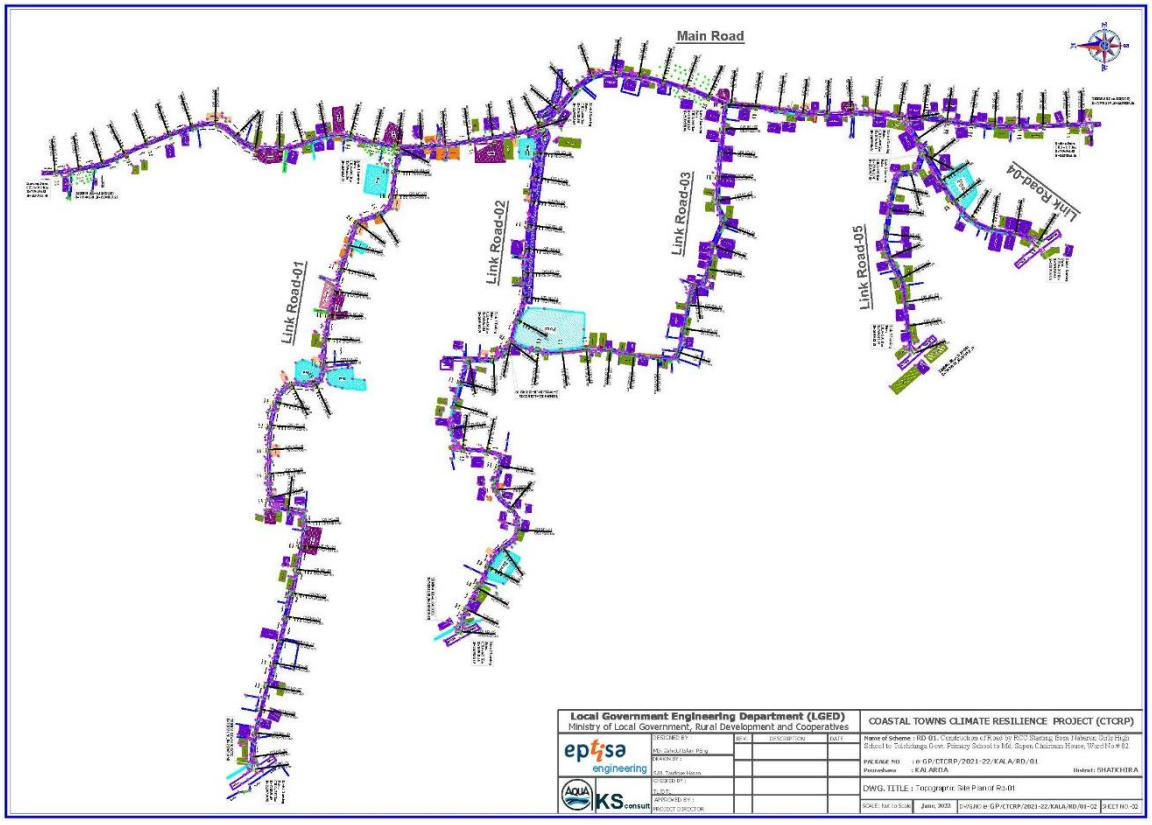
C. Subproject Scope and Components

48. The construction and improvement of road and roadside drains subproject will be implemented in Kalaroa Pourashava to provide more accessible, reliable, and climate-resilient roads. The subprojects (Package No.: e-GP/CTCRP/KALA/RD-01, and Contract Package No.: e-GP/CTCRP/KALA/RD-02) will cover five roads with total length of 6.650 km works in Kalaroa Pourashava. The typical cross section and topographic of the road improvement are given in Figure 4. All works will be confined in existing road alignments, and within existing rights-of-way (ROWs) in government lands. The drains will discharge into existing canals in the area. Detailed design of the roadside drains including discharge outfalls are yet to be completed and will be included in the updated IEE to be submitted to ADB for review and clearance prior to award of contract, or latest, prior to the start of construction.

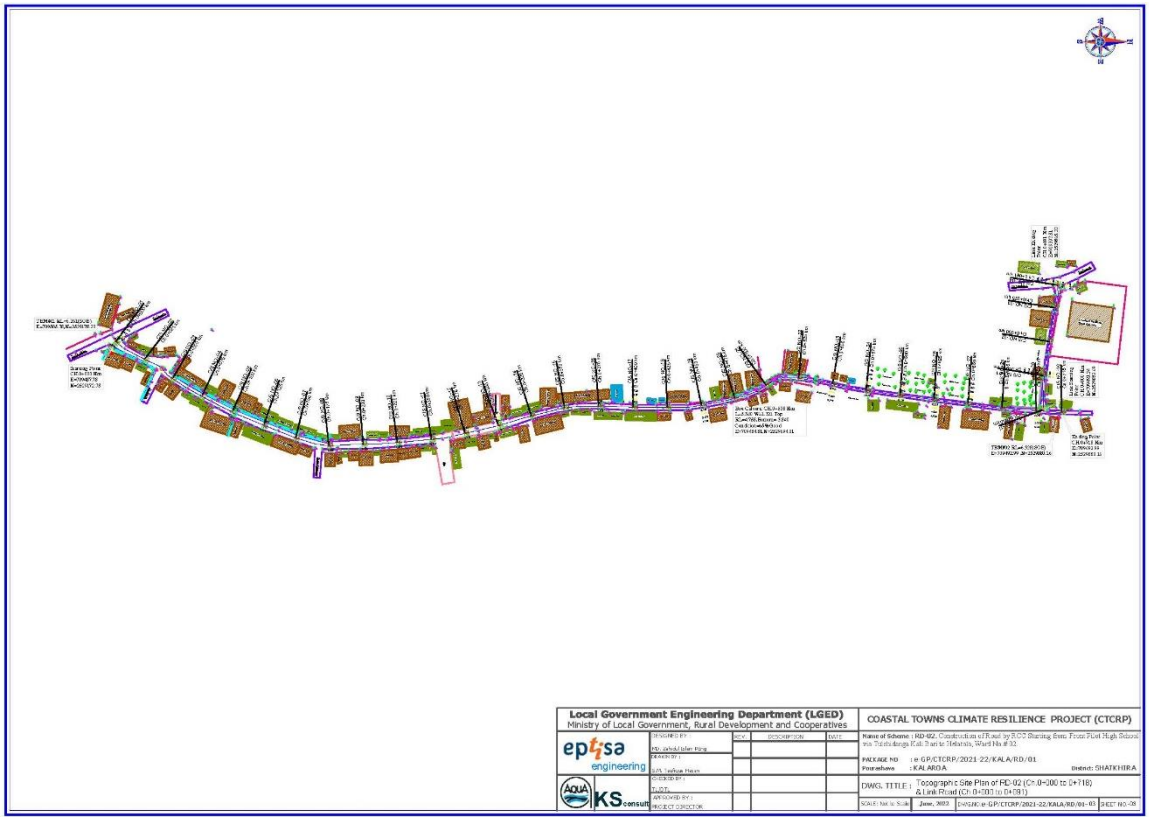
49. Subproject activities include the upgrading, re/construction including road protection work involving widening of the existing road formation and construction of roadside drains. Specifically, the works will include the following: (i) Earth filling works with excavation, ii) Roadway reinforcement with CC and RCC works iv) Sand filling, aggregate sand sub-base, polythene sheet, WBM, Brick; A summary of the road and roadside packages under the subproject is in the Table 10. Detailed design of all roadside drains (width, depth, outfall location and design, others) is yet to be completed and will be included in the updated IEE.

Figure 4: Typical Cross section and Topographic Site Plan of the Proposed Road Subproject

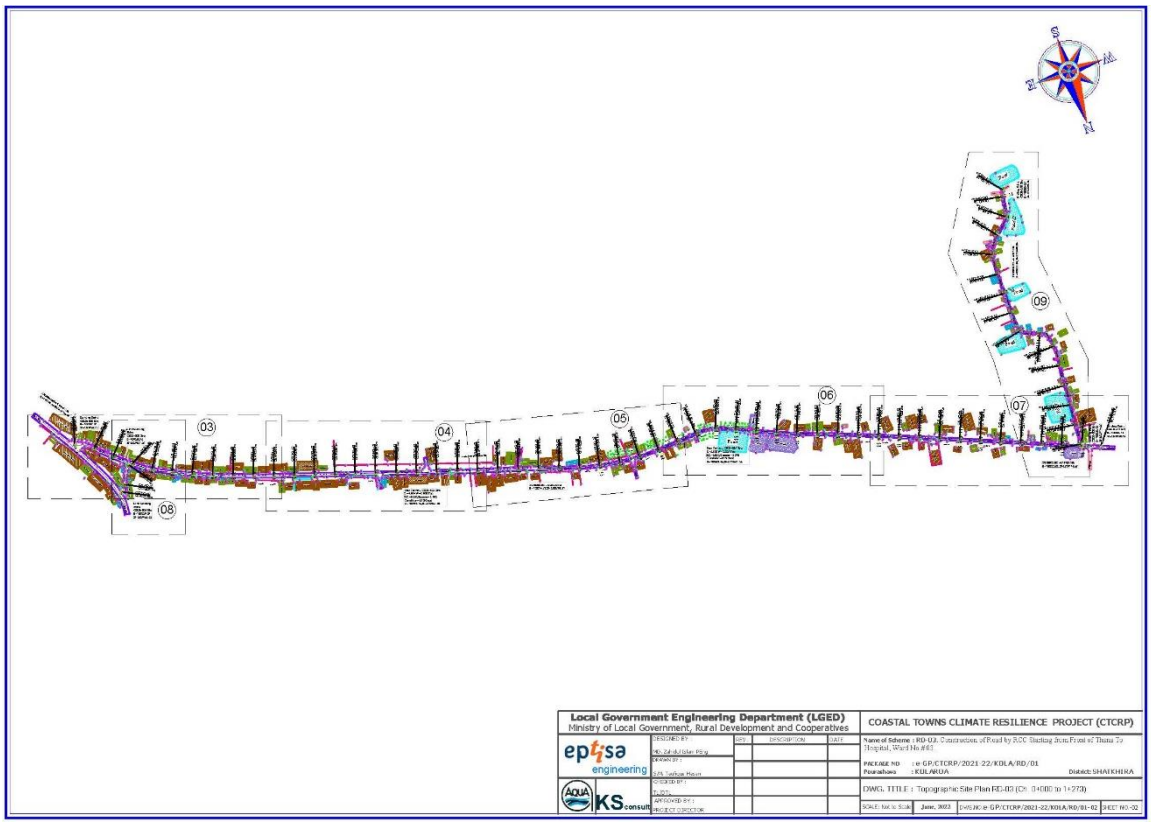




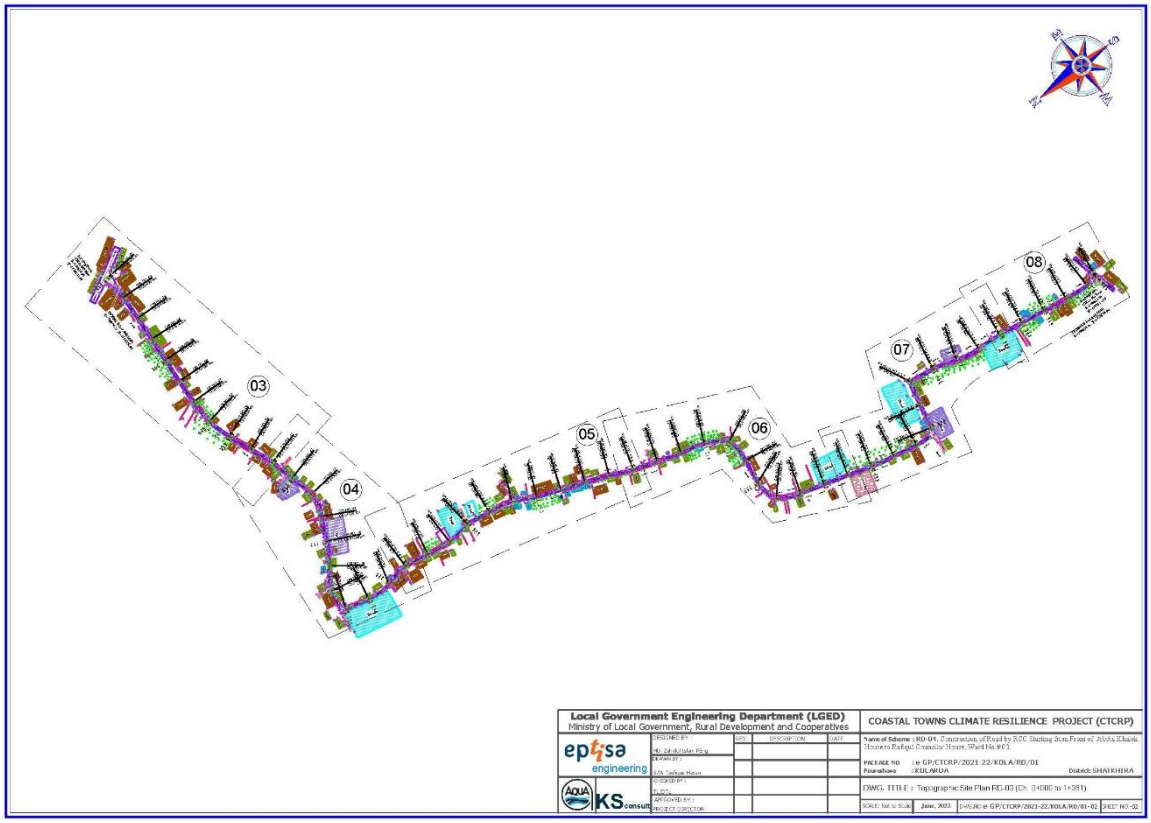
Topographic Site Plan of RD-1



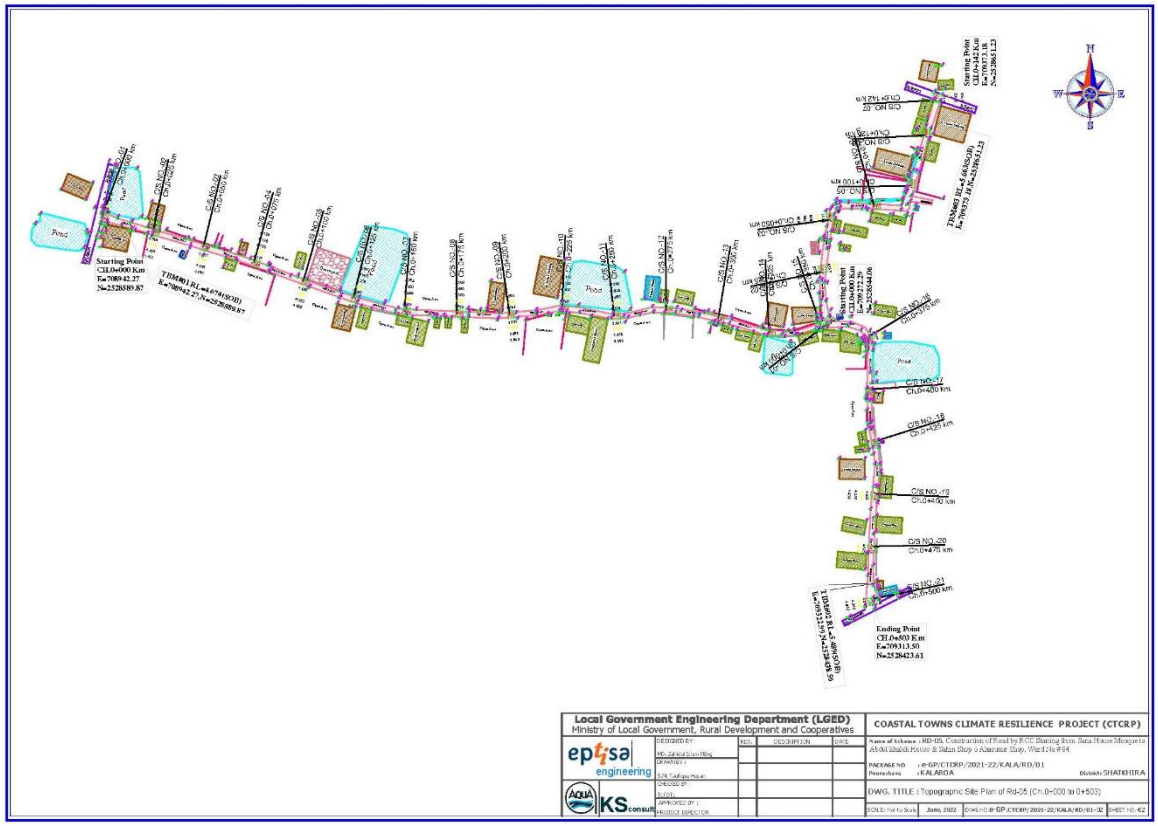
Topographic Site Plan of RD-2



Topographic Site Plan of RD-3



Topographic Site Plan of RD-4



Topographic Site Plan of RD-5

Table 10: Summary Description of Subproject Components

SL.No	Road	Existing Road Length (km)	Proposed Road Length (km)	Width (m)		Type	
				Existing	Proposed	Existing	Proposed
e-GP/CTCRP/KALA/RD-01: Construction/ Improvement of 2 nos. roads including roadside drains under Kalaroa Pourashava, District- Satkhira							
1	Construction of RCC Road From Murarikati bottola mor to united high school. Ward No 08 with Roadside Drain	1.750	1.750	3.00	5.0 (Main) 3.66 (link)	Earthen & Damaged Soling Road. No existing roadside drain	RCC RCC drain with cover (see note below)
2	Construction of RCC Road From Front Pilot High School via Tulsidanga Kali bari to Shuvonkor kati mor. Ward No 02 with Roadside Drain	1.900	2.000	3.50	5.0 (Main) 3.66 (link)	Earthen & Damaged Soling Road. No existing roadside drain	RCC RCC drain with cover (see note below)
Total Road Length			**3.750**				
e-GP/CTCRP/KALA/RD-02: Construction/ Improvement of 3 nos. roads including roadside drains under Kalaroa Pourashava, District- Satkhira							
3	Construction of RCC Road From Front of Kanipara to Hospital. Ward No 01,02 with Roadside Drain	1.100	1.200	3.0	5.0 (Main) 3.66 (link	Damaged BC No existing roadside drain	RCC RCC drain with cover (see note below)
4	Construction of RCC Road From Front of Abdul Khalek House to Rafiqul Councilar. Ward No 03 with Roadside Drain	0.450	0.500	4.0	5.0 (Main) 3.66 (link	Damaged BC, soling and earthen No existing roadside drain	RCC RCC drain with cover (see note below)

5	Construction of RCC Road From Murrikati mor to habujal. Ward No -6,7,8 with Roadside Drain	1.200	1.200	4.00	5.0 (Main) 3.66 (link	Damaged soling and BC No existing roadside drain	RCC RCC drain with cover (see note below)
	Total Length		**2.900**				
Grand total			**6.650**				

Note: Detailed design of all roadside drains (width, depth, outfall location and design, others) is yet to be completed.

D. Resource Utilization

50. Gravel, sand, and aggregate will be required for civil construction part of this project, most of which are available in Bangladesh, which may, however, need to be transported over long distances. Reinforcing steel (both mild and high grade) is produced in the country. However, a guarantee of quality, quantity and delivery schedule is important. All these materials, and other construction materials will be sourced from legitimate entities authorized by the government.

Table 11: Quantity of Construction Material (for Roads only)

Sl. No	Description	Unit	Quantity
1	**Earthworks**		
i)	Earth filling works, Earth work in excavation	m^3	12,886
2	**Roadway**		
i)	CC & RCC works	m^3	5,347
ii)	Reinforcement	Kg	249,062
iii)	Geo-textile	m^2	1,045
iv)	Blocks (size 400mm X 400mm X 100mm)	each	6,705
v)	Sand filling, Aggregate sand sub-base, polythene sheet, WBM, Brick	m^3	9,815

Note: The quantity of construction material is only for the road component. The quantity of construction material for the roadside drains shall be determined during the detailed design.
Source: DDS Computation Based on Designs

E. Construction Schedule

51. The packages for the construction and improvement of roads and roadside drains in Kalaroa are proposed to be implemented by post-qualified contractors under a single envelope single stage bidding process through National Competitive Bidding (NCB) procedures. The subproject may take 18 months for construction. The post-construction will also include defect liability period of 12 months.

IV. ANALYSIS OF ALTERNATIVES

53. The primary objective of the “analysis of alternatives” is to identify the location/technology for a particular subproject that would generate the least adverse impact and maximize the positive impacts. The preliminary assessment of the project included an analysis of alternatives, addressing the optimal match between required technical specifications and site conditions, as well as addressing any concerns for environmental, social, and economic features in each location.

54. "With Project” alternative. The implementation of the subprojects will contribute to physical improvement and socio-economic development in the Pourashava and will eventually lead to a better quality of life of the people. Specifically, the alternative of pursuing the subprojects (“with project” alternative) have that following advantages:

(i) There will be improved and assured road transport facilities for the residents of Pourashava/District;
(ii) Transport development will stimulate socio-economic development of the area. The proposed roads with existing damaged conditions comprise major deterrent to commercial growth in the area, the project scenario will catalyse commercial growth in various centers of the respective locality and will facilitate better business opportunities for local people;
(iii) Roads improved through the project will also result in savings in the vehicle operation cost (fuel, operation, and maintenance) due to better road condition;
(iv) Less emission from road vehicles due to better roads will result in better environmental conditions along the influence area;
(v) The roadside drains will direct the flow of surface run-off and will prevent waterlogging in the area

Table 12: Negative impact of current proposal on environment and society

Sector	Impact
Land (Government-owned land are to be given priority)	No, construction and improvement of roads will be within existing ROWs in government-owned lands.
Presence Agricultural/crop land	No
Village affected	Close by, no significant impact will occur if EMP is followed
Families affected	Close by, no significant impact will occur if EMP is followed
Local Business affected	Close by, no significant impact will occur if EMP is followed
Loss of structures	Close by, no significant impact will occur if EMP is followed
Impact on Common properties	Close by, no significant impact will occur if EMP is followed
Trees to be chopped down	No
Presence of sensitive ecosystem	No
Presence of waterbody	Close by, no significant impact will occur if EMP is followed
Tribal population affected	No

55. **No-project Alternative and Implications.** The “no-project” option means that no road and drains improvement/reconstruction will be implemented in the Pourashava. The “do nothing” or “without the project” option is not viable due to the following factors:

(i) The socio-economic-physical status of the Kalaroa residents would remain unchanged;
(ii) The local skills would remain underutilized as no employment opportunities will be created for local population who would have otherwise worked at the project area;
(iii) Reduced business development due to current poor bad condition of the road and drains network;
(iv) The current erosion rate of the existing feeder roads will continue due to lack of drainage system; and
(v) No project scenario case will also result in environmental and social impacts due to potential pollution, increase of accidents, and increase of diseases brought by poor road and drainage condition.

V. DESCRIPTION OF BASELINE ENVIRONMENT

A. Baseline Information

56. The primary objective in this chapter is to provide an environmental baseline of the proposed road construction and improvement sites. Baseline data includes an inventory of physical, ecological, and socio-economic parameters. Baseline environmental data presented in this chapter are based on available secondary information. No sampling for air quality, noise and water quality was conducted. Baseline environmental monitoring for such will be conducted before the start of construction. The Integrated Biodiversity Assessment Tool (IBAT) was used to screen the potential risks on the protected areas or critical habitat that may exist around the project sites.

B. Project Influence Area

57. Impacts and risks were analyzed in the context of the project's area of influence, which encompasses the area where the roads will be constructed, immediate vicinity and the location of construction phase facilities such as the worker's camp, storage, and disposal areas.

58. The primary impact will be confined mostly within the location of road construction areas. Delivery of construction materials to the site would extend the PIA. This means that during transport of construction materials, the impact area is extended along the roads being traversed by the transporting equipment.

C. Physical Environment

59. **Topography**. Kalaroa Pourashava falls under Satkhira District, which is a part of the south-western region of Bangladesh. The south-western region of Bangladesh falls under lower Ganges River Flood plain and Ganges Tidal Floodplain. The region has very little variation in elevation, with only a few metres being the difference between "highland" and "lowland".

60. Kalaroa Pourashava is a land of mixed topography. According to Kalaroa Pourashava Master Plan (2011-2031), the lowest spot height of the Pourashava area is 0.45 m(PWD), the highest spot height is 6.28 m(PWD) and average spot height is 2.226 m(PWD). Except ward no. 3 and 7, all other wards have been found to have the highest elevation. The lowest elevation is found on natural features (canal, pond and khal) in different wards of the Pourashava. Four main river tributaries are located in the region. Alluvium, stream deposits, delta plain deposits, and flood plain deposits are the main topographic base forming calcareous to non-calcareous alluvium, with grey and dark grey soils and no or little effects from salinity (SRDI 1997).

61. **Geology, soil, and subsoil conditions:** Soils of the region are formed by the alluvial deposition of the Ganges systems. In Satkhira region, saline Ganges tidal flood plain with silty loam to clay soils dominate in the northern parts and acid sulfate silty clay loam soils of the Ganges tidal flood plain is found in the southern parts. Peat soils in the sub-surface layers exist in western part of the district. Nevertheless, the soil of the region are highly valued for agricultural production. The soil of Kalaroa consists of active natural levee, flood plain, and sand bar, point bar sediments composed of naturally low to medium compact sandy silt, sandy clay, organic clay, loose sand, depression, and abandoned channel sediments.

62. **Seismicity.** Twenty-six, 38 and 36 percent of Bangladesh falls within the high, moderate, and low risk zones in terms of earthquake vulnerability, respectively. The distribution of recorded earthquakes indicates a major clustering of seismicity around the Dauki Fault and scattering of other events along other major fault systems of Bangladesh. The

magnitude of the earthquakes is moderate (4-6, magnitude in Richter scale) and the majority of them are at shallow depth. Based on the Geological Survey of Bangladesh (GSB, undated[10]), Satkhira falls in low intensity seismic zone (Zone-III, Basic Seismic Coefficient 0.04g).

63. The Bangladesh National Building Code (2010) on the other hand, divides Bangladesh into four categories of seismic zone according to intensity, i.e., very high, high, moderate, and low. Kalaroa falls within seismic zone 1 (Z = 0.12).

64. **Climate:** The climate in Khulna Division is tropical according to the Koppen-Geiger climate classification (Beck et al. 2018[17]). The subproject site has a tropical climate.

65. **Rainfall:** Tropical to sub-tropical monsoon climate characterizes the region. Seasonal rain is the result of tropical depressions in the Bay of Bengal. The monsoon season (June–October) receives more than 80% of the total annual rainfall (average 1800 mm, range 1400–2600 mm). The annual rainfall increased by 9.5 mm over the period of 1990–2005. The pattern of total rainfall of different years of the last decade was quite irregular. Pre-monsoon rainfall followed a decreasing pattern (sharp and gradual) from 1997 to 2005. On the other hand, the monsoon of 2002 received the highest (1271 mm) rainfall compared to other years of the last decade. A gradually decreasing pattern of pre-monsoon rainfall was observed from 1997 to 2005 while the total rainfall of post-monsoon shows an increasing pattern from 2002 to 2005.

66. **Temperature:** Annual average temperature varies from a maximum of 31.6°C to a minimum of 21.4°C. The long-term trend in average maximum temperature shows a decline over the period of 1976–2005. It has, on average, reduced by 0.009°C per annum over the period. The average annual minimum temperature in the Satkhira region has also declined, on average, by 0.001 over the period (1976–2005). The annual average minimum temperature of Satkhira region shows variations. Most of the years of the first of the last three decades experienced less than 21.5°C of annual average minimum temperature. The lowest average was observed during the first half of the last decade. However, from 2000 to 2005 the minimum average temperature followed an increasing pattern. The climate change impact includes shorter winters, late rainfall, lack of rainfall and long summer as climate related hazards in the area. The frequency and intensity of cyclones and storm surges have increased in the last decade. The temperature has increased especially during pre-monsoon.

67. Wind speed is the highest in April (around 176 kph) and the lowest in November (around 68 kph). During cyclone Sidr (2007) and Aila (2009), 1-minute sustained wind speeds were recorded as 260 kph and 120 kph respectively, the former one created devastating impacts due to the high wind speed whereas the later one is more related to the increased storm surge. As per Bangladesh National Building Code (BNBC), the basic wind speeds considered for structural design for Satkhira is 207.36 kph.

68. **Ground water:** Ground water is the only source for the supply of safe drinking water to the inhabitants of the Pourashava. The Pourashava has no water supply network. Neither the Pourashava nor DPHE has any record nor census of hand tube wells within the Pourashava. The ground water table of the Pourashava varies from minimum 6ft during rainy season to maximum 22ft during winter. The ground water of Kalaroa Pourashava is heavily loaded with iron. Hand tube wells contain iron and other harmful minerals and are main cause for most of most chronic intestinal diseases. Moreover, during winter the level of ground water table goes down and concentration of iron in ground water increases. The DPHE identified a few tube wells contaminated by arsenic in Kalaroa Pourashava. The contaminated hand tube wells were abandoned, and new wells were constructed in those places.

[17] Beck, H., Zimmermann, N., McVicar, T. et al. Present and future Köppen-Geiger climate classification maps at 1-km resolution. Sci Data 5, 180214 (2018). https://doi.org/10.1038/sdata.2018.214

69. **Surface water:** The sources of surface water of Kalaroa Pourashava like ponds, ditches and khals are being contaminated from improper sanitation, solid waste disposal, improper treatment and disposal of hospital waste, use of chemical fertilizers, poisonous insecticides, etc. Another source of water pollution is the use of chemical fertilizer in agricultural land.

70. **Natural Hazards**. The Pourashava area including the Pourashava Upazila has been affected by the several major natural disasters ranging from cyclone, flood to water logging and droughts.

71. **Flood**: Low-lying areas in Kalaroa gets flooded/water-logged during events of heavy rains.

72. **Cyclone:** Although Bangladesh is cyclone-prone area, Kalaroa Pourashava is out of the range of tropical cyclone which occur mainly the coastal areas of Bangladesh. Kalaroa Pourashava is also free from Nor'werters and Tornadoes. The Nor'werters, severe seasonal storm locally known as Kalbaishakhi occurs during pre-monsoon season. Severe Nor'westers is generally associated with tornadoes. Tornadoes are suddenly formed and are extremely localized in nature and of brief duration.

73. **Air Quality.** Baseline data on air quality for the subproject area is not available. There is no major source of air pollution at the proposed site. The contractor will be required to establish the baseline air quality before the start of construction.

74. **Noise Level.** Baseline data on noise for the subproject area is not available. There is no major source of noise pollution at the proposed site. Sources of noise in the subproject site include motor vehicles (motorcycles, pick-up, mini-trucks, auto-rickshaws, Nochimon/Tomtom), playing of loud-speaker, mass people gathering and people chatting. The contractor will be required to establish the baseline noise levels before the start of construction.

D. Biological Environment

75. **Terrestrial Fauna and Flora.** The proposed roads and roadside drains construction and improvement in Kalaroa Pourashava are located within built-up areas. Vegetation in the surrounding area are secondary grown trees and shrubs. There are no forests, national parks, or sanctuaries in or adjacent to the proposed roads construction and improvement location. There are also no rare, threatened, or endangered species reported.

76. **Fauna Species**. Common mammals are Jackal (*Canis aureus*), Grey mask shrew (*Suncus murinus*) and small Indian civet (*Viverricula indica*), Common Mongoose (*Herpestes edwardsii),* Jungle Cat (*Falis chaus*), Bengal Bandicot Rat (*Bandicota bengalensis*), Common House Rat (*Rattus rattus*), Squirrel *(Cllosciurus pygeryhrus)* and bats like Short-nosed Bat (*Cyynopterus sphinx*) mostly live in bamboo thickets, cropped fields or broken, bushy areas.

77. **Flora Species:** The area is covered with trees common throughout Bangladesh which are of fruits, timber, medicinal and shrubs and undershrub.

78. **Protected Areas and Critical Habitats**. Protected areas (PAs) are "especially dedicated to the protection and maintenance of biological diversity and associated cultural resources, which are managed through legal or other effective means" (IUCN, 1994). They are "designated or regulated and managed to achieve specific conservation objectives" (Mulongoy & Chape, 2004). Three types of protected areas were defined under the

Bangladesh Wildlife Preservation Act, 1973; i.e., National Park, Wildlife Sanctuary and Game Reserve.

79. The IBAT was used to screen the presence of protected areas or key biodiversity areas (Appendix 3). Based on the results, there are no PAs or KBAs within 10 km of the subproject area. Forty-seven threated species per the IUCN Red List could be potentially found within 50km of the area of interest. However, the subproject site is already a built-up area and the probability of these species being found at the site is very low.

E. Socio-Economic Environment

80. **Demography**. As of the 2011 Bangladesh census, Kalaroa Pourashava has a population of 27,250 and male and female are 49.58% and 50.42% respectively.

81. **Land use pattern**. The major portion of land of the project area is under agricultural use. Around 2478.817 acres of land of the Pourashava is under agricultural use. Ward no. 7 has maximum agricultural land (770.32 acres), which is 31.08% of the total agricultural land of the Pourashava. These areas have distinct rural characters. Residential use includes residential houses, residential quarters, rest house, slum, mess etc. It has been shown that Ward no. 8 has the most residential concentration (14.56%) while; Ward no. 2 possesses the second position having 14.13% residential land. Ward no. 4 has the lowest residential concentration. Commercial land use mainly comprises of different types of shops (book shops, cloth shops, department stores, grocery shops, stationary shops etc.), market, kitchen market and other lands being used for commercial purposes. Commercial activities are mainly concentrated in Ward no. 2, which is 40.34% of the commercial uses of the entire Pourashava. Ward no. 3 has the second highest commercial uses of land (17.04%). The water body of Kalaroa Pourashava mainly consists of ponds, ditches, khals, irrigation canals etc. It covers 383.44 acres of land. Ward no. 7 has the highest percentage (26.64%) of water body in the Pourashava. Ward no. 1 has the minimum amount of water body compared with other wards of the Pourashava. Pucca road, semi-pucca road, katcha road and rail line constitutes circulation network category of land use. The highest percentage of circulation network land use is around 17.72% in Ward no. 6. Ward no. 2 has the minimum amount (16.21%) of this kind of land use. Educational and research land use categories include college, high school, primary school, NGO school, madrasha and other means of education. Ward no. 2 has the highest amount of land (27.46%) of this category. Ward no. 8 has the highest level of land use (33.93%) for industrial/processing and manufacturing purpose. This type of use includes rice mill, saw mill, ice factory, and seed processing industry, bakery factory and other manufacturing and processing activities. It is noticed that Ward 3 has no such type of land use. Transportation facilities include bus-truck terminal/stand, ferry ghat, rickshaw garage, passenger shed, post office, rail station, telephone exchange, ticket counter etc. There are 4.91 acres of land in Kalaroa Pourashava used for this purpose. Botanical gardens, ecological park, graveyard, crematorium, historic sites etc. are included in urban green space category. There is 4.416 acres land for this type of land services in this Pourashava.

82. **Literacy rate and educational institutions.** According to BBS (2011), an increasing trend of literacy is observed in the Kalaroa Upazila over the decades. The literacy rate is 61.3% in 2011 against 57.21% in 2001. It appears that the literacy rate has increased for both sexes in 2011 over 2001. In the project area it is found that about 88.09% of people have attained education level ranging from primary level to higher education. Out of the total population, 11.91% never attended school. People with primary level education (Class I-V) account for 40.14%. People with high school level education (Class VI-X) constitute 28.2%. 14.67% of people are reported to have attained higher secondary level education. 5.08% of people have achieved above higher secondary education level. There are 47 educational establishments in the project area. It has a total of 6 primary schools, 10 high schools, 6 colleges and 4 Madrashas. The area does not serve any academic institute of national importance. Among

the NGOs, BRAC has a significant role in education for the poor and deprived children. Several schools run by BRAC are found in different parts of the town.

83. **Income Level:** More that 11.3% of households have a monthly income of Tk. 5,000 or below and may be classified as poor. The households with income ranging from Tk. 5,001-10,000 constitute 53.5% of households. The high-income households with monthly income of above Tk. 15,000 constitute only 15.4% of the total households. It also reveals that the mean monthly income of the project area households is Tk. 7,483.35.

84. **Physical Cultural Resources**. The subprojects components are not immediately located near historical, cultural, and archaeological sites, no excavation works will be conducted in the vicinities of such sites. There are no other scheduled or unscheduled archaeological, paleontological, or architectural sites of heritage listed by local and/or national authority. Socio-cultural and religious establishments in the vicinity of the proposed road subproject include graveyards, schools, madrashas and mosques.

F. Site-Specific Environmental Features

85. The table below shows the site-specific environmental features along the proposed road construction and improvements.

Table 13: Site-Specific Environmental Features

SI	Road	Environmental Features	Photograph
1	Construction of RCC Road From Murarikati bottola mor to united high school. Ward No 08 with Roadside Drain	Nearby the road alignment there are, trees, agriculture land, electric poles, and residential houses.	 Residential house
2	Construction of RCC Road From Front Pilot High School via Tulsidanga Kali bari to Shuvonkor kati mor. Ward No 02 with Roadside Drain	Nearby the road alignment there are trees, agriculture land, electric poles, mosque and residential houses.	 Trees

SI	Road	Environmental Features	Photograph
3	Constraction of RCC Road From Front of Kanipara to Hospital. Ward No 01,02 with Roadside Drain	Nearby the road alignment there are trees, electric poles, agriculture land, graveyard and residential houses.	 Trees
4	Construction of RCC Road From Front of Abdul Khalek House to Rafiqul Council. Ward No 03 with Roadside Drain	Nearby the road alignment there are , over electric overhead electric poles and shops.	 Residentail house
5	Constraction of RCC Road From Murrikati mor to habujal. Ward No - 6,7,8 with Roadside Drain	Nearby the road alignment there are trees, agriculture land, electric poles, residential houses boundary wall of houses.	 Boundary of residential house

VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

86. Environmental impact assessment is the systematic identification and evaluation of the potential impacts (effects) of proposed projects, plans, programs, or legislative actions relative to the physical, chemical, biological, cultural, and socioeconomic components of the total environment. ADB SPS, 2009 requires the assessment of environmental impacts during the different stages of the project, including project design/pre-construction, construction, and operation phases, and the formulation of corresponding mitigation measures to avoid, minimize or offset environmental impacts.

A. Design/Pre-Construction Phase Impacts and Mitigation Measures

87. **Integration of EMP in bidding documents and contracts**. Lack of awareness by contractors on ADB SPS, 2009 requirements may result in insufficient budget and non-implementation of EMP.

88. To ensure that EMP will be provided with sufficient budget and implemented:

(i) The PMU will incorporate the costs of implementing OHS and the EMP as well as specific provisions requiring contractors to comply with all other conditions required by ADB into the bidding and contract document; and

(ii) Once the Contractor is selected, the PIU with support from PMSC will inform contractors on their responsibilities in EMP implementation, in compliance with ADB and government requirements, self -monitoring and reporting procedures.

89. **Updating of IEE.** The PMU shall update the IEE in case of change in design and submit the same for review and clearance of ADB.

90. **Provisions for connection to service infrastructure**. Unplanned construction activity may be necessary in case of absence of service infrastructure at the site.

91. To avoid unplanned construction activity, the PMU and PIU shall confirm the location, capacity, functionality and connection readiness of water, sewerage, electricity, heating and legal landfills to avoid wastewater dumping, ad-hoc connection arrangements, or inappropriate waste disposal during the construction phase.

92. **Integration of climate change considerations in design**. The detailed design of the road network and roadside drains 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.

93. Detail design of the subproject roads provides for possible measures, both structural and non-structural, to integrate climate resilient design standard into the road and drains subproject. Such actions are to include: (a) raising of road levels to optimum heights; (b) bitumen carpeting increased to required thickness; (c) proper compaction of soil beneath carpeted layers; (d) preference to cement concrete (CC) pavement with appropriate temperature reinforcement and guide wall to protect erosion and sliding where there are threats of inundation; and (e) turf and tree plantation along the road shoulders and roadside slopes.

94. **Impacts on local hydrology.** Failure to consider the local hydrology in the siting and design planning may lead to local waterlogging problems and obstruction of water flows in the vicinity.

95. To address these impacts, the design will consider the following:

(i) Detailed assessment of the micro hydrology and topography of the project site;

(ii) Design the roads and drains according to the slope and elevation relative to the water bodies that may exist in the area; and

(iii) Provide the appropriate design of drains for road stretches that do not have existing drainage or where persistent flooding has been recorded.

96. **Disruption of Existing Utilities**. Construction activities may disrupt existing utilities.

97. To avoid/minimize or manage the disruption of existing utilities, the following measures will be implemented:

(i) Conduct investigation at site to determine all the existing utilities that will likely be disturbed during construction phase; and

(ii) Coordinate with agencies responsible for the maintenance of the utilities and formulate a plan to minimize disruption of services during construction phase. The plan must be formulated in coordination with LGED and stakeholders at the site. Where required, the responsible agency shall be requested by PIU to carry out the necessary works at the time required and at cost of the subproject.

98. **Disturbance of private and common properties and physical cultural resources.** Road works will be confined to the location of the existing selected roads and the available road right-of-way (ROW). The subproject road improvement will cross few government infrastructure (schools, eidgah, mosques, different government offices), water bodies (canals), ponds, graveyards, residential area; and commercial areas. As per design, the construction/improvement of roads may adversely impact some of structures like fencing, trees, properties etc.

99. The following mitigation measures shall be implemented to address the above impacts:

(i) Conduct investigation at site to determine if any existing private or common properties/structures will be disturbed during construction phase;

(ii) Conduct meaningful consultation with stakeholders whose private and common properties are confirmed to be likely affected by the construction works;

(iii) Ensure that all works will be confined within existing alignments, and within existing rights-of-way (ROWs);

(iv) Avoid disturbance or damage of physical cultural resources (mosque, graveyards) through proper design of road alignment and demarcating construction area; and

(v) Ensure the implementation of measures according to the resettlement plan for the subproject, as necessary.

100. **Material sourcing**. Erosion and sedimentation may be caused by illegal quarries in the region. Materials for the construction should not be sourced from these facilities.

101. As a measure,

(i) the bid documents should include a clause on material sourcing that will require the contractor to source construction materials from legal or government-approved sources only.

(ii) no new quarry sites shall be used for the subproject;

(iii) verify suitability of all material sources and obtain approval of PMU/DIVISIONAL/REGIONAL OFFICE or PIU; and

(iv) document all sources of materials and include in the monthly reporting to the PIU.

102. **Drinking water quality.** Drinking water supply for workers will be likely sourced from tube wells. However, there is a possibility that underground sources have arsenic levels that could be detrimental to the health.

103. To avoid any health risks from the drinking water supply:

(i) the bid documents should include a requirement that Contractor will ensure that drinking water supply shows compliance with the drinking water quality standards, particularly for arsenic parameter; and

(ii) the Contractor will undertake groundwater quality sampling and analysis to ensure that water from tube wells follows the drinking water quality standards. If the groundwater quality does not comply with the standards, the contractor will source potable water from alternative source or provide onsite treatment facility at its own cost and approval from PIU/PMU.

104. **Consents, Permits and Clearances**. Failure to obtain necessary consents, permits, and other appropriate regulatory clearances can result in design revisions and work stoppage.

105. All the necessary consents, permits, and clearances shall be obtained before the start of civil works. Environmental clearance for the entire Project will be obtained by the PMU from the Department of Environment prior to award of contract. LGED will contact the Upazila Parishad for clearance and NOC for construction. Additionally, any permits or consents required from relevant government agencies for construction activities near locally recognized monuments, cultural resources or any other important structures, if any, will be obtained.

106. **EMP Implementation Training.** If the contractors and construction supervision engineers are not aware about the requirements of this EMP, the project may not proceed and comply with ADB and GoB environmental policies.

107. The PMU, Divisional/Regional Office, PIU and contractors will be required to undergo training/capacity building on EMP implementation. The capacity building program will be participatory to the extent possible to make it more effective, with learning by doing, role playing, group exercises, on-the-job training, etc. Pre- and post-training assessment will be conducted to measure the effectiveness of the program.

108. **Community awareness of project activities and impacts**. Lack of community awareness on project activities may result in potential community health and safety concerns and complaints.

109. Before the start of project construction, consult with relevant authorities of affected establishments/institutions (e.g. schools, colleges or hospitals) on the plan and schedule works so that construction activities do not interfere or disturb the operations of these entities

(due to noise, dust, movement of vehicles,) and also considering safety and security of users of these establishments/institutions. Further, the community should be made aware of the upcoming project and project activities. Important information to be disseminated to the people are, among others, the following:

(i) Overview and objectives of the proposed project;

(ii) Final detailed design of proposed project components;

(iii) Potential environmental and social impacts (positive and negative) of the project, and the proposed mitigation measures for the perceived negative impacts; and

(iv) Grievance redress mechanism and contact details of the project.

B. Construction Phase Impacts and Mitigation Measures

110. **Construction Planning.** Inadequate planning could lead to non-implementation of EMP during the construction phase and result in significant environmental impacts leading to non-compliance with ADB's environmental safeguard requirements.

111. To ensure that EMP will be implemented during the construction phase, the contractor should, prior to start of construction activities:

(i) Designate an Environmental Health and Safety Officer (EHSO).

(ii) Conduct training on the rationale for and implementation of the SEMP and EMP to enhance general understanding and clarify responsibilities regarding implementation, including monitoring and reporting, must also be provided to relevant staff of contractors (including EHSOs)

(iii) The Contractor will be required to submit to PMU, for review and approval, a SEMP including (a) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes, (b) specific mitigation measures following the approved EMP; (c) monitoring program as per EMP; and (d) budget for SEMP implementation. No work can commence prior to approval of SEMP. The SEMP will include the following:

a. Construction Compound Management Plan;
b. Construction Traffic Management Plan (Appendix 4);
c. Construction Health and Safety Plan (including COVID-19 H&S guidance);
d. Materials Management Plan;
e. Noise and Vibration Management Plan
f. Water Quality Management Plan;
g. Dust Management Plan;
h. Spoils Management Plan (Appendix 3);
i. Wastes Management Plan; and
j. Emergency Incident Response Plan.

112. **Excavation Works.** Excavations may affect local drainage patterns if surface and groundwater collect in voids as they are being dug.

113. To mitigate, the contractor will ensure the following:

(i) All excavations shall be done to the minimum dimension as required for safety and working facility.

(ii) The excavation shall be executed in such a manner that the contractor does not damage or interfere with existing services or structures. If damage or interference is so caused, the contractor shall make arrangements with the supply and/or building owner to execute the repairs at the contractor's own cost.

(iii) All excavations and other work shall be carried out during nighttime at busy road section.

(iv) Road drains and channels shall be kept free from obstructions at all times.

114. **Removal of Trees. N**o tree cutting is anticipated for the construction/ improvement of roads.

115. While cutting of trees will be avoided as much as possible, there may be instances when cutting of trees may be necessary. In such case, the following actions are proposed to minimize the impact of tree removal:

(i) After the finalization of the designs and layout of the project components, the trees within proposed construction areas will be marked;

(ii) Trees within area required for construction will be felled after prior approval;

(iii) Replacement of the tree shall be undertaken by LGED at the replacement ratio of two trees for every tree that is cut (e.g., 2:1 ratio); (project has already considered budget for tree plantation for its road subproject and it has provisioned around 50,000 BDT for each of km of road and trees will be planted to increase green coverage where there will be spaces on road shoulders)

(iv) No tree cutting should be done during bird nesting season Or, ensure that trees being cut have no active bird nests. Contractor should be able to spot active bird nests prior to any tree cutting attempt;

(v) Only trees that will require removal within the proposed construction areas of the sites will be cut; and

(vi) For trees that will not be cut, take all precautions to protect them from any damage from construction activities.

116. **Soil erosion and sediment mobilization.** Excavation during construction will generate loose soil which can be carried through surface run-off during rainfall.

117. During construction phase, the Contractor shall implement the measures at all times to control soil erosion that shall include, but not be limited to the following:

(i) The Contractor shall plan his works to minimize surface excavation works during the rainy season where practicable;

(ii) Precautions to be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecast, and actions to be taken during or after rainstorms shall be developed by the Contractor;

(iii) The earthwork sites where exposed land surface is vulnerable to runoff shall be consolidated and/or covered;

(iv) Channels, earth bunds, netting, tarpaulin and or sandbag barriers shall be used on site to manage surface water runoff and minimize erosion;

(v) The overall slope of the works areas and construction yards shall be kept to a minimum to reduce the erosive potential of surface water flows; and

(vi) Monitor groundwater quality that could exist close to the working areas to ensure compliance.

118. **Surface water pollution.** Silt-laden run-off from stockpiled materials, solid wastes and domestic wastewater from the construction camp, and leaks from chemical storage areas and machineries may contaminate or result in water pollution if disposed or discharged to nearby receiving bodies of water. Untreated sewage from the pit latrines could enter surface water if not adequately designed and positioned to reflect the local hydrological and hydrogeological patterns. Periods of high rainfall could lead to the overflow of the pit and overland flow, or rapid through-flow of the effluent to surface water prior to its full digestion in the soil. Raw sewage can potentially impact surface water quality by promoting the growth of algae and delivering pathogens may be harmful to human and ecological receptors. Solvents and vehicle maintenance fluid (oil, coolant) and diesel fuel may contaminate surface and groundwater if these are disposed of directly into the ground or washed into the streams. Human waste from construction workers may also contaminate surface water and groundwater if there are no adequate sanitary facilities.

119. To mitigate these impacts, the contractor will comply with the following:

(i) Provision of temporary sedimentation canal and/or silt traps along construction areas, particularly alignments that are adjacent to receiving bodies of water or canals;
(ii) The measures to address soil erosion at the proposed facilities will consist of measures as per design, or as directed by the PMSC to control soil erosion, sedimentation, and water pollution. All temporary sedimentation, pollution control works, and maintenance thereof will be deemed incidental to the earthwork or other items of work;
(iii) All temporary discharge points shall be located, designed and constructed in a manner that will minimize erosion in the receiving channels;
(iv) Ensure proper compaction of refilled soil and there shall not be any loose soil particles on the top; the material shall be refilled in layers and compacted properly layer by layer;
(v) Use surplus soil for beneficial purposes such as in any other construction activities, or to raise the level of low lying areas;
(vi) Avoid scheduling of excavation work during the monsoon season. Earthworks during dry season;
(vii) Confine construction area including the material storage (sand and aggregate) so that runoff will not enter the site;
(viii) Ensure that drains are not blocked with excavated soil;
(ix) Stockyards at least 50 meters (m) away from watercourses;
(x) Fuel and other petroleum products stored at storage areas away from water drainage and protected by impermeable lining and bunded 110% by volume;
(xi) Daily control of machinery and vehicles for leakages;
(xii) No obstruction in flowing water;
(xiii) For effluents from workplace, camps, and offices, provide treatment arrangements such as retention ponds and septic tanks which should be incorporated in the facility designs. A sewage management plan has to be prepared by the contractor and agreed with the PMSC; and
(xiv) Monitor water quality according to the environmental monitoring plan.

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

(i) collection of recyclable solid wastes and supply to scrap vendors;

(ii) ensure all the camp wastes and construction wastes are placed in the designated waste collection pits away from receiving water;

(iii) establishment of separate bunded and lined areas with 110% volume for the storage of all the toxic material wastes, including batteries, oil filters, mobile, burnt oils, etc. at the construction site; and

(iv) consultation with PIU on the proper disposal of all residual wastes.

121. **Groundwater use and contamination.** Increased demand for groundwater is anticipated during the construction phase for construction activities and personal consumption by workers. Uncontrolled extraction of water may affect availability of water to locals. In addition, construction waste, if left unattended, will result in percolation of leachate through the soil strata reaching the groundwater table contaminating it.

122. It is necessary that arrangement for safe drinking water is made prior to start of work. Water will be supplied for consumption only after adequate analysis and requisite treatment. The workers may also be trained on the need for judicious use of freshwater resources. The contractors will use water in consideration to its value as a resource. Mitigation measures will include:

(i) Prevent pollutants from contaminating the soil and the groundwater;

(ii) All tube wells, test holes, monitoring wells that are no longer in use or needed shall be properly decommissioned;

(iii) Storage of lubricants and fuel at least 50 m from water bodies;

(iv) Storage of fuel and lubricants in double hulled tanks. Fuel and other petroleum products stored at storage areas away from water drainage and protected by impermeable lining and bunded 110% by volume;

(v) Daily control of machinery and vehicles for leakages;

(vi) Collection of waste during construction activities;

(vii) Provide uncontaminated water for dust suppression;

(viii) Enclose the construction area to prevent unauthorized access.

123. **Drainage Congestion.** Construction material getting onto surface run off or uncontrolled disposal may cause drainage congestion. The impact of these on hydrology is expected to be more pronounced during post monsoon period with rapid movement of rainwater through existing drainage structures, which if blocked by construction waste and debris may cause flooding or waterlogging in neighboring areas.

124. The contractor shall adopt a site clearance procedure that separates topsoil and stores it under appropriate conditions for reuse as instructed by the Engineer. Waste and construction debris will not be disposed of in a manner that these would end up in drainage canals. The on-site storage of excessive quantities of unwanted spoil and aggregate materials should be avoided. Where storage is necessary, the Contractor shall ensure heaps and stockpiles are located at sites that do not permit direct runoff into watercourses and are on land sloping at less than 1.5%. All heaps shall be of a size and stability that will ensure the risk of mass movement during period of heavy rainfall is minimized.

125. **Impact on Air Quality.** There will be two main sources of air emissions, i.e., mobile sources and fixed sources during construction phase. Mobile sources are mostly associated with vehicles involved in construction activities. On the other hand, air pollution from fixed

sources is mainly from generator sets, construction equipment (e.g. compressors) and excavation/ grading activities.

126. Dust and gaseous emissions will be generated by the construction machinery**.** Pollutants of primary concern include particulate matter (PM10). However, suspended dust particles are coarse and settle within a short distance of the construction area. Therefore, the impact will be direct but temporary, and will be restricted to areas in close vicinity of the construction activities only.

127. Construction work also involves breaking up, digging, transporting, and dumping large quantities of dry material. The particulate matter from these can cause health impacts, i.e. respiratory problems, irritation in eyes and reduction in visibility.

128. In the conduct of construction activities and the operation of equipment, contractors shall utilize all practical methods to control, prevent and otherwise minimize atmospheric emissions, specifically:

(i) Take every precaution to reduce the levels of dust at construction sites, and not exceeding the pre-project ambient air quality standards;
(ii) Fit all heavy equipment and machinery with air pollution control devices that are operating correctly;
(iii) Vehicles travelling to and from the construction site must adhere to speed limits to avoid producing excessive dust;
(iv) Reduce dust by spraying stockpiled soil, excavated materials, and spoils;
(v) Cover with tarpaulin vehicles transporting soil and sand;
(vi) Cover stockpiled construction materials with tarpaulin or plastic sheets;
(vii) Heavy equipment and transport vehicles shall move only in designated areas and roads;
(viii) Water spraying to access roads, camp sites and work sites to reduce dust emissions;
(ix) Machines and vehicles must be regularly examined and maintained to comply with requirements of technical specifications;
(x) All vehicles, equipment, and machinery used for construction will be regularly maintained to ensure that pollution emission levels comply with the relevant requirements of DOE. Copies of conformance will be submitted regularly to the PMSC;
(xi) Repair and maintain access roads, as necessary;
(xii) Monitor air quality according to the environmental monitoring plan;
(xiii) Clean wheels and undercarriage of vehicles prior to leaving construction site;
(xiv) Prohibit burning firewood in work and labor camps (promote liquified petroleum gas for cooking purposes and electric heater for heating purposes);
(xv) Use vehicles that have government-issued permits and registrations; and
(xvi) Prohibit open burning of solid waste.

129. **Noise.** Noise-emitting construction activities include earthworks, concrete mixing, concrete formation works, movement and operation of construction vehicles and equipment, and loading and unloading of coarse aggregates, among others. The vulnerable groups who are susceptible to construction noise include (i) onsite workers who are the most exposed to the highest noise levels generated from different construction activities due to their proximity to the noise sources; and (ii) neighboring communities and other sensitive receptors (such as worshipers at church/mosque, students at schools and other educational institutes, patients at hospitals etc.).

130. The significance of noise impact will be higher at the immediate vicinity of the subproject site where noise-sensitive receptors are situated, such as for example schools and residential areas. 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]

131. Mitigation measures to reduce the noise impacts off-site at the nearest sensitive receptors include the following:

(i) Provide prior information to the local public, including institutions such as schools and hospitals along alignments that may be affected, about the work schedule;
(ii) Use equipment that emits the least noise, is well-maintained and with efficient mufflers. Install silencers if necessary and practical;
(iii) Restrict noisy activities to daytime, except in areas near schools, places of worship, and other institutions which may be likely disturbed during daytime. Consider nighttime works in these areas;
(iv) Avoid use of noisy equipment or doing noisy works at nighttime near residential areas;
(v) Limit engine idling to a maximum of one minute;
(vi) Spread out the schedule of material, spoil and waste transport;
(vii) Minimize drop heights when loading and unloading coarse aggregates and other construction materials;
(viii) Avoid use of horns unless it is necessary to warn other road users or animals of a vehicle's approach; and
(ix) Implement a complaints handling system.

132. On-site construction noise shall be mitigated to ensure a safe work environment by implementing an on-site occupational health and safety plan, which considers national and international requirements. The plan shall include the following measures:

(i) Ear muffs/protective hearing equipment shall be made available to all workers in noise critical areas;

(ii) Training on how and when to use protective hearing equipment shall be conducted as part of the workers' induction sessions;

(iii) Place visually clear instructions in areas where noise emissions are significant; and

(iv) Measure noise level according to the environmental monitoring plan.

133. **Construction wastes generation.** Solid wastes will include construction wastes (solid wastes: piece of rods, woods, bricks, stones, containers, electric wire, pipes etc. liquid waste: paint, bitumen, oil etc.) and general wastes (solid wastes: papers, plastic containers, residues of food, fruits etc. and liquid waste: from kitchen and bathroom etc.). This waste will be generated due to construction camps, construction activities and materials used for construction. Inadequate management of construction wastes will result in negative impact on the soil, aesthetic beauty of area and workers' health and safety.

134. To mitigate the impacts, the contractor will implement the following to manage wastes:

(i) The contractors should take every opportunity to reduce the amounts of waste generated and collect recyclable material for processing by local operators;
(ii) Contractor shall implement waste segregation on site;

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

(iii) Receptacles for solid waste should be provided for the use of workers, and their contents should be disposed of in officially sanctioned local landfills;
(iv) Construction waste should also be disposed of in legal local landfills;
(v) Clean construction waste such as excess soil or rubble should be used in landscaping on site or given to landowners and developers seeking fill material;
(vi) Waste auditing. The contractor will record the quantity in tons and types of waste and materials leaving site during the construction phase;
(vii) Waste fuels/oils may be generated from equipment used on-site during construction and may be classified as hazardous waste. Such wastes will be stored in a secure, bunded area on-site prior to collection by relevant parties.

135. **Disturbance to terrestrial flora and fauna**. The subproject area is a built-up area, hence, the impacts to flora and fauna will be insignificant. For trees found at the site, the design will ensure that these trees will not be cut, or if tree cutting is necessary, mitigation measure should be strictly followed.

136. To mitigate these impacts, contractor will be required to:
(i) avoid, or minimize when avoidance is not possible, tree cutting;
(ii) for any tree cut, conduct replacement planting at a ratio of 1(cut):2 (new planting) and consistent with the social forestry program of LGED (see Appendix 5 for LGED Tree Plantation Program);
(iii) protect giant trees and locally important trees (for religious reasons), if any is identified as the site during implementation;
(iv) prevent workers or any other person from removing and damaging any other flora and fauna found in the subproject site; and
(v) prohibit employees and workers from poaching animals and cutting of trees for firewood in the vicinity of the site.

137. **Impacts on aquatic ecology.** Some of the subproject alignments are near or adjacent to khals (canals) and ponds. The construction of the subproject may affect these ponds due to siltation and chemical spills, and improper waste disposal, and therefore may impact the quality of the water and any thriving aquatic species. As observed during the site visit, no ponds or khals are used for aquaculture within the subproject area.

138. To mitigate, contractor will be required to:
(i) provide temporary protection at sections near any river or khal (canal) to avoid sliding of soils; and
(ii) store spoils away from the side of any river or khal in the area to avoid being washed down.

139. **Impacts to protected areas and critical habitats.** Subproject areas are located within the Pourashava which are a built-up area. No ecologically sensitive areas nearby, therefore, no impact is predicted. No mitigation measure is necessary.

140. **Impact on Traffic.** The road rehabilitation works will render some portions of the road impassable at periods of time. This scenario will create traffic congestion and disturbance to pedestrians and motorists in the vicinity of the affected area if not properly managed.

141. A traffic management plan (TMP) will be developed prior to construction and approved by the PIU. The TMP shall include the following: (i) installation of clear signages; (ii)

barricades; (iii) lightings at night; and (iv) markers to direct traffic movement in sites, among others. A sample TMP is attached with this IEE as Appendix 4. Emergency response plan must be prepared for any traffic accident during construction.

142. **Disruption of Public Access.** Public access to establishments adjacent to the road alignments may be disrupted during construction activities.

143. Mitigation measures to ensure safe access shall be implemented by the contractor. Among which are the following:

(i) Prior coordination with the surrounding community on operation and work schedules;
(ii) As necessary, increase workforce for speedy completion;
(iii) Inform through display board about nature, duration of construction and contact for complaints;
(iv) Schedule material deliveries on low pedestrian traffic hours;
(v) Restore damaged properties and utilities;
(vi) Erect and maintain barricades if required;
(vii) Pedestrian access will be maintained with the use of walking boards. Wheelchair and disabled access shall be maintained; and
(viii) Surfaced roads shall be subject to road cleaning and unsurfaced roads to dust suppression, the methodology and frequency of which shall be included in the traffic management plan.

144. **Impacts on physical cultural resources (PCR) and chance finds.** The subproject area is not located near nationally or internationally protected historical, cultural and archaeological sites. However, few alignments are adjacent locally recognized mosques. Detailed design ensures that these mosques will not be significantly impacted by the subproject through either re-alignment or institution of appropriate measures. The local people use these for the purposes of religious, social and cultural gathering. However, as a precautionary approach, the contractor will be required to implement the following measures in the event of a chance finds:

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

145. Common property resources/community facilities in the subproject area include mosques, graveyards, temples, cremation ground, playground, open water bodies, and Eidgahs (place for offering Eid prayers). The mitigation measures are discussed in “Disturbance of private/common properties, physical cultural resources” under the design phase.

146. **Impacts on socio-economic activities.** 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). The potential impacts include disturbance to economic activities, particularly to the businesses operating along the alignments of construction works.

147. Contractor will be required to:

(i) Implement the traffic management plan in collaboration with local authorities;
(ii) Where traffic congestion will likely occur, place traffic flagmen during working hours;
(iii) Avoid full road closures by applying the construction method on section-wise and/or chainage-wise approach during excavation, concreting and/or curing periods;
(iv) If full road closure is not possible, especially on very narrow roads, ensure that alternate routes are identified and that affected residents and establishments are informed prior to conducting the construction activities;
(v) Provide convenient access to pedestrians when works occur in front of residential, commercial or institutional establishments. Examples are planks with handrails that should be provided to cross excavated areas.
(vi) Provide appropriate compensation to qualified affected people or businesses per approved resettlement plan for the subproject;
(vii) Manage stockpile;
(viii) Manage pumped water from excavations either to drains or drums for later use;
(ix) Relocate the affected power supply poles; and
(x) Advise the concerned authority during accidental damage to utilities.

148. **Occupational health and safety risks.** Safety risks and health issues arise from storage, handling, and transport of hazardous construction material. Construction workers are also at risk of accidents due to moving vehicles, and other construction related activities. Workers are also exposed to high levels of pollution from dust, exhaust of vehicles and machinery and noise. Further, if workers do not keep to regulated working hours, the risk of accident events will be higher due to fatigue. Insufficient supply and improper use of personal protective equipment (PPE) and lack of safety procedures may cause injuries or fatal accidents. Spread of communicable diseases, such as COVID-19 is also a risk to manage among workers. There is also a risk of transmitting COVID-19 to the residents.

149. The contractor will be required to implement the following measures:

(i) All relevant provisions of the Bangladesh Labor Act, 2006 and relevant WHO guidelines will be adhered to, concerning the provision of adequate measures to avoid contracting and/or spreading diseases during construction phase;
(ii) Follow 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;[19]
(iii) Follow established occupational health and safety protocol on emerging infectious diseases such as the corona virus disease (COVID19).
(iv) A readily available first aid unit, including an adequate supply of sterilized dressing material and appliances, will be provided as per the factory rules. Suitable transport will be provided to facilitate the transfer of injured or ill persons to the nearest hospital;
(v) Other first aid medical equipment and nursing staff will be made available or arranged on-call;
(vi) The contractor will, at his own expense, conform to all disease prevention instructions as may be given by PMU/DIVISIONAL/REGIONAL OFFICE and/or PIU;
(vii) Provide regular health check-ups, sanitation and hygiene, health care, and control of epidemic diseases to the workforce;

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

(viii) The contractor shall provide at cost all labor and materials and construct/install and maintain site safety, hard barricading, flexible green net, signboards, temporary day/light traffic diversions throughout the construction activities according to the specifications and provide personal protective equipment (PPE) to all the laborers working at the construction site;
(ix) Launch awareness programs concerning human trafficking and the possibility of spread of sexually transmitted diseases (STDs) and HIV/AIDS using brochures, posters, and signboards;
(x) Make available first aid kits, ambulance facilities, and fire extinguishers in camp sites, if any;
(xi) Compensation for the loss of life (a zero tolerance to loss of life policy should be developed and implemented) or for any type of injuries; and
(xii) Provide insurance to the workers. Health and safety training for all site personnel is very important and must be mandatory.

150. **Community health and safety risks.** Communities will be moderately exposed to threats due to impacts on air and water quality, ambient noise level; mobility of people, goods, and services; access to properties, economic activities, and social services; service disruptions, etc. Construction workers may potentially bring communicable diseases in the community, including COVID-19.

151. To mitigate these impacts, the contractor will be required to implement the following measures:

(i) Code of conduct for workers includes restricting workers in designated areas, no open defecation, no littering, no firewood collection, no fire except designated places, no trespassing, no residence at construction sites, and no obligation to potentially dangerous work;
(ii) Follow 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;[20]
(iii) Follow established community health and safety protocol on emerging infectious diseases such as COVID19.
(iv) Implement measure to prevent proliferation of vectors of diseases at work site;
(v) Maintain a complaint logbook in worker's camp and take action promptly of complaints. Follow the established GRM of the overall project (CTCRP);
(vi) Schedule transportation activities by avoiding peak traffic periods;
(vii) Clean wheels and undercarriage of haul trucks prior to leaving construction site;
(viii) Educate drivers: limit speed not more than 30 km/h in settlements and avoid use of horn;
(ix) Earmark parking place for construction equipment and vehicles when idling; no parking shall be allowed on the roads, that may disturb the traffic movement;
(x) Provide prior information to local people, particularly any affected institutions (e.g. schools/madrasa, hospitals, mosques or places of worship, etc.) nearby about work schedules;
(xi) Noise barriers must be installed in between the construction site and any institutions (e.g. schools/madrasa, hospitals, mosques or places of worship, etc.) to reduce the impact of noise to these receptors;
(xii) Provide adequate space and lighting, temporary fences, reflectorized barriers and signages at the work site; and
(xiii) Ensure contractor has staff trained on emergency response.

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

152. **Post-construction clean-up and reinstatement.** Construction debris, spoils, and excess construction materials may pose hazards to properties, community and environment if left unattended after construction.

153. The contractor will reinstate all working areas and access routes as work proceeds during construction. All plant, equipment, materials, temporary infrastructure and vehicles will be removed at the earliest opportunity and the surface of the ground restored as near as practicable to its original condition. The following generic measures should be taken:

(i) Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required;
(ii) All roads that are not part of/included in the rehabilitation works but damaged due to construction or subproject activities shall be reinstated to original condition;
(iii) All disrupted utilities restored;
(iv) All affected structures rehabilitated/compensated;
(v) The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up;
(vi) All hardened surfaces within the construction camp area shall be ripped;
(vii) All imported materials removed, and the area shall be top soiled and regressed using guidelines set out in the re-vegetation specification that forms part of this document;
(viii) The contractor must arrange the cancellation of all temporary services; and
(ix) Request PIU to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work.

C. Operation Phase Impacts and Mitigation Measures

154. **Routine maintenance**. In the operations and maintenance (O&M) phase, the roads will operate with routine maintenance, which should not affect the environment. Routine repairs will be very small in scale, to be conducted manually by small teams of men with simple equipment (shovels, wheelbarrows, etc.) and works will be very short in duration thus will not cause significant physical impacts. Traffic may be interrupted temporarily but this work will be very small in scale, infrequent, and short in duration, so there will be no economic or other implications. The infrastructure will need to be repaired from time to time, but environmental impacts will be much less than those of the construction period as the work will be infrequent, affecting small areas only.

155. To maintain the safety of workers and road-users, such work should be coordinated with the local police department so that adequate warning signs and traffic diversions can be set up when necessary. Debris needs to be collected and disposed of at a designated site such as a landfill. Community participation will be encouraged in ensuring drainage canals are clog-free through information and behavior change campaigns and incentives, if possible

156. **Air pollution and noise.** Improved roads may result in elevated noise levels and air emissions from increased vehicular traffic over time. However, the extent of air pollution will depend upon i) the rate of vehicular emission and ii) the prevailing meteorological conditions. Air quality is likely to improve in the initial years after commissioning because of saving fuel in the vehicular traffic riding on smooth and improved roads with much less interruption.

157. **Community safety.** Improved roads may give way to faster vehicle speeds which could endanger people and households along the road alignments. Damage to roads may also cause accidents for motorists.

158. To mitigate these impacts, the PIU will be required to:

(i) Conduct regular inspection of the roads to check for damages, and undertake rehabilitation measures for any damages found;
(ii) Inspect and maintain the integrity of road barriers, especially at critical curves or locations that are prone to vehicular accidents;
(iii) Inspect and maintain speed limiters such as humps installed on road sections near residential areas, schools, and religious establishments.
(iv) Inspect and maintain all road signages, including appropriate warning signages at silent zones, and ensure that these are reflectorized and visible even during night time; and
(v) Ensure pedestrian crossings are maintained.

D. Cumulative Impacts and Mitigation Measures

159. There are no similar construction or project activities in the area that would result in cumulative environmental impacts. Direct impacts during construction phase, including, among others, increase in noise levels, fugitive dust, and common air emissions near the construction areas, are temporary in nature and will not result in cumulative adverse impacts to people and environment with the implementation of mitigation measures discussed in this IEE report.

E. Unanticipated Impacts during Construction and Operation

160. In the event unanticipated impacts become apparent during project implementation, the PMU will: (i) inform and seek ADB's advice; (ii) assess the significance of such unanticipated impacts; (iii) evaluate the options available to address them; and (iv) update the IEE including EMP. ADB will help the borrower mobilize the resources required to mitigate any adverse unanticipated impacts or damage.

VII. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

A. Consultation and Participation

161. Meaningful consultation is an essential part of the environmental assessment process which enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, and the sharing of development benefits and opportunities, and implementation issues. The process also helps avoid potential conflicts with stakeholders for smooth project implementation. The findings from the public consultations are documented and considered in the development of the EMP, especially in identifying the significant impacts of the proposed Project and developing the corresponding mitigation measures.

162. Consultations may be conducted through focus group discussions, interviews, and town meetings. During these activities, implementation of COVID-19 health and safety measures as per local and national guidelines must be observed.

163. The key stakeholders to be consulted include:

(i) Project beneficiaries;
(ii) Elected representatives, community leaders and representatives of community-based organizations;
(iii) Local non-government organizations (NGOs);
(iv) Local government and relevant government agency representatives, including local authorities responsible for land acquisition, protection and conservation of forests and environment, archaeological sites, religious sites, and other relevant government departments; and
(v) Residents, shopkeepers, businesspeople, and farmers who live and work near the subproject.

B. Public Consultations Conducted

164. Public consultation was carried out in the project area with the objective of minimizing probable adverse impacts of the project and achieving speedy implementation of the project by bringing in awareness among the community on the environmental impacts, mitigation measures and benefits of the project.

165. As part of the impact assessment, the consultants conducted focus group discussions in May 2024 with selected groups at the locations of the proposed five roads.

166. During these consultations, the communities were explained about the project, its benefits, social and environmental impacts. The participants were encouraged to (i) be open and make known their concerns and claims. The presentation highlighted the project background, objectives, expected upcoming activities, social economic information, and environmental information. The salient features of the meetings are presented below:

- Create awareness of the project;
- To obtain stakeholders responses, feedback and concerns on the project;
- To obtain environmental information on the community.

167. After the presentations, the community was given opportunity to give their views, comments and queries. Different community problems were addressed during the meeting in which the local participants expressed repeatedly their main concerns as follows:

- Road connectivity and access;
- Prospects of jobs and income generating activities;

- Likely impacts and proposed mitigation measures.

168. Comments or questions raised by stakeholders were responded to. Participants expressed their appreciation of the Project. Minutes, photos, and attendance sheets of public consultation is in Appendix 7.

C. Future Consultations

169. Stakeholder consultations will continue throughout the subproject implementation. PMU and PMSC will ensure that consultations will be conducted as meaningful per definition of ADB SPS, 2009. The summary of the IEE will be locally disclosed in an accessible place and in a form and language(s) understandable to affected people and other stakeholders before consultations to give stakeholders a chance to read it and consult experts.

D. Information Disclosure

170. Information shall be disclosed through public consultation and making available relevant documents in public locations. The following documents will be submitted to ADB for disclosure on its website: [21] ADB will disclose upon receipt of acceptable reports and endorsement from the PMU:

(i) IEE report (including subproject EMP);
(ii) Updated IEE report (in case of change in scope or location); and
(iii) Environmental monitoring reports.

171. The EA/IA will send a written endorsement to ADB for disclosing these documents on the ADB website. The PIUs will provide relevant safeguard information in a timely manner, in an accessible place and in a form and language understandable to affected people and other stakeholders. For illiterate people, other suitable communication methods will be used. For the benefit of the community, the summary of the IEE will be translated in Bangla and made available at: (i) office of PMU; and (ii) offices of the contractors. Hard copies of the IEE report will also be available at the PMU 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 a photocopy from the office of the Project Director, on a written request and payment for the same. 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. Disclosure will follow ADB's Access to Information Policy, 2018.

[21] 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." Upon its receipt of acceptable safeguard documents and endorsement by PMU, ADB discloses the same on ADB website.

VIII. GRIEVANCE REDRESS MECHANISM

172. A common GRM is in place for social, environmental, or any other grievances related to the project; the resettlement plans (RPs), RSECPs and IEEs will follow the GRM described below, which is developed in consultation with key stakeholders. The GRM will provide an accessible and trusted platform for receiving and facilitating resolution of affected persons' grievances related to the project. The multi-tier GRM for the project is outlined below, each tier having time-bound schedules and with responsible persons identified to address grievances and seek appropriate persons' advice at each stage, as required.

173. Across the Pourashava, awareness on grievance redress procedures will be generated through a public awareness campaign. The PIU under the guidance of Deputy Project Director of PMU and Deputy Director Regional Municipal Support Unit of Divisional/Regional Office will conduct Pourashava-wide awareness campaigns to ensure that poor and vulnerable households are made aware of grievance redress procedures and entitlements and will work with the PIU safeguards assistant to help ensure that their grievances are addressed.

174. Affected persons will have the flexibility of conveying grievances/suggestions by dropping grievance redress/suggestion forms in complaints/suggestion boxes that will be installed by project Pourashavas or through telephone hotlines at accessible locations, by e-mail, by post, WhatsApp or by writing in complaints register that will be kept in Pourashava offices. Appendix 6 has the sample grievance registration form. Careful documentation of the name of the complainant, date of receipt of the complaint, address/contact details of the person, location of the problem area, and how the problem was resolved will be undertaken. The Deputy Project Director from PMU, Divisional/Regional Office and PIU will have the overall responsibility for timely grievance redressal on environmental and social safeguards issues and for registration of grievances, related disclosure, and communication with the aggrieved party.

175. **Grievance redress process**. In case of grievances that are immediate and urgent in the perception of the complainant, the Social Coordinator, Contractor and Social Safeguard and Environment Specialist from the project management and supervision consultants (PMSC) on-site will provide the most easily accessible or first level of contact for quick resolution of grievances. The contact phone numbers and names of the concerned PIU safeguards assistant, contractors, PMU safeguards officer, PMSC environmental and social safeguards specialists will be posted at all construction sites at visible locations.

176. **First Level Grievance, Pourashava Level PIU**. The contractors, PIU Safeguard and Gender Focal person can immediately resolve issues on-site or at Pourashava level in consultation with each other and with the support of Administrative Officer of Pourashava, designated municipal ward councilor and will be required to do so within 7 days of receipt of a complaint/grievance. Assistance of ward level coordination committees (WLCC) will be sought if required for resolution of the issue, by any one or all of them jointly. The first level grievance redress team will comprise of the following members:

(i) Chief Executive Officer or in his absence Pourashava Secretary
(ii) Executive Engineer, Pourashava (Safeguard and Gender Focal person)
(iii) Administrative Officer, Pourashava
(iv) Municipal Ward Councilor (designated)
(v) EHS Supervisor/Social Coordinator, Contractor

177. The town-level grievance redress team shall have at least one woman member. In addition, for project-related grievances, representatives of affected persons, community-based organizations (CBOs), and eminent citizens must be invited as observers in GRC meetings. In case of any impacts on small ethnic communities (SECs), in subproject towns (example: Kalaroa), the grievance redress team must have representation of the affected SECs, the chief of the SEC group as traditional arbitrator (to ensure that traditional grievance redress systems are integrated) and/or an NGO working with SECs.

178. **Second Level Grievance, Divisional/Regional Office, Division Level**. All grievances that cannot be redressed within 7 days at PIU level will be brought up to the Divisional/Regional Office level. Second level grievance redress team headed by the Deputy Project Director, Divisional/Regional Office supported by the Assistant Directors (environment, social safeguard and gender) and Construction Supervision and Safeguards Engineers /Asst. Supervision and Safeguards Engineers, PMSC will attempt to resolve the grievance /complaint within 7 days. At the Divisional/Regional Office level, the composition of 2nd level grievance redress team will be as follows:

(i) Deputy Director
(ii) Assistant Director (Safeguards, Livelihood and Gender)
(iii) Construction Supervision and Safeguards Engineers /Asst. Supervision and Safeguards Engineers, PMSC (Support)

179. **Third Level Grievance, PMU Level**. All grievances that cannot be redressed within 7 days at Divisional/Regional Office level will be brought up to the PMU level. The Divisional/Regional Office safeguards team will refer any unresolved or major issues to the PMU level grievance redress team, that will be headed by the Project Director and will have Deputy Project Director, social safeguard, environment safeguards and gender Assistant Directors, and PMSC, who will resolve the complaints/grievances within 15 days. The PMU level grievance team will comprise of:

(i) Project Director, PMU
(ii) Deputy Project Director (Safeguards, Livelihoods and Gender)
(iii) Sub Assistant Engineer Safeguards
(iv) Social, Environment and Gender Specialist, PMSC (support)

180. The grievance redress process is represented in Figure 5.

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

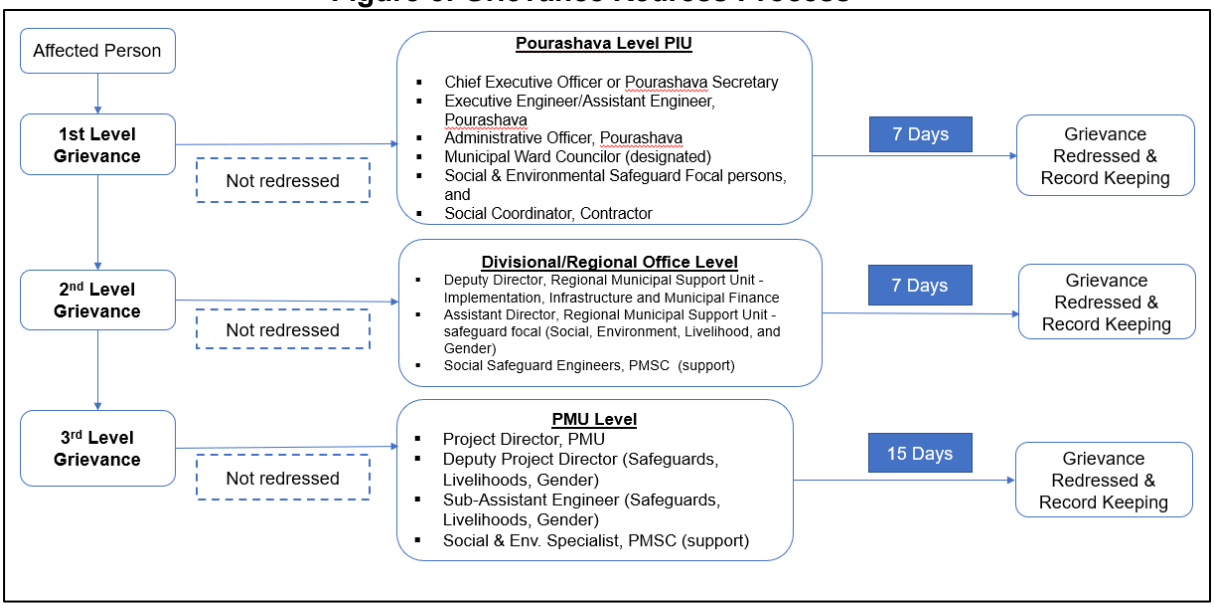
182. **ADB Accountability Mechanism**. In the event that the established GRM is not in a position to resolve the issue, the affected person can also use the ADB Accountability Mechanism (AM) through directly contacting (in writing) the Complaint Receiving Officer (CRO) at ADB headquarters or the ADB Bangladesh Resident Mission (BRM). Before submitting a complaint to the Accountability Mechanism, it is necessary that an affected person makes a good faith effort to solve the problem by working with the concerned ADB operations department and/or BRM. Only after doing that, and if they are still dissatisfied, will the Accountability Mechanism consider the complaint eligible for review. 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-relevant information to be distributed to the affected communities, as part of the project GRM.

183. **Documentation and Record Keeping.** All GRC documents will be maintained by Contractor and PMU. Record of all complaints received, and action taken will be maintained at both at the field level and the PMU. This information will be available for review and verification by supervision consultants and ADB or any third party. All the grievance records will be updated regularly and easily accessible on-site.

184. **Information dissemination methods of the GRM:** GRC procedures and operational rules will be publicized widely through community meeting and pamphlets in Bengali so that the affected persons are aware of their rights and obligation, and procedures of grievance redress. Grievances received, and responses provided will be documented and reported back to the affected persons.

185. **Costs:** All costs involved in resolving the complaints (meetings, consultations, communication, and reporting/information dissemination) will be borne by the PMU.

Figure 5: Grievance Redress Process



GRC = grievance redressal committee; PIU = project implementation unit; PMSC = project management and supervision consultants; PMU = project management unit

Note: In case of project towns where impacts to SEC are assessed, the PIU-level grievance redress committee/team will have representation of the affected SECs.

IX. ENVIRONMENTAL MANAGEMENT PLAN

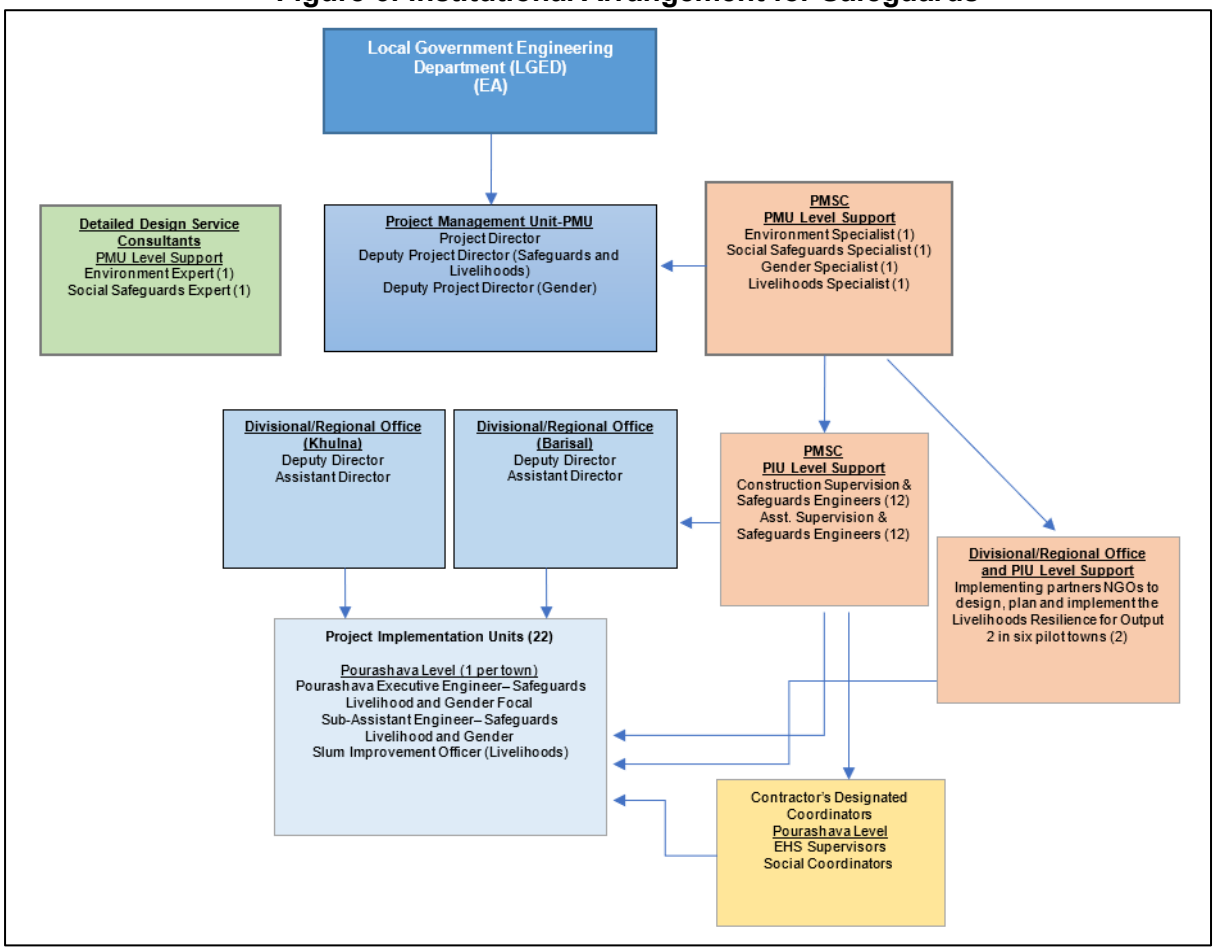
186. This environmental management plan (EMP) has been prepared in accordance with the ADB's Safeguard Policy Statement 2009. This EMP identifies the minimum requirements with regard to the appropriate mitigation, monitoring, inspection and reporting mechanisms that need to be implemented throughout design, construction and operation periods of the project, to avoid, minimize or offset the potential environmental impacts identified in the chapter on Anticipated Environmental Impacts and Mitigation Measures of this IEE. This chapter also discusses the institutional arrangement, roles, and responsibilities for the effective implementation of the EMP.

A. Institutional Arrangement

187. The Ministry of Local Government, Rural Development and Cooperatives, acting through its Local Government Engineering Department (LGED), will be the Executing Agency. Pourashavas or towns selected to be beneficiaries of the project are the implementing agencies.

188. Figure 6 below shows the institutional arrangement for safeguards of the overall project.

Figure 6: Institutional Arrangement for Safeguards



DDSC = Detailed Design Service Consultant; EHS = Environment, Health, and Safety; PIU = Project Implementation Unit; PMSC = project management supervision consultant; PMU = project management unit

189. **Project Management Unit (PMU)**. PMU will be created within LGED to support the management and supervision of the project. The PMU will coordinate environment safeguards

planning and implementation and ensure that the environmental assessment and review framework is followed during subproject implementation. The PMU will be headed by a project director (PD) of Executive Engineer rank. The PD will be supported by a Deputy Project Director (DPD) who is also a permanent staff of LGED and will serve as the environmental safeguards focal person in the PMU on concurrent capacity. The PMU will be assisted by two consultant teams, namely: Detailed Design Service Consultant (DDSC) and Project Management and Supervision Consultant (PMSC). DDSC and PMSC will each include an Environment Specialist who will support in the efficient overall implementation of environmental safeguards of the project, through tasks described in relevant paragraphs below. The PMU will work closely with the Divisional/Regional Offices and project implementation units (PIUs) at the Pourashava level. The PMU will have the following responsibilities with regard to environmental safeguards:

(i) Ensure subprojects comply with the national and local statutory and legal environmental requirements, ADB SPS 2009, EARF and environmental safeguards provisions of the ADB loan covenant;
(ii) Ensure subprojects conform to exclusion criteria and subproject selection guidelines as stipulated in the EARF;
(iii) Review and approve the environmental categorization of future subprojects;
(iv) Review and approve subproject IEE reports, including EMPs, and ensure that subproject IEEs and EMPs are updated based on final detailed designs and submit to ADB for review, clearance and disclosure prior to bid invitation;
(v) Ensure that robust chance find protocol is put in place and implemented properly;
(vi) Engage competent heritage experts and oversee conduct of heritage assessment study for towns where there are notified heritage areas close by (such as for example in Bagerhat); and ensure that no works/sites are located within 1 km from the boundary of any UNESCO notified heritage area or within monuments protected by Department of Archaeology, Government of Bangladesh;
(vii) Ensure that updated/final IEEs based on final detailed design are provided to the construction contractor prior to start of construction ;
(viii) Ensure that the IEEs including EMPs are updated in case of changes in detailed design that may occur during implementation phase, and submitted to ADB for review, clearance and disclosure;
(ix) Ensure that IEEs with EMPs are included in bidding documents and civil works contracts;
(x) Ensure that the requirement for contractors to prepare their respective Health and Safety (H&S) Plans including COVID-19 H&S Plans is included in bidding documents and civil works contracts;
(xi) Review and approve site-specific EMPs (SEMPs) of contractors;
(xii) Provide oversight on environmental management aspects of the project, and ensure EMPs and SEMPs are implemented by contractors;
(xiii) Establish a system to monitor environmental safeguards of the Project including monitoring the indicators set out in the monitoring plan of the IEE;
(xiv) Facilitate timely and ensure overall compliance with all national and local government rules and regulations regarding site and environmental permits/clearances/approvals as well as any other environmental requirements as relevant;
(xv) Review, monitor and evaluate effectiveness with which the EMPs, SEMPs, and Health and Safety Plans are implemented, and recommend necessary corrective actions to be taken;
(xvi) With support from PMSC, consolidate quarterly monitoring reports from the Divisional/Regional Offices and/or PIUs and submit semi-annual environmental monitoring reports (SEMRs) to ADB;

(xvii) Ensure availability of budget for safeguards activities;
(xviii) Ensure adequate awareness campaigns, information disclosure among affected communities and timely disclosure of final IEEs/EMPs and SEMRs, including corrective action plans, if any, in project website and in a form accessible to the public;
(xix) Address any grievances brought through the grievance redress mechanism (GRM) described in this IEE report in a timely manner;
(xx) Undertake regular review of safeguards-related loan covenants, and the compliance during project implementation; and
(xxi) Organize periodic capacity building and training programs on safeguards for stakeholders, PMU, Divisional/Regional Offices, PIUs and contractors.

190. **Divisional/Regional Office of LGED, Division Level** The Divisional/Regional Office in Khulna will be responsible for overall implementation of the subprojects within the Division. The Assistant Director of the Regional Municipal Support Unit of the Divisional/Regional Office will be responsible for Social and Environmental Safeguards, Livelihoods and Gender, with support by PMSC in the implementation of social and environmental safeguard plans and gender action plan (GAP). The Divisional/Regional Office will undertake internal monitoring and supervision and record observations throughout the project period to ensure that the safeguards and mitigation measures are provided as intended.

191. The PMU and Divisional/Regional Office of LGED will jointly oversee safeguards implementation by the *pourashava*/town level PIU, coordinate public consultations, information disclosure, regulatory clearances and approvals, implementation of resettlement plans, EMP implementation, and grievance redressal.

192. The key tasks of the Divisional/Regional Office on environmental safeguards, through the Divisional/Regional Office Assistant Director (Environmental Safeguards) as lead and PMSC as support, will be as follows:

(i) Supervise PMSC to coordinate with PIU, conduct consultations with affected persons and key stakeholders, and update PMU accordingly for all subproject locations;
(ii) Ensure and support preparation and/or updating of this IEE report by DDSC and submit to PMU for review and approval and submission to ADB;
(iii) Support PIU to obtain no objection certificates and/or permits required for the subproject at the local or pourashava level, other than those certificates or permits that are to be obtained by the contractor;
(iv) Provide all necessary support to heritage expert in the conduct of heritage assessment study in subproject towns close to UNESCO heritage areas, and coordinate with DDSC to ensure that component sites are away from these UNESCO heritage areas (1.5-2 km), and in any case, no works/sites shall be located within 1 km from the boundary of any UNESCO heritage area or within monument/sites protected by Department of Archaeology, Government of Bangladesh;
(v) Supervise PIU to ensure no subproject civil works will commence until all relevant statutory requirements are obtained;
(vi) Support PMU to ensure IEE report is included in bidding documents and civil works contracts;
(vii) Guide PIU to ensure EMP of subproject is implemented effectively and efficiently;

(viii) Consolidate monthly environmental monitoring reports received from PIU (and other PIUs in the Division) and prepare quarterly environmental monitoring reports to PMU;
(ix) Guide PIU to conduct continuous public consultation and awareness with affected persons and other key stakeholders;
(x) Address any environment-related grievances brought about through the GRM promptly;
(xi) Organize an induction course for the training of contractors, preparing them on EMP implementation and monitoring, GRM and actions towards any unanticipated environmental impacts that may occur during implementation; and
(xii) Liaise with the district administration, and other division-level stakeholders, as and when required.

193. **Project Implementation Unit (PIU), Pourashava/Town Level.** The Kalaroa PIU will be established and staffed with a safeguards and gender focal person (Executive Engineer/Assistant Engineer, Pourashava). The PIU will be assisted and will receive support from the Divisional/Regional Office environment, social and gender Assistant Directors and region level Construction Supervision and Safeguards Engineers, PMSC. The PIUs will be responsible for implementation of the IEE/resettlement plan/RSECP/gender action plan. The Executive Engineer (safeguards and gender focal person) with the support of Assistant Directors (social, environment and gender), Divisional/Regional Office and the Construction Supervision and Safeguards Engineers, PMSC will support PMU safeguards Assistant Directors in subproject implementation. The Executive Engineer/ Assistant Engineer (safeguards and gender focal person) at PIU level will be assisted by Sub-Assistant Engineers (if available at the Pourashava level) with the safeguard and gender tasks. The Slum Improvement Officer at the Pourashava will be responsible for livelihood intervention tasks and responsibilities.

194. Key tasks and responsibilities of the PIUs on environmental safeguards, through the PIU safeguard and gender focal person as lead and division-level PMSC as support, are as follows:

195. Key tasks and responsibilities of the PIUs on environmental safeguards, through the PIU safeguard and gender focal person as lead and division-level PMSC as support, are as follows:

(i) Ensure compliance with government and ADB requirements on environmental safeguards;
(ii) Provide all necessary support to heritage expert in the conduct of heritage assessment study in subproject towns close to UNESCO heritage areas, and coordinate with DDSC to ensure that component sites are away from these UNESCO heritage area (1.5-2 km), and in any case, no works/sites shall be located within 1 km from the boundary of any UNESCO heritage area or within monument/sites protected by Department of Archaeology, Government of Bangladesh;
(iii) With support from PMSC, review and approve site-specific EMPs (SEMPs) prepared by contractor;
(iv) Conduct regular site visits, including spot checks, to ensure the EMP and/or SEMP are properly implemented;
(v) Review monthly reports from contractor;
(vi) Prepare quarterly reports on all aspects concerning environmental assessment, management, and monitoring;
(vii) Obtain approval of the quarterly reports from the Project Engineer, and submit approved reports to Divisional/Regional Office;

(viii) Address any grievances brought about through the GRM as described in the IEE report in a timely manner; and
(ix) Support all other environmental safeguards-related activities and tasks of the PMU/Divisional/Regional Office as may be needed.

196. **Detailed Design Service Consultants (DDC).** The project will be supported by the DDSC. The DDSC will be staffed by an Environment Expert, Heritage / Archaeological Expert, and a Social Safeguard Expert. DDSC will support PMU in designing and planning of subproject components. The DDSC will screen all subprojects for climate resilience, conduct technical surveys and detailed studies, heritage assessment studies, and prepare all engineering designs, bidding and safeguard documents. In collaboration with the PMSC Environmental Safeguards and Heritage/Archaeological Experts, the tasks of the DDSC Environmental Safeguards and Heritage Experts are as follows:

(i) Screen and categorize the subproject based on the EARF;
(ii) Update/Finalize the initial environmental examination (IEE) report including environmental management plans (EMP) based on final detailed design of the subproject and in accordance with ADB SPS and national laws, regulations, policies and guidelines; and
(iii) Ensure that technical design team works closely with the Heritage Expert; select subproject sites/work area as far as away from UNESCO heritage area if any, and in any case, no works/sites shall be located within 1 km from the boundary of UNESCO heritage area or within monument/sites protected by Department of Archaeology, Government of Bangladesh;
(iv) Ensure that all recommendations made in the heritage assessment study are in integrated into finalization of subproject sites, detailed designs, and construction methodologies; and
(v) Conduct due diligence of associated facilities and/or audit of existing facilities, if any, during the detailed design phase, as defined in ADB SPS;

197. **Project Management Supervision Consultant (PMSC).** The PMSC will provide project management and supervision services to support the PMU, including overall project management and administration, construction supervision and quality control, safeguard compliance, municipal services operation and maintenance, monitoring and evaluations, and other activities as appropriate. PMSC will have an Environment Specialist, a Social Safeguard Specialist, Heritage/Archaeological Expert, and a Gender Specialist.

198. The key responsibilities of PMSC on environmental safeguards (PMU level and PIU level), with the support of heritage expert to be assigned in subproject towns where heritage areas are likely to be affected, are to fulfil collaborative tasks with the DDSC Environment Specialist and Heritage Expert and provide expert support to PMU, Divisional/Regional Office and PIU on the following:

(i) Screen and categorize final components of the subproject based on the EARF;
(ii) Update/Finalize the initial environmental examination (IEE) report including environmental management plans (EMP) based on final detailed design of the subproject and in accordance with ADB SPS and national laws, regulations, policies and guidelines;
(iii) Engage heritage expert to review the works sites before the start of works, and confirm on site by joint verification with PIU and heritage management authority that project component sites are away from UNESCO notified heritage area, and no works are located within 1 km of the boundary and are not within the monument/sites protected by Department of Archaeology, Government of Bangladesh;

(iv) Ensure that all recommendations made in the heritage assessment study are implemented;
(v) Conduct due diligence of associated facilities and/or audit of existing facilities, if any, during the detailed design phase, as defined in ADB SPS;
(vi) Conduct of meaningful consultations and ensure issues/concerns/suggestions raised are incorporated in the design and updated/final IEE report;
(vii) Ensure relevant provisions from the updated/final IEE report and EMP are incorporated in the bid and contract documents;
(viii) Establish grievance redressal mechanism and ensure members of the grievance committee have the necessary capacity to resolve project-related issues/concerns;
(ix) Together with the social safeguards experts, conduct safeguards capacity building to ensure PMU, Divisional/Regional Office and PIU have the capacity to implement, monitor, and report on implementation of EMP, resettlement plans and indigenous peoples plans (if any); and
(x) Monitor implementation of EMP at all work sites, including all potential safeguard issues identified in the safeguard documentation mentioned above;
(xi) Monitor any unanticipated environmental risks or impacts that arise during construction, implementation or operation of the subproject that were not considered in the IEE report and EMP. Prepare corrective action plans and ensure that these are implemented by the contractor and reported accordingly in environmental monitoring reports to ADB; and
(xii) Undertake all other tasks to ensure the subproject complies with ADB SPS and national environmental laws, rules, and regulations.

199. **Civil Works Contract and Contractor.** The IEE with EMP will form part of bidding and contract documents and verified by PMU. The Contractor will be required to designate an environment, health and safety officer (or equivalent) to ensure implementation of EMP during civil works. Contractor is to carry out all environmental mitigation and monitoring measures outlined in their contract and the IEE. The Contractor will be required to submit to PMU, for review and approval, a 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 per EMP; and (iv) budget for SEMP and EMP implementation. No works can commence until SEMP is approved by PMU.

200. Specifically, the Contractor will have the following responsibilities, among others that will be included in the bid and contract documents:

(i) Ensure that the infrastructure development works are carried out in an environmentally friendly manner, minimizing environmental impacts while ensuring the health and safety of all its workers and the minimizing disturbance to the surrounding environment and communities;
(ii) Consideration of ADB SPS, national regulations and the EMP during bid preparation and cost estimation;
(iii) Hire or designate a full time Environment, Health and Safety Officer (or equivalent) responsible for compliance to ADB SPS requirements, national regulations and the EMP. The officer/staff must have a clear terms of reference and responsibilities to ensure that all environmental and social concerns are properly managed;
(iv) Ensure regular reporting to the PIU on work progress and alert management on any potential issues or delays;
(v) Strictly follow national health protocols and related instructions issued by the government, and immediately report to the PIU upon detection of COVID positive cases at the subproject site;

(vi) Obtain the necessary permits and clearances, if any is required for the contractor, to implement the subproject;
(vii) Ensure that all worker recruitment and OHS requirements are complied;
(viii) Take necessary corrective action to rectify any non-conformance, including actions related to grievances;
(ix) Institute an emergency plan for natural calamities/disasters and accidents at the site; and
(x) Follow chance finds procedures to discovery of any physical cultural artifact.
(xi) A copy of the EMP/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/SEMP constitutes a failure in compliance and will require corrective actions.

201. A copy of the EMP/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/SEMP constitutes a failure in compliance and will require corrective actions.

202. PMU will ensure that bidding and contract documents include specific provisions requiring contractors to comply with: (i) all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; and (c) elimination of forced labor; and with (ii) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the proposed project sites.

B. Environmental Management Plan (EMP)

203. The EMP is necessary on the grounds that it will manage the environment by offsetting the negative impacts with possible mitigation measures and enhancing the positive impacts within the allocated fund from the project. Thus, the main objectives of the EMP for the road and roadside construction and improvement subproject are:

(i) Define the responsibilities of the project proponents in accordance with the three project phases (design, construction and operation);
(ii) Facilitate the implementation of the mitigation measures by providing the technical details of each project impact, and proposing an implementation schedule of the proposed mitigation measures;
(iii) Define a monitoring mechanism and identify monitoring parameters to ensure that all proposed mitigation measures are completely and effectively implemented;
(iv) Identify training requirements at various levels and provide a plan for the implementation of training sessions; and
(v) Identify the resources required to implement the EMP and outline corresponding financing arrangements; and Providing a cost estimate for all proposed EMP actions.

204. The Environmental Management Plan (EMP) is presented in **Table 144.** This summarizes the potential environmental impacts, mitigation measures, responsible entity for implementation and monitoring, and cost of implementation.

Table 14: Environmental Management Plan (EMP)

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
Design Phase and Pre-Construction Phase				
Integration of EMP in bidding documents and contracts	Lack of awareness by contractors on ADB SPS requirements may result in insufficient budget and non-implementation of EMP	• The PMU will incorporate the costs of implementing OHS and the EMP as well as specific provisions requiring contractors to comply with all other conditions required by ADB into the bidding and contract document. • Once the Contractor is selected, the PIU with support from PMSC will inform contractors of their responsibilities in EMP implementation, in compliance with ADB and government requirements, self - monitoring and reporting procedures.	PMU, PMSC	EA
Updating of IEE	IEE and EMP out of date due to changing conditions or design	The PMU shall update the IEE in case of change in design/based on the final detailed design and submit the same for review and clearance of ADB.	PMU, PMSC	EA
Provisions for connection to service infrastructure	Potential for unplanned construction activity due to absence of service infrastructure	• Confirm location, capacity, functionality and connection readiness of water, sewerage, electricity, heating and legal landfills to avoid wastewater dumping, ad-hoc connection arrangements, or inappropriate waste disposal during the construction phase.	PIU, DDC	PMU, PMSC
Integration of climate change considerations in design	Extreme weather events such as heavy rainfalls and tidal surges leading to flooding in the area	• Detail design of the subproject roads provides for possible measures, both structural and non-structural, to integrate climate resilient design standard into the road subproject. Such actions are to include: (a) raising of road levels to optimum heights; (b) bitumen carpeting increased to required thickness;	PIU, DDC	PMU, Divisional/Regional Office, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		(c) proper compaction of soil beneath carpeted layers; (d) preference to cement concrete (CC) pavement with appropriate temperature reinforcement and guide wall to protect erosion and sliding where there are threats of inundation; and (e) turf and tree plantation along the road shoulders and roadside slopes.		
Local hydrology	Local waterlogging problems and obstruction of natural water flows in the vicinity	• Detailed assessment of the microhydrology and topography of the project site; • Design the roads according to the slope and elevation relative to the water bodies that may exist in the area; and • Provide the appropriate design of drains for road stretches that do not have existing drainage or where persistent flooding has been recorded	PIU, DDC	PMU, Divisional/Regional Office, PMSC
Disruption of Existing Utilities	Disruption of infrastructure and services	• Conduct investigation at site to determine all the existing utilities that will likely be disturbed during construction phase; and • Coordinate with agencies responsible for the maintenance of the utilities and formulate a plan to minimize disruption of services during construction phase. The plan must be formulated in coordination with LGED and stakeholders at the site. Where required, the responsible agency shall be requested by PIU to carry out the necessary works at the time required and at cost of the subproject.	PIU, DDC	PMU, PMSC
Physical Cultural Resources - private and common properties	Disturbance to private and common properties (such as boundary walls, ramps, fences, telephone and electric poles/posts,	• Conduct investigation at site to determine if any existing private or common properties/structures will be disturbed during construction phase;	PIU, DDC, Contractor	PMU, Divisional/Regional Office, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
	roadside business structures, houses), and physical cultural resources such as graveyards and mosque will be avoided. Common property resources/community facilities in the subproject area include mosques, playground, open water bodies	• Conduct meaningful consultation with stakeholders whose private and common properties are confirmed to be likely affected by the construction works; • Consultations with relevant authorities, local people/stakeholders living near common property resources that are likely to be affected, and owners of private property resources that are also likely to be affected. These consultations will be conducted prior to finalizing the options. Required permits, if any, for the construction activity near any monument or establishments such as mosques will also be obtained. • Ensure that all works will be confined within existing road and side drains alignments, and within existing rights-of-way (ROWs). • Avoid disturbance or damage of physical cultural resources through proper design of road alignments and demarcating construction area; and • Ensure the implementation of measures according to the resettlement plan for the subproject, as necessary.		
Drinking water quality	Groundwater may likely be the source of drinking water. Ground water may have arsenic levels that could be detrimental to the health.	• The bid documents should include a requirement that Contractor will ensure that drinking water supply shows compliance with the drinking water quality standards, particularly for arsenic parameter. • The Contractor will undertake groundwater quality sampling and analysis to ensure that water from tube wells is in compliance with the drinking water quality standards. If the groundwater quality does not comply with the standards, the contractor will source	PMU, PMSC	EA, ADB

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		potable water from alternative source or provide onsite treatment facility at its own cost and approval from PIU/PMU.		
Material sourcing	Sourcing of aggregates from illegal quarries	• The bid documents should include a clause on material sourcing that will require the contractor to source construction materials legal or government-approved sources only. • no new quarry sites shall be used for the subproject; • verify suitability of all material sources and obtain approval of PMU/DIVISIONAL/REGIONAL OFFICE or PIU; and • document all sources of materials and include in the monthly reporting to the PIU.	PMU, Divisional/Regional Office, PIU	EA, ADB
Consents, permits and clearances	Failure to obtain necessary consents, permits, and clearances can result in design revisions and/or stoppage of the Works.	• All necessary local clearances and no objection certificates will be obtained prior to award of contract. • Environmental clearance will be obtained prior to award of contract/construction (if required). • LGED will contact the Upazila Parishad for clearance and NOC for construction. • Additionally, any permits or consents required from relevant government agencies for construction activities near locally recognized monuments, cultural resources or any other important structures, will be obtained.	PMU, PIU, PMSC	EA, ADB
EMP Implementation Training	If the contractors and construction supervision engineers are not aware about the requirements of this EMP, the project may not proceed and comply	The PMU, Divisional/Regional Office, PIU and contractors will be required to undergo training/capacity building on EMP implementation. • The capacity building program will be participatory to the extent possible to make	PMU, Divisional/Regional Office, PIU, PMSC	EA, ADB

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
	with ADB and GoB environmental policies.	it more effective, with learning by doing, role playing, group exercises, on-the-job training, etc. Pre- and post-training assessment will be conducted to measure the effectiveness of the program.		
Community Awareness on Project Activities and Impacts	Lack of community awareness on project activities may result in potential community health and safety concerns and complaints.	• Before the start of project construction, consult with relevant authorities of affected establishments/institutions (e.g. schools, colleges or hospitals) on the plan and schedule works so that construction activities do not interfere or disturb the operations of these entities (due to noise, dust, movement of vehicles,) and also considering safety and security of users of these establishments/institutions. • A meaningful consultation with the affected communities will be conducted. Important information to be disseminated to the people are, among others, the following: o Overview and objectives of the proposed project; o final detailed design of proposed project components; o Potential environmental and social impacts (positive and negative) of the project, and the proposed mitigation measures for the perceived negative impacts; and o Grievance redress mechanism and contact details of the project.	Divisional/Regional Office, PIU, Contractor	PMU, PMSC
Construction Phase Impacts and Mitigation Measures				
Construction Planning	Inadequate planning could lead to non-implementation of EMP	• Designate an Environmental Health and Safety Officer (EHSO). • Conduct training on the rationale for and implementation of the SEMP and EMP to	Contractor	PMU, Division/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
	during the construction phase and result in significant environmental impacts leading to noncompliance with ADB's environmental safeguard requirements.	enhance general understanding and clarify responsibilities regarding implementation, including monitoring and reporting, must also be provided to relevant staff of contractors (including EHSOs) • The Contractor will be required to submit to PMU, for review and approval, a SEMP including (a) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes, (b) specific mitigation measures following the approved EMP; (c) monitoring program as per EMP; and (d) budget for SEMP implementation. No works can commence prior to approval of SEMP. The SEMP will include the following: i. Construction Compound Management Plan; ii. Construction Traffic Management Plan; iii. Construction Health and Safety Plan (including COVID-19 H&S guidance); iv. Materials Management Plan; v. Noise and Vibration Management Plan vi. Water Quality Management Plan; vii. Dust Management Plan; viii. Waste Management Plan; and ix. Emergency Incident Response Plan.		
Excavation Works	Excavations may affect local drainage patterns if surface and groundwater collect in voids as they are being dug.	• All excavations shall be done to the minimum dimension as required for safety and working facility. • The excavation shall be executed in such manner, that the contractor does not damage or interfere with existing services or structures. If damage or interference is so caused, the contractor shall make	Contractor	PMU, Division/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		arrangements with the supply and/or building owner to execute the repairs at the contractor's own cost. • All excavations and other work shall be carried out during nighttime at busy road section. • Road drains and channels shall be kept free from obstructions at all times.		
Removal of Trees	It is anticipated that tree cutting will not be required for the subproject.	It is anticipated that tree cutting will not be required but in case it requires following measures will be undertaken: • Trees within area required for construction will be felled after prior approval; • Replacement of the tree shall be undertaken by LGED at the replacement ratio of two trees for every tree that is cut (e.g., 2:1 ratio); • No tree cutting should be done during bird nesting season Or, ensure that trees being cut have no active bird nests. Contractor should be able to spot active bird nests prior to any tree cutting attempt; • Only trees that will require removal within the proposed construction areas of the sites will be cut; and • For trees that will not be cut, take all precautions to protect them from any damage from construction activities.	Contractor	PMU, Division/Regional Office, PIU, PMSC
Soil erosion and sediment mobilization	Excavation during construction will generate loose soil which can be carried through surface run-off during a rainfall.	• The Contractor shall plan his works to minimize surface excavation works during the rainy season where practicable. • Precautions to be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecast, and actions to be taken during or	Contractor	PMU, Division/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		after rainstorms shall be developed by the Contractor. • The earthwork sites where exposed land surface is vulnerable to runoff shall be consolidated and/or covered. Channels, earth bunds, netting, tarpaulin and or sandbag barriers shall be used on site to manage surface water runoff and minimize erosion. • The overall slope of the works areas and construction yards shall be kept to a minimum to reduce the erosive potential of surface water flows. • Monitor groundwater quality that could exist close to the working areas to ensure compliance.		

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
Surface water pollution	Silt-laden run-off from stockpiled materials, solid wastes and domestic wastewater from the construction camp, and leaks from chemical storage areas and machineries may contaminate or result in water pollution if disposed or discharged to nearby receiving bodies of water	• Provision of temporary sedimentation canal and/or silt traps along construction areas, particularly alignments that are adjacent to receiving bodies of water or canals. • The measures to address soil erosion at the proposed facilities will consist of measures as per design, or as directed by the PMSC to control soil erosion, sedimentation, and water pollution. All temporary sedimentation, pollution control works, and maintenance thereof will be deemed incidental to the earthwork or other items of work. • All temporary discharge points shall be located, designed and constructed in a manner that will minimize erosion in the receiving channels. • Ensure proper compaction of refilled soil and there shall not be any loose soil particles on the top; the material shall be refilled in layers and compacted properly layer by layer. • Use surplus soil for beneficial purposes such as in any other construction activities, or to raise the level of low lying areas; • Avoid scheduling of excavation work during the monsoon season. Earthworks during dry season; • Confine construction area including the material storage (sand and aggregate) so that runoff will not enter the site; • Ensure that drains are not blocked with excavated soil; • Stockyards at least 50 meters (m) away from watercourses; • Fuel and other petroleum products stored at	Contractor	PMU, Division/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		storage areas away from water drainage and protected by impermeable lining and bunded 110% by volume; • Daily control of machinery and vehicles for leakages; • No obstruction in flowing water; • For effluents from workplace, camps, and offices, provide treatment arrangements such as retention ponds and septic tanks which should be incorporated in the facility designs. A sewage management plan has to be prepared by the contractor and agreed with the PMSC; • Monitor water quality according to the environmental monitoring plan; • 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 away from receiving water; • Establishment of separate bunded and lined areas with 110% volume for the storage of all the toxic/hazardous material wastes, including batteries, oil filters, mobile, burnt oils, etc. at the construction site; and • Consultation with PIU on the proper disposal of all residual wastes.		
Groundwater use and contamination	Increased demand for groundwater is anticipated during the construction phase for construction activities and personal consumption by workers. Even a small project can require 100	It is necessary that arrangement for safe drinking water is made prior to start of work. Water will be supplied for consumption only after adequate analysis and requisite treatment. The workers may also be trained on the need for judicious use of freshwater resources. The contractors will use water in consideration to its	Contractor	PMU, Division/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
	m3/day of water. Uncontrolled extraction of water may affect availability of water to locals. In addition, construction waste, if left unattended, will result in percolation of leachate through the soil strata reaching the groundwater table contaminating it.	value as a resource. Mitigation measures will include: • Prevent pollutants from contaminating the soil and the groundwater; • All tube wells, test holes, monitoring wells that are no longer in use or needed shall be properly decommissioned; • Storage of lubricants and fuel at least 50 m from water bodies; • Storage of fuel and lubricants in double hulled tanks. Fuel and other petroleum products stored at storage areas away from water drainage and protected by impermeable lining and bunded 110% by volume; • Daily control of machinery and vehicles for leakages; • Collection of waste during construction activities; • Provide uncontaminated water for dust suppression; • Enclose the construction area to prevent unauthorized access.		
Drainage Congestion	Construction material getting into surface run off or uncontrolled disposal may cause drainage congestion, flooding or waterlogging in neighboring areas.	The contractor shall adopt a site clearance procedure that separates topsoil and stores it under appropriate conditions for reuse as instructed by the Engineer. Wastes and construction debris will not be disposed in a manner that these would end up in drainage canals. The on-site storage of excessive quantities of unwanted spoil and aggregate materials should be avoided. Where storage is necessary, the Contractor shall ensure heaps and stockpiles are located at sites that they do not permit direct runoff into watercourses and are on land sloping at less than 1.5%. All heaps	Contractor	PMU, Division/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		shall be of a size and stability that will ensure the risk of mass movement during period of heavy rainfall is minimized		
Impact on Air Quality	Construction activities including transport and storage of raw materials will likely create dust and emissions that could deteriorate ambient air quality in the area.	• Take every precaution to reduce the levels of dust at construction sites, and not exceeding the pre-project ambient air quality standards; • Fit all heavy equipment and machinery with air pollution control devices that are operating correctly; • Vehicles travelling to and from the construction site must adhere to speed limits to avoid producing excessive dust; • Reduce dust by spraying stockpiled soil, excavated materials, and spoils; • Cover with tarpaulin vehicles transporting soil and sand; • Cover stockpiled construction materials with tarpaulin or plastic sheets; • Heavy equipment and transport vehicles shall move only in designated areas and roads; • Water spraying to access roads, camp sites and work sites to reduce dust emissions; • Machines and vehicles must be regularly examined and maintained to comply with requirements of technical specifications; • All vehicles, equipment, and machinery used for construction will be regularly maintained to ensure that pollution emission levels comply with the relevant requirements of DOE. Copies of conformance will be submitted regularly to the PMSC; • Repair and maintain access roads, as necessary;	Contractor	PMU, Division/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		• Monitor air quality according to the environmental monitoring plan; • Clean wheels and undercarriage of vehicles prior to leaving construction site; • 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.		
Noise	Noise generation may disturb nearby sensitive receptors (e.g school, etc.)	• Provide prior information to the local public, including institutions such as schools and hospitals along alignments that may be affected, 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, except in areas near schools, places of worship, and other institutions which may be likely disturbed during day time. Consider night time works in these areas; • Avoid use of noisy equipment or doing noisy works at night time near residential areas; • 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 other construction materials; • Avoid use of horns unless it is necessary to warn other road users or animals of a vehicle's approach; and • Implement a complaints handling system.	Contractor	PMU, Division/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		On-site construction noise shall be mitigated to ensure a safe work environment by implementing an on-site occupational health and safety plan, which considers national and international requirements. The plan shall include the following measures: • Ear muffs/protective hearing equipment shall be made available to all workers in noise critical areas; • Training on how and when to use protective hearing equipment shall be conducted as part of the workers' induction sessions; • Place visually clear instructions in areas where noise emissions are significant; and • Measure noise level according to the environmental monitoring plan.		
Construction wastes generation	Inadequate management of construction wastes will result in negative impact on the soil, aesthetic beauty of area and workers' and community's health and safety.	• The contractors should take every opportunity to reduce the amounts of waste generated and collect recyclable material for processing by local operators. • Contractor shall implement waste segregation on site. • Receptacles for solid waste should be provided for the use of workers, and their contents should be disposed of in officially sanctioned local landfills. • Construction waste should also be disposed of in legal local landfills. • Clean construction waste such as excess soil or rubble should be used in landscaping on site or given to landowners and developers seeking fill material.	Contractor	PMU, Division/Regional Office PIU, PMSC
Disturbance to terrestrial flora and fauna	The subproject area is not within any forest, hence,	• Avoid, or minimize when avoidance is not possible, tree cutting;	Contractor	PMU, Division/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
	the impacts to flora and fauna will be minimal to insignificant.	• For any tree cut, conduct replacement planting at a ratio of 1(cut):2 (new planting) and consistent with the social forestry program of LGED (see Appendix 5 for LGED Tree Plantation Program); • Protect giant trees and locally important trees (for religious reasons), if any is identified as the site during implementation; • Prevent workers or any other person from removing and damaging any other flora and fauna found in the subproject site; and • Prohibit employees and workers from poaching animals and cutting of trees for firewood in the vicinity of the site.		
Impacts on aquatic ecology	The construction of the subproject may affect nearby khals and ponds and the aquatic species thriving therein due to siltation and pollutant spills.	• Provide temporary protection at sections near any river or khal (canal) to avoid sliding of soils; and • Store spoils away from the side of any river or khal in the area to avoid being washed down.	Contractor	PMU, Division/Regional Office, PIU, PMSC
Impact to Traffic	Rehabilitation works will render some portions of the road impassable at periods of time. This scenario will create traffic congestion and disturbance to pedestrians and motorists in the vicinity of the affected area if not properly managed.	A traffic management plan (TMP) will be developed prior to construction and approved by the PIU. The TMP shall include the following: • installation of clear signages; • barricades; • lightings at night; and • markers to direct traffic movement in sites, among others. Emergency response plan must be prepared for any traffic accident during construction.	Contractor	PMU, Division/Regional Office PIU, PMSC
Disruption of Public Access.	Public access along the road/drainage alignments may be disrupted during construction activities.	• Prior coordination with the surrounding community on operation and work schedules.	Contractor	PMU, Division/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		• As necessary, increase workforce for speedy completion; • Inform through display board about nature, duration of construction and contact for complaints; • Schedule material deliveries on low pedestrian traffic hours; • Restore damaged properties and utilities; • Erect and maintain barricades if required; • Pedestrian access to school and mosque will be maintained with the use of walking boards. Wheelchair and disabled access shall be maintained. • Surfaced roads shall be subject to road cleaning and unsurfaced roads to dust suppression, the methodology and frequency of which shall be included in the traffic management plan.		
Impacts on physical cultural resources (PCR) and chance finds	The subproject area is not located near nationally or internationally protected historical, cultural and archaeological sites. However, few alignments are adjacent a locally recognized mosques. Detailed design will ensure these mosques will not be significantly impacted by the subproject through either re-alignment or institution of appropriate measures. Excavation activities might encounter chance finds.	• Strictly follow the protocol by coordinating immediately with 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 finds, and comply with further instructions.	Contractor	PMU, Division/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
Impacts on socio-economic activities.	Disturbance to economic activities may 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)	• Implement the traffic management plan in collaboration with local authorities; • Where traffic congestion will likely occur, place traffic flagmen during working hours; • Avoid full road closures by applying the construction method on section-wise and/or chainage-wise approach during excavation, concreting and/or curing periods; • If full road closure is not possible, especially on very narrow roads, ensure that alternate routes are identified and that affected residents and establishments are informed prior to conducting the construction activities; • Provide convenient access to pedestrians when works occur in front of residential, commercial, or institutional establishments. Examples are planks with handrails that should be provided to cross excavated areas. • Provide appropriate compensation to qualified affected people or businesses per approved resettlement plan for the subproject; • 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.	Contractor	PMU, Division/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
Occupational health and safety risks.	Construction activities could create health and safety risks to construction workers	• All relevant provisions of the Bangladesh Labor Act, 2006 and relevant WHO guidelines will be adhered to, concerning the provision of adequate measures to avoid contracting and/or spreading diseases during construction phase; • Follow 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; • Follow established occupational health and safety protocol on emerging infectious diseases such as the corona virus disease (COVID19 • A readily available first aid unit, including an adequate supply of sterilized dressing material and appliances, will be provided as per the factory rules. Suitable transport will be provided to facilitate the transfer of injured or ill persons to the nearest hospital; • Other first aid medical equipment and nursing staff will be made available or arranged on-call; • The contractor will, at his own expense, conform to all disease prevention instructions as may be given by PMU/DIVISIONAL/REGIONAL OFFICE and/or PIU; • Provide regular health check-ups, sanitation and hygiene, health care, and control of epidemic diseases to the workforce; • The contractor shall provide at cost all labor and materials and construct/install and maintain site safety, hard barricading,	Contractor	PMU, Division/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		flexible green net, signboards, temporary day/light traffic diversions throughout the construction activities according to the specifications and provide personal protective equipment (PPE) to all the laborers working at the construction site; • Launch awareness programs concerning human trafficking and the possibility of spread of sexually transmitted diseases (STDs) and HIV/AIDS using brochures, posters, and signboards; • Make available first aid kits, ambulance facilities, and fire extinguishers in camp sites, if any; • Compensation for the loss of life (a zero tolerance to loss of life policy should be developed and implemented) or for any type of injuries; and • Provide insurance to the workers. Health and safety training for all site personnel is very important and must be mandatory.		
Community health and safety risks	Construction activities could create health and safety risks to community people.	• Code of conduct for workers includes restricting workers in designated areas, no open defecation, no littering, no firewood collection, no fire except designated places, no trespassing, no residence at construction sites, and no obligation to potentially dangerous work; • Follow 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;	Contractor	PMU, Division/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		• Follow established community health and safety protocol on emerging infectious diseases such as COVID19. • Implement measure to prevent proliferation of vectors of diseases at work site; • Maintain a complaint logbook in worker's camp and take action promptly of complaints. Follow the established GRM of the overall project (CTCRP); • Schedule transportation activities by avoiding peak traffic periods; • Clean wheels and undercarriage of haul trucks prior to leaving construction site; • Educate drivers: limit speed not more than 30 km/h in settlements and avoid use of horn; • Earmark parking place for construction equipment and vehicles when idling; no parking shall be allowed on the roads, that may disturb the traffic movement; • Provide prior information to local people, particularly any affected institutions (e.g. schools/madrasa, hospitals, mosques or places of worship, etc.) nearby about work schedules; • Noise barriers must be installed in between the construction site and any institutions (e.g. schools/madrasa, hospitals, mosques or places of worship, etc.) to reduce the impact of noise to these receptors; • Provide adequate space and lighting, temporary fences, reflectorized barriers and signages at the work site; and • Ensure contractor has staff trained on emergency response.		

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
Post-construction clean-up and reinstatement	Construction debris, spoils, and excess construction materials may pose hazards to properties, community and environment if left unattended after construction.	The contractor will reinstate all working areas and access routes as work proceeds during construction. All plant, equipment, materials, temporary infrastructure and vehicles will be removed at the earliest opportunity and the surface of the ground restored as near as practicable to its original condition. The following generic measures should be taken: • Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; • All roads that are not part of/included in the rehabilitation works but damaged due to construction or subproject activities shall be reinstated to original condition; • All disrupted utilities restored; • All affected structures rehabilitated/compensated; • The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up; • All hardened surfaces within the construction camp area shall be ripped; • All imported materials removed, and the area shall be top soiled and regressed using guidelines set out in the re-vegetation specification that forms part of this document; • The contractor must arrange the cancellation of all temporary services; and • Request PIU to report in writing that worksites and camps have been vacated	Contractor	PMU, Division/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		and restored to pre-project conditions before		
Operation and management phase				
Routine Maintenance	Traffic may be interrupted temporarily but this work will be very small in scale, infrequent, and short in duration, so there will be no economic or other implications. The infrastructure will need to be repaired from time to time, but environmental impacts will be much less than those of the construction period as the work will be infrequent, affecting small areas only.	• To maintain the safety of workers and road-users, such work should be coordinated with the local police department so that adequate warning signs and traffic diversions can be set up when necessary. • Debris need to be collected and disposed at a designated site such as the landfill. • Continue to encourage community participation in ensuring drainage canals are clog-free through information and behavior change campaigns and incentives, if possible. •	Kalaroa Pourashava	LGED
Road Safety	Improved roads may give way to faster vehicle speeds which could endanger people and households along the road alignments. Damage in roads may also cause accidents for motorists.	• Conduct regular inspection of the roads to check for damages, and undertake rehabilitation measures for any damages found; • Inspect and maintain the integrity of road barriers, especially at critical curves or locations that are prone to vehicular accidents; • Inspect and maintain speed limiters such as humps installed on road sections near residential areas, schools, and religious establishments; • Inspect and maintain all road signages, including appropriate warning signages at silent zones, and ensure that these	Kalaroa Pourashava	

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		are reflectorized and visible even during nighttime; and • Ensure pedestrian crossings are maintained.		

C. Environmental Monitoring Program

205. Monitoring of mitigation measures during construction is the responsibility of the Kalaroa PIU and PMU, supported by the PMSC Environmental Specialist, while monitoring of mitigation measures during operation phase is the responsibility of the Kalaroa Pourashava and LGED. Table 15 shows the proposed Environmental Monitoring Program for this subproject, which specifies the various monitoring activities, indicating location, frequency of monitoring and responsibility.

Table 15: Environmental Monitoring Program

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Methods	Monitoring Frequency	Monitoring Responsibility
Preconstruction					
Secure Environmental Clearance Certificate (ECC) from Department of Environment (if required)	PMU office	PMU, PMSC	Copy of approved ECC	Before construction activities	PMU, PMSC
IEEs and EMPs are included in bid and contract documents	PMU office	PMU, PMSC	Copies of bid and contract documents	Before approval tender document	PMU, Division/Regional Office, PMSC
Site-specific EMP (SEMP) submitted by Contractor for approval by PIU/ Division/Regional Office	PIU office	Contractor, PIU	Copy of approved SEMP	Before commence construction activities	PMU, Division/Regional Office, PMSC
Spoil management plan (SMP) submitted by Contractor for approval by PIU/Division/Regional Office	PIU Office	Contractor, PIU	Copy of approved SMP:	Before commence construction activities	PMU, Division/Regional Office, PMSC
Traffic management plan (TMP) submitted by Contractor for approval by PIU/ Division/Regional Office	PIU Office	Contractor	Copy of approved TMP	Before commence construction activities	PMU, Division/Regional Office, PMSC
Secure all other necessary permits and licenses from relevant government agencies		Contractor	Copies of permits and licenses	Before commence construction activities	PMU, PMSC
Conduct of baseline ambient air quality and noise level monitoring	Subproject site	Contractor	Site visits and observations, Contractor records, Results of laboratory analysis (if necessary)	Before commence construction activities	PMU, Division/Regional Office, PIU, PMSC

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Methods	Monitoring Frequency	Monitoring Responsibility
Conduct of baseline surface water quality monitoring	Subproject site	Contractor	Site visits and observations, Contractor records, Results of laboratory analysis (if necessary)	Before commence construction activities	PMU, Division/Regional Office, PIU, PMSC
Construction					
Implementation of SEMP; including implementation of community and occupational health and safety measures.	Subproject site	Contractor	Site visits, Contractor records,	Weekly or as needed	PMU, Division/Regional Office, PIU, PMSC
Implementation of SMP	Subproject site	Contractor	Site visits, Contractor records,	Weekly or as needed	PIU, PMSC
Implementation of TMP	Subproject site	Contractor	Site visits, Contractor records,	Weekly or as needed	PIU, PMSC
Tree Removal and Replacement	Subproject site and planting site	Contractor	Site visits, Contractor records,	Monthly or as needed	PMU, Division/Regional Office, PIU, PMSC
Conduct of ambient air quality and noise level monitoring	Subproject site	Contractor	Site visits and observations, Contractor records, Results of laboratory analysis (if necessary)	Quarterly or as needed	PMU, Division/Regional Office, PIU, PMSC
Conduct of surface water quality monitoring	Subproject site	Contractor	Site visits and observations, Contractor records,	At least semi annual or as needed	PMU, Division/Regional Office, PIU, PMSC

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Methods	Monitoring Frequency	Monitoring Responsibility
			Results of laboratory analysis (if necessary)		
Develop and apply archaeological protocol to protect chance finds	Subproject site	Contractor, PMU, PIU, PMSC	Contractor records,	Once until protocol is approved	PMU, Division/Regional Office, PIU, PMSC
Provide EHS training for all personnel	Subproject site	Contractor	Site visits, Contractor records, interviews to workers	Monthly	PIU, PMSC
Keep accident reports and records	Subproject site	Contractor	Site visits, Contractor records, interviews to workers and community people	Monthly	PIU, PMSC
Employ workforce from communities near sites	Subproject site	Contractor	Contractor records	Monthly	PIU, PMSC
Implementation of EHS measures at construction camps	Construction camp site	Contractor	Site visits; Interviews to workers at camp	Monthly	PIU, PMSC
Operation and Maintenance					
Drainage repair and maintenance	Subproject site	Drainage Management	Site observation	Monthly	LGED
Prevent run-off/deposit of foreign materials into drains and clean drain periodically; dispose of materials removed from drains	Subproject site	Drainage Management	Site observation	Monthly	LGED

D. Capacity Development Training

206. The PMSC Environment Specialist and Social Safeguard Specialist will be responsible for training the PMU, Division/Regional Office, PIU and contractors. Training modules will need to cover safeguards awareness and management in accordance with both ADB and government requirements as specified below:

I. Environmental Safeguards

1. sensitization on ADB's safeguard policy on environment;
2. introduction to environment and environmental considerations in urban infrastructures;
3. review of IEEs and integration into the project detailed design;
4. improved coordination within nodal departments; and
5. 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

1. sensitization on ADB's policies on Involuntary Resettlement and Indigenous People;
2. introduction to social safeguards assessment and document requirements;
3. Consultation and participations requirements;
4. Project GRM and ADB's Accountability Mechanism; and
5. monitoring and reporting system.

207. **Methodology**. Capacity building activities will be achieved through combination of practical methodologies available such as lecture and workshop training by experts, on-the-job training and mentoring, and continuing team meetings and exercises. The PMSC Environment Specialist will spearhead the designing of specific programs appropriate for the target participants or stakeholders, including the execution of these programs during the different implementation phases of the CTCRP, which includes the subproject. Pre-training and post-training assessment will be an integral part of the overall program to measure its effectiveness, and identify any other needed interventions to improve effectiveness, if necessary.

208. As fundamental component for the capacity building program, basic lectures and seminar training sessions will be provided by the PMSC Environment Specialist to strengthen the awareness of project stakeholders on the requirements of ADB SPS and government environmental laws, rules and regulations. Modules will be prepared and customized based on the skills set and needs of the different stakeholders. The entire training will cover basic principles of environmental assessment and management mitigation plans and programs, implementation techniques, monitoring methods and tools. A proposed lecture and seminar training program along with the frequency of sessions is presented in the following table.

Table 16: Sample Lecture and Seminar Training Program for Environmental Management

Items	Pre-construction	Construction	
Training Title	Orientation workshop	Orientation program/workshop for contractors and supervisory staff	Experience and best practice 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	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	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 PMU and PMSC
Participants	PMU, Divisional/Regional Office and PIU staff (technical and environmental) involved in the project implementation	PMU, Divisional/Regional Office, PIU, Contractor	PMU, Divisional/Regional Office, PIU, Contractor

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

209. Most of environmental mitigation and enhancement measures are integrated into the design and cost are included as part of the civil works contract. Some items need to be incorporated in the Bill of Quantities (BOQ) of this subproject including the environmental

monitoring costs. The environmental costs presented in table below 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.

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

(The following items are rough estimates and some costs of Contractor in BOQs and other budgets of PMU, Divisional/Regional Office, or PIU may not be included. These activity items and costs need to be reviewed and finalized by PMU in case of change/s in the design.)

No.	Impact Description	Unit	Quantity	Frequency	Rate	Total (Tk.)
1	Environmental Safeguards Capacity Development/GRM Implementation Training	Module	2	2	100,000.00	200,000.00
2	EMP Implementation and Monitoring					
A-Mitigation Measures: e-GP/ CTCRP/KALA/RD-01						
	Dust suppression measures (excluding watering for compaction) to the entire satisfaction of the engineer-in-charge, site safety plan	Lumpsum	1	-	80,000	80,000
	Establishment of composite, waste treatment and disposal, spillage and spoil management and leakage of water	Lumpsum	1		100,000	100,000
	Covid-19 Prevention Response: Providing and maintaining temporary isolation facilities, Installation of cautionary sign in term of health & safety signs and preventive messages against Covid-19, Providing PPEs considering covid-19, Providing and maintaining a Portable hand wash station including wash basin, plastic water tank, plastic tab (Bibcock), hand wash liquid soap/soap etc.	Lumpsum	1		30,000	30,000
	Environmental monitoring: Air quality (PM10, PM2.5, Sox, NOx and CO) during construction three times during project period.	Each	8	Sample: 2 locations x 4 times in project duration[a]	25000.00	200,000.00
	Environmental monitoring: Water quality monitoring during construction. Ground Water Quality (pH, Turbidity ,Total Coliform (TC), Fecal Coliform (FC), Arsenic (As), Salinity, Chloride, Dissolve Oxygen (DO)	Each	8	Sample: 2 locations x 4 times in project duration[b]	10000.00	80,000.00

No.	Impact Description	Unit	Quantity	Frequency	Rate	Total (Tk.)
	Environmental monitoring: Noise Levels (Day and Night during construction)	Each	8	Sample: 2 locations x 4 times in project duration[a]	5000.00	40,000.00
	Other environmental mitigation measures not included above, including measures and monitoring for unanticipated impacts during construction phase.[a]	LS	1	1	120,000.00	120,000.00
B-Mitigation Measures: e-GP/ CTCRP/KALA/RD-02						
	Dust suppression measures (excluding watering for compaction) to the entire satisfaction of the engineer-in-charge, site safety plan	Lumpsum	1	-	60,000	60,000
	Establishment of composite, waste treatment and disposal, spillage and spoil management and leakage of water	Lumpsum	1		60,000	60,000
	Covid-19 Prevention Response: Providing and maintaining temporary isolation facilities, Installation of cautionary sign in term of health & safety signs and preventive messages against Covid-19, Providing PPEs considering covid-19, Providing and maintaining a Portable hand wash station including wash basin, plastic water tank, plastic tab (Bibcock), hand wash liquid soap/soap etc.	Lumpsum	1		30,000	30,000
	Environmental monitoring: Air quality (PM10, PM2.5, Sox, NOx and CO) during construction three times during project period.	Each	8	Sample: 2 locations x 4 times in project duration[a]	25000.00	200,000.00
	Environmental monitoring: Water quality monitoring during construction. Ground Water Quality (pH, Turbidity ,Total Coliform (TC), Fecal Coliform (FC), Arsenic (As), Salinity, Chloride, Dissolve Oxygen (DO)	Each	8	Sample: 2 locations x 4 times in project duration[b]	10000.00	80,000.00

No.	Impact Description	Unit	Quantity	Frequency	Rate	Total (Tk.)
	Environmental monitoring: Noise Levels (Day and Night during construction)	Each	8	Sample: 2 locations x 4 times in project duration[a]	5000.00	40,000.00
	Other environmental mitigation measures not included above, including measures and monitoring for unanticipated impacts during construction phase.[a]	LS	1	1	50,000.00	50,000.00
	Total (1+2) =	Thirty-one lakh fifty thousand taka only				**13,70,000.00**

a Number of sampling activity is indicative. Air quality sampling or noise level monitoring may not be necessary when construction activities do not generate air pollutants or high noise level that are detrimental to the environment, nearby residents, or the workers. Ambient air quality and noise level measurements will be done at the construction sites and other critical areas/points where sensitive receptors exist. Locations of sampling points for linear works shift as construction activities progress. Exact sampling locations will be selected during the works.

b Surface water quality sampling will only be conducted when surface water is deemed affected by the construction works. Therefore, the no. of sampling activity is indicative. Sampling will be done on the downstream of an affected water body.

X. MONITORING AND REPORTING

210. PMU will monitor the overall progress of EMP implementation of the entire CTCRP through the different subproject jurisdictions, including the road and roadside drains construction and improvement in Kalaroa Pourashava. The PMU, Divisional/Regional Office and PIU will undertake their respective roles in site inspections and document review to verify compliance with the EMP and SEMP, and progress toward the final outcome. The contractor will conduct day-to-day implementation of the SEMP.

211. The contractor will submit monthly reports to the PIU/Divisional/Regional Office. The monthly reports will include a compilation of copies of monitoring sheets accomplished and duly signed by the contractor's EHS Officer (or equivalent) on a daily basis. A sample daily monitoring sheet which can be used by the contractor is in Appendix 9. This monitoring sheet is indicative which can be further enhanced depending on the actual situations at subproject construction site.

212. The PIU/ Divisional/Regional Office will submit quarterly environmental monitoring reports to PMU, which will include summary of monthly monitoring activities of contractor and results of any independent monitoring or inspection activities of the PIU and/or Divisional/Regional Office. In the conduct of these independent inspection activities, PIU and/or Divisional/Regional Office will be supported by PMSC in this regard. A sample inspection checklist is in Appendix 10. This checklist is indicative which can be further enhanced depending on the actual situations at subproject construction site.

213. PMU shall consolidate quarterly reports from the PIUs including PIU in Kalaroa, and results of its independent monitoring or inspection activities. PMU shall accomplish semi-annual environmental monitoring report (SEMRs) starting from the effectivity date up to the end of construction phase, which shall be submitted to ADB for review and disclosure on ADB website. The template for the SEMR is attached as Appendix 11. The PMU shall prepare and submit an annual environmental monitoring report during the operation phase until project completion. Submission of these reports to ADB will be within thirty (30) days from the end date of the reporting period.

XI. CONCLUSION AND RECOMMENDATION

214. The construction and improvement of roads and roadside drains in Kalaroa Pourashava will result in significant socio-economic benefits due to the improved road facilities and roadside drains.

215. Potential environmental impacts were assessed based on secondary data, stakeholder consultations, and field visits at the subproject sites. Proposed roads and roadside drains for construction/improvement will be in existing road alignments and ROW within the pourashava. No tree cutting will be required. There are no environmentally sensitive areas near or in the project sites such as protected areas like national parks or wildlife sanctuary or important cultural and archaeological sites.

216. Impacts were assessed based on the location and project activities during the pre-construction, construction, and operation phases. The subproject component will involve straightforward construction and is unlikely to cause significant adverse impact. Usual construction-related impacts such as noise, dust generation, silt generation, construction waste generation, and occupational and community health and safety risks including the spread of infectious diseases such as COVID-19, among others, will be localized and temporary and can be readily mitigated through the measures indicated in the EMP. Potential adverse impacts that are associated with the operation phase can be mitigated upfront through incorporation of environmental requirements in the detailed engineering design, including climate change adaptation measures.

217. Public consultation was conducted as part of the environmental assessment process. The stakeholders expressed support for the road construction and improvement in the subproject site. Results of the consultation were documented and considered in the formulation of the environmental management plan. Public consultation will continue throughout the project implementation.

218. Based on the results of the IEE, no further environmental assessment such as EIA is required and the classification of Category B per ADB SPS, 2009 is confirmed. Based on the Environmental Conservation Rules of Bangladesh (ECR, 2023 latest amendment of ECR, 1997), roads construction or extension with length of 5 km to 10 km fall under Orange category while roads construction or extension with length of more than 10 km fall under Red category, and therefore, are required to obtain environmental clearance. For this subproject, only rehabilitation/improvement of existing roads and no new roads will be constructed. Further, none of the roads under the subproject have a length of 5 km or more. On 4 March 2024, PMU submitted a letter to DoE to request the issuance of ECC for CTCRP subprojects. Based on the scope and nature of road subprojects works of CTCRP, DOE confirmed through a letter dated 04 April 2024 that CTCRP is not required to obtain ECC for such subprojects. .

219. This IEE has been prepared based on detailed designs of the roads. However, detailed design of the roadside drains is yet to be completed and will be included in the updated IEE for submission to ADB for review and clearance prior to award of contract, or latest, prior to the start of construction. If the design is revised or modified during implementation, the PMU, with support from PMSC, shall update this and submit it to ADB for review and disclosure. No work can commence until the final IEE is approved by ADB and provided to the Contractor, and the SEMP is approved by the PIU or Divisional/Regional Office.

Appendix 1: Rapid Environmental Assessment (REA) Checklist for road subprojects

Instructions:

1. The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (SDES) for endorsement by the Director, SDES and for approval by the Chief Compliance Officer.

2. This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and on tribes, minor races, ethnic sects and communities;[22] (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

3. Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: Coastal Towns Climate Resilience Project (CTCRP)

Sector Division: CTCRP/construction/Improvement of Roads in Kalaroa Pourashava

Screening Questions	Yes	No	Remarks
A. Subproject Siting Is the subproject area			
1. Densely populated	✓		The proposed road alignments are located within the Pourashava area which is densely populated.
2. Heavy with development activities?		✓	There are no heavy development activities in the area.
3. Adjacent to or within any environmentally sensitive areas?			
• Cultural heritage site		✓	Based on desk review of locations and field visit, there is no environmentally sensitive cultural heritage site within or near any of the subproject locations/alignments.
• Protected Area		✓	Based on desk review of locations and field visit, there is no protected area encompassing or near any of the subproject locations/alignments.
• Wetland		✓	Based on desk review of locations and field visit, there is no protected wetland near any of the subproject locations/alignments.
• Mangrove		✓	Based on desk review of locations and field visit, there is no mangrove near any of the subproject locations/alignments.
• Estuarine		✓	Based on desk review of locations and field visit, there is no estuarine near any of the subproject locations/alignments.
• Buffer zone of protected area		✓	Based on desk review of locations and field visit, there is no buffer zone of protected encompassing or near any of the subproject locations/alignments.

[22] Groups or population identified as Indigenous Peoples within the context of ADB's Safeguard Policy Statement will be referred to in this document as *tribes, minor races, ethnic sects and communities* (following the request of the Government of Bangladesh).

Screening Questions	Yes	No	Remarks
• Special area for protecting biodiversity		✓	Based on desk review of locations and field visit, there is no special area for protecting biodiversity encompassing or near any of the subproject locations/alignments.
• Bay		✓	Based on desk review of locations and field visit, there is no bay near any of the subproject locations/alignments.
B. Potential Environmental Impacts Will the Subproject cause			
▪ encroachment on historical/cultural areas; disfiguration of landscape by road embankments, cuts, fills, and quarries?		✓	There are no historical/cultural area except local mosques, graveyards along the proposed roads. Project activities will be confined to road right of way and will not encroach on these mosques/graveyards. No notable cuts or fills proposed that may disfigure these areas.
▪ encroachment on precious ecology (e.g. sensitive or protected areas)?		✓	Proposed roads are urban roads, located in urban areas converted long ago for human use. There are no sensitive or protected areas in or near the roads.
▪ alteration of surface water hydrology of waterways crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?	✓		Construction/improvement of roads will potentially increase siltation of surface waters near or adjacent to the alignments. However, this impact will be mitigated through implementation of measures suggested in the EMP.
▪ deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?	✓		Construction/improvement of roads, use of chemicals such as fuels, and operation of construction worker camps will potentially increase occurrence of siltation and/or cause pollution of surface waters near or adjacent the sites. However, this impact will be mitigated through implementation of measures suggested in the EMP.
▪ increased local air pollution due to rock crushing, cutting and filling works, and chemicals from asphalt processing?	✓		Air pollution / dust is anticipated from earthwork and other construction activities. Proposed roads are of cement concrete. Construction materials like aggregate will be sourced from existing quarries with valid licenses and permits including environmental clearance certificate. No activities such as rock crushing will be carried out. No asphalt processing will be carried out on site.
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during subproject construction and operation during subproject construction and operation?	✓		Construction activities and exposure to various occupational hazards at the sites will pose risks to workers. However, this can be mitigated through the implementation of the EMP, particularly occupational health and safety measures both at work sites and construction camp sites.
▪ noise and vibration due to blasting and other civil works?	✓		Project will not involve blasting activities. Construction activities will elevate noise levels. Vibration levels will not be significant considering the small-scale nature of work. However, impacts can be mitigated through the implementation of related measures suggested in the EMP.
▪ dislocation or involuntary resettlement of people?		✓	Not anticipated. All works will be confined on existing road alignments, and within existing rights-of-way (ROWs).
▪ dislocation and compulsory resettlement of people living in right-of-way?		✓	Not anticipated. Proposed right-of-way is free of any encroachment.

Screening Questions	Yes	No	Remarks
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples, or other vulnerable groups?		✓	During construction phase, all mitigation measures are developed to protect all receptors regardless of status or affiliation. During operation phase (once subproject is completed), the roads under the subproject will benefit all sectors of the society, including the disadvantaged and vulnerable groups.
▪ other social concerns relating to inconveniences in living conditions in the subproject areas that may trigger cases of upper respiratory problems and stress?	✓		Construction activities will potentially increase pollutant concentration, such as particulate matter, in ambient air. However, this can be mitigated through the implementation of community and occupational health and safety measures suggested in the EMP.
▪ hazardous driving conditions where construction interferes with pre-existing roads?	✓		Construction activities may pose hazardous driving conditions at the sites. However, the implementation of effective traffic management as indicated in the EMPs will mitigate this impact.
▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as STI's and HIV/AIDS) from workers to local populations?	✓		Construction activities may result to poor sanitation and improper solid waste handling and disposal. However, this can be mitigated through the implementation of related measures in suggested the EMP, including awareness campaigns on communicable diseases such as COVID-19 and sexually transmitted diseases.
▪ creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?	✓		The EMP provides measures to avoid proliferation of disease vectors, both the work sites and worker camps.
▪ accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials?		✓	Not anticipated. These are urban roads, and will mostly facilitate movement of residents, and not anticipated to increase vehicular traffic because of road improvement.
▪ increased noise and air pollution resulting from traffic volume?	✓		Construction activities will elevate noise levels and air pollution due to traffic. However, the traffic management as per EMP will provide measures to avoid traffic congestion at subproject sites.
▪ increased risk of water pollution from oil, grease and fuel spills, and other materials from vehicles using the road?	✓		This may occur during the construction phase. Measures are provided in the EMP to ensure that risks of water pollution from spills is avoided.
▪ social conflicts if workers from other regions or countries are hired?		✓	Not anticipated. Labor requirements will be sourced mostly locally.
▪ large population influx during subproject construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	Not anticipated. Labor requirements will be sourced mostly locally. The roads are existing infrastructures that will only be rehabilitated, and no population influx due to the operation of these infrastructures is expected.
▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?	✓		Use of explosives not anticipated. Use of fuel and construction chemicals will be minimal, and transport, storage and application will follow the procedures specified in respective Material Safety Data Sheet (MSDS).

Screening Questions	Yes	No	Remarks
▪ community safety risks due to both accidental and natural causes, especially where the structural elements or components of the subproject are accessible to members of the affected community or where their failure could result in injury to the community throughout subproject construction, operation and decommissioning.	✓		Construction activities will pose risks to community health and safety. However, this can be mitigated through the implementation of related measures suggested in the EMP.

A Checklist for Preliminary Climate Risk Screening

Country/Project Title: BAN: Coastal Towns Climate Resilience Project (CTCRP)

CTCRP/construction/Improvement of Roads in Kalaroa Pourashava:

Subsector:

Division/Department:

Screening Questions		Score	Remarks[23]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	0	
	Would the project design (e.g., the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc.)?	1	Project needs to consider extreme rainfall events
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	1	Flooding frequency may aggravate under current Climate Change scenario
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design lifetime?	0	

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

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

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

Other comments:_____
_____

Prepared by: PMU

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

Appendix 2: Screening for Kalaroa roads as per road subproject selection criteria

Issues/ concerns	Subproject compliance status (C, NC, NA[24])	Remarks
Exclusion Criteria		
No Category A projects per ADB SPS will be considered for implementation under CTCRP. Subprojects that would directly affect environmentally protected areas, and highly valued cultural property and fall under Category A shall be strictly avoided or the subproject component(s) causing potential impacts relocated or suitable alternatives derived. CTCRP will not include and/or involve any activities listed in ADB's Prohibited Investment Activities List. The following criteria will be used for excluding sites which might have significant negative environmental impacts:	C	No A project or Prohibited Investment Activities done
(i) Projects located in ecologically sensitive areas such as protected areas (national parks, wildlife sanctuaries), notified wetlands or wetlands of significant value, critical habitats	C	No ecological sensitivity of this subproject
(ii) Project with potentially significant impacts on mangroves, wetlands, estuaries, buffer zones of protected areas etc.,	C	No such impacts are assessed for the subproject
(iii) Projects with potential for disrupting the life and property of the indigenous or tribal population	C	Not affecting indigenous people anyhow
(iv) Projects that need for significant amount of land acquisition and compensation	C	No land acquisition is required
(v) Projects located in world heritage sites, and/or within 1 km from the outer boundary of the world heritage area	C	Not located in world heritage sites, and/or within 1 km from the outer boundary of the world heritage area.
(vi) Projects located within monuments/sites protected by Department of Archeology	C	Not located within monument or protected site by Archelogy Department
(vii) Projects which may potentially lead to encroachment/damage of physical cultural resources with significant value and/or places recognized by government agencies (e.g., Department of Archeology), which may include places of worship, cultural heritage sites, graves/cemeteries, historical monuments, etc.	C	No such damage is foreseen.
Subproject Selection Criteria		
1. Overall selection guidelines - applicable to all subprojects		

[24] C= Complied, NC= Non-complied, NA= Not applicable

Issues/ concerns	Subproject compliance status (C, NC, NA[24])	Remarks
(i) Comply with all requirements of relevant national and local laws, rules, and guidelines, including obtaining environmental clearance certificate (ECC) from DOE for all subprojects classified as red / orange / green per Bangladesh Environmental Conservation Act, 1995	C	As per DOE ECC noy required and they issued letter for this.
(ii) Comply with all requirements of ADB SPS 2009 and follow procedures set in environmental assessment and review framework (EARF)	C	EARF is followed
(iii) Subproject design should reflect inputs from public consultation	C	Opinions from public consultations are listened.
(iv) Avoid locations in forests, mangrove areas, estuaries, buffer zones of protected areas. If unavoidable: - Approval from concerned authority -Alternative site analysis to justify site selection -confirm via detailed baseline and impact assessment that the project will not lead to significant impacts on respective areas -EMP to include measures to avoid, minimize, mitigate impacts, and monitoring actions to confirm mitigation	C	Complied with all this items
(v) Avoid locations within 100 m of protected monuments/sites protected by department of archeology, government of Bangladesh	C	No such locations are seen within subproject location.
(vi) Avoid locations within 1.5-2 km of UNESCO notified protected monuments / world heritage sites. If unavoidable - conduct heritage assessment study by engaging a competent expert, and integrate recommendations into design, construction, and operation -ensure that no damage / disruption to such places/monuments -obtain necessary clearance and permissions -EMP to include measures to avoid destruction / disturbance of such places -Provide “chance find” procedures in the EMP that include a pre-approved management and conservation approach for materials that may be discovered during project implementation.	C	UNESCO guidelines and EMP of the project will be followed as included with this IEE. There are no UNESCO heritage site near the subproject location.

Issues/ concerns	Subproject compliance status (C, NC, NA[24])	Remarks
(vii) Avoid tree-cutting where possible. Retain mature roadside trees which are important/valuable or historically significant. If any trees will have to be removed, plant two new trees for every one that is lost. (viii) Preference shall be given to planting indigenous or local tree species. For any tree to be cut, consider replacement of 2:1. See Appendix 4 of this EARF (Local Government Engineering Department of Bangladesh's Tree Plantation and Conservation and Tree Resources Distribution Activities Implementation Manual dated April 2003). ix) Ensure all planning and design interventions and decisions are made in consultation with local communities and include women. Reflect inputs from public consultation and disclosure for site selection. (x) Synchronize all road improvement and pipe laying works (to extent possible) to minimize disturbance and optimize use of resources (e.g., water pipes laid prior to road improvements). (xi) If subproject includes existing facilities to be rehabilitated or expanded and/or associated Facilities, conduct environmental audit and/or environmental due diligence per ADB SPS part of IEE.	C	No tree cutting will be required for this subproject
Specifically for roads		
(i) Include the provision of new or improved storm water drainage to remove the increased runoff caused by increasing the road surface area	C	Drainage issues/ proper flowing of runoff water are included in design.
(ii) Shall not lead to alteration of surface water hydrology of waterways crossed by roads; ensure appropriate cross drainage structures	C	No surface water hydrology of waterways will be altered.
(iii) Ensure that drainage system including cross drainage works are designed adequately considering the raised road levels that may create barrier effect	C	Proper raising of roads is consider with design.
(iv) Include tree planting preferably with indigenous or local tree species and duly considering road safety issues, alongside roads to provide a natural barrier to noise and visual impacts and include additional physical barriers where required	C	No tree cutting will be required but Tree plantation will be done as enhancement measure following this suggestion.

Appendix 3: Result of Integration Biodiversity Assessment Tool Screening

IBAT

Integrated Biodiversity Assessment Tool

PROXIMITY REPORT
KALAROA ROADS AND ROADSIDE DRAINS

Country: Bangladesh

Location: [22.9, 89]

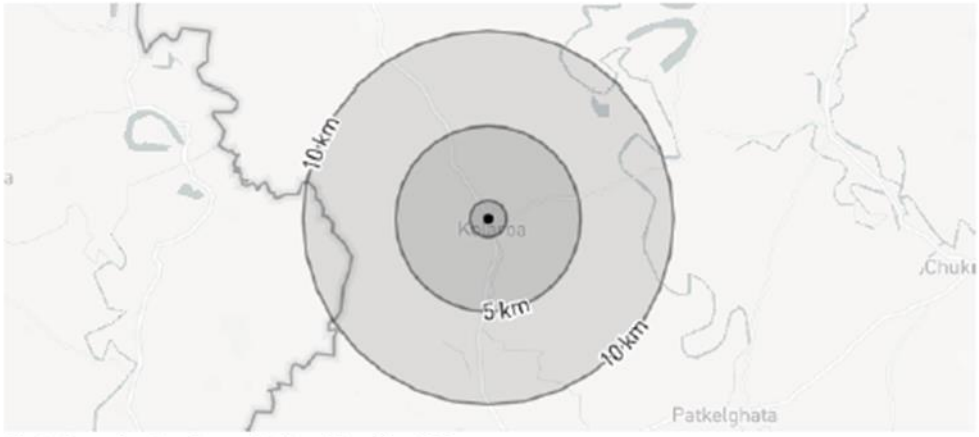
Date of analysis: 06 May 2024 (GMT)

Buffers applied: 1 km | 5 km | 10 km

IUCN Red List Biomes: Marine, Freshwater, Terrestrial

Overlaps with:

Protected Areas	0
Key Biodiversity Areas	0
IUCN Red List	47



Displaying project location and buffers: 1 km, 5 km, 10 km

Appendix 4: Spoil Management Plan

a. Spoil Types

Spoil is defined as any earthen material that is surplus to requirements or unsuitable for reuse in fill and embankments (such as unsuitable rock and soil material) or material that is contaminated. This plan has been prepared to facilitate the beneficial reuse of all material, ensuring that none is disposed off-site, except if unsuitable for reuse.

Fill is defined as earthen material excavated from one location along the corridor (for example, for a detention basin or cut excavations) and relocated elsewhere as compacted fill. Cut and fill material will generally not be stockpiled but will be removed from the excavation site and transported directly to the construction face for immediate reuse as compacted fill. Unsuitable excavated material will primarily be transported to identified locations within the road corridor for reuse or, if space is not available, will be stored temporarily off-site for reuse later.

Select material is defined as earthen material of comparatively higher quality, necessary for engineered backfill and incorporation in upper earthworks layers as part of the overall pavement design. Typically, on the HEA project this will include high strength sandstone and low/medium strength claystone, siltstones and sandstones. Wherever possible, select material will be sourced on site, and stockpiled as necessary until incorporated in the works. However, preliminary investigations suggest that a considerable proportion of the selected material required for the project will need to be sourced from off site.

Unsuitable (non-contaminated) material on the construction project is generally composed of silty, sandy, gravely and organic clays; sandy silts; clayey, silty and gravely sands and carbonaceous rock. This material will be reused on the project in the following ways:

1. widen embankments where possible;
2. land contouring;
3. landscaping mounds;
4. landscape treatments; and
5. noise mounds (if required).

Topsoil will be stripped and recovered for reuse in landscaping and revegetation. On average, the top 100mm of topsoil will be collected for future use.

b. Spoil strategy

The following provides an overview of the spoil management strategy for achieving the key spoil management objectives:

1. Minimize the amount of spoil generated: This requirement will be achieved by ensuring that the design minimizes the volume of spoil generated from excavation (a key driver for this is the need to minimize our construction footprint in order to reduce clearing). It should be noted that the minimization of spoil generation is a standard process in developing designs and planning construction activities as there are significant financial savings in minimizing spoil generation and management.

2. Classify the spoil generated using recognized guidelines and its geotechnical characteristics: There is no Waste Classification Guidelines to follow in Bangladesh. The geotechnical characteristics of spoil therefore are important to consider as it will determine the potential engineering uses of spoil.

3. Maximize the beneficial reuse of spoil on site based on its classification (both contamination category and geotechnical characteristics): Some of the spoil generated is expected to be able to be reused on site and will be suitable as general fill across the site. Some spoil may be unsuitable; however, this may be used for inclusion in capped landscaping mounds or features. Some spoil material, mainly due to its geotechnical characteristics will not be suitable for reuse.

4. Maximize the beneficial reuse of spoil off site based on its classification (both contamination category and geotechnical characteristics): Whilst it is the general intention to try and re-use all material on-site some of the spoil generated may be able to be reused off site on other projects. Further investigation into the needs of the numerous nearby mine sites will continue in this regard. Some spoil material due to its geotechnical characteristics will not be suitable for reuse.

5. Dispose of spoil off site based on its contamination classification: Spoil unable to be reused on site or off site would be disposed of at a facility that has the appropriate development approval and Environment Protection License to receive and store the relevant waste classification of the spoil.

6. Manage the excavation, storage, transport reuse and disposal of spoil to minimize impacts and meet other environmental requirements: This includes implementing mitigation measures to manage potential impacts on traffic and soil and water, dust generation and contamination of spoil (e.g. onsite - dust control, erosion and sedimentation controls, monitoring and validation for contamination and Potential Acid Sulphate Soils, offsite – tracking and monitor spoil/fill movements and quality (contamination), haulage routes, impacts on public safety and roads and public amenity, noise impacts and required compliance requirements (i.e. approvals and consents/licenses).

c. Spoils generating activities

Spoil generated by construction will primarily come from excavation works. The spoil is expected to vary in content with silty, sandy, gravely and organic clays; sandy silts; clayey, silty and gravely sands and carbonaceous rock.

The activities associated with the generation and management of spoil and fill materials are:

1. Clearing of vegetation;
2. Selection of material;
3. Clearing of topsoil;
4. Excavation of earthen material;
5. Blasting of earthen material (if required);
6. Transport of earthen material;
7. Storage/stockpiling of spoil, topsoil and mulch; and
8. Reuse of spoil, topsoil and mulch.

Appendix 5: Generic Traffic Management Plan (TMP)

A. Principles

One of the prime objectives of the Contractor's **TMP** is to ensure the safety of all the road users along the work zone, and to address the following issues:

1. the safety of pedestrians, bicyclists, and motorists travelling through the construction zone;
2. protection of work crews from hazards associated with moving traffic;
3. mitigation of the adverse impact on road capacity and delays to the road users;
4. maintenance of access to adjoining properties; and
5. Addressing issues that may delay the project.

B. Operating Policies for TMP

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.

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

Figure A1 to Figure A6 illustrates the operating policy for TMP for the construction of water pipes and the sewers along various types of roads.

C. Analyze the Impact Due to Street Closure

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

1. Approval from the ULB/CMC/Public Works Department (PWD) to use the local streets as detours;
2. consultation with businesses, community members, traffic police, PWD, etc, regarding the mitigation measures necessary at the detours where the road is diverted during the construction;
3. Determining of the maximum number of days allowed for road closure, and incorporation of such provisions into the contract documents;

4. Determining if additional traffic control or temporary improvements are needed along the detour route;
5. Considering how access will be provided to the worksite;
6. Contacting emergency service, school officials, and transit authorities to determine if there are impacts to their operations; and
7. 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.

If full road-closure of certain roads within the area is not possible, due to inadequate capacity of the detour arrangements, the full closure can be restricted to weekends with the construction commencing on Thursday night and ending on Sunday morning prior to the morning peak period. The traffic management guidelines are as follows:

1. Review construction schedule and methods;
2. Identify initial traffic recirculation and control policy;
3. Identify routes for traffic diversions;
4. Analyze adverse impact & mitigation at the detours;
5. Begin community consultation for consensus;
6. Finalize or determine alternate detours;
7. Identify temporary parking (on and off -street);
8. Discuss with CMC, owner, community for use;
9. Coordinate with the Traffic Police to enforce traffic and diversions;
10. Install traffic control devices (traffic cones, signs, lightings, etc);
11. Conduct campaigns, publicity, and notify public about street closure; and
12. Develop a mechanism to address public grievances regarding disruptors of traffic, utilities, etc.

D. Public Awareness and Notifications

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

1. Traffic control devices in place at the work zones (signs, traffic cones, barriers, etc.);
2. defensive driving behavior along the work zones; and
3. Reduced speeds enforced at the work zones and traffic diversions.

It may be necessary to conduct the awareness programs/campaigns on road safety during construction. 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 PIU, and the contractor's site office. The text of the brochure should be concise to be effective, with a lot of graphics. It will serve the following purpose:

1. Explain why the brochure was prepared, along with a brief description of the project;
2. Advise the public to expect the unexpected;
3. Educate the public about the various traffic control devices and safety measures adopted at the work zones;
4. Educate the public about the safe road user behavior to emulate at the work zones;
5. 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
6. Indicate the office hours of relevant offices.

E. Install Traffic Control Devices at the Work Zones and Traffic Diversion Routes

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:

1. Signs
2. Pavement Markings
3. Channelizing Devices
4. Arrow Panels
5. Warning Lights

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”).

Figure A1to Figure A6illustrate typical set-ups for installing traffic control devices at the work zone of the area, depending on the location of work on the road way, and road geometrics. The Contractor would need to consider such Traffic Management situations for these typical arrangements and others that may occur during road construction works. The Contractor would need to coordinate closely with the road management and road police authorities and submit their Traffic Management proposals, with not less than a month’s prior notice, to the PIU for obtaining prior approval, before any closure of roads are considered.

1. Work on Shoulder or Parking Area;
2. Work with Land Closure: Low Traffic;

3. Work on Lane Closure With Yield Sign on Two Lane: Low Volume;
4. Work on Lane Closure With Single Flag Operator on Two Lane: Low Volume;
5. Lane Closure: Two Flag Operators on Two Lane Road; and
6. Street Closure with Detour.

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.

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.

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.

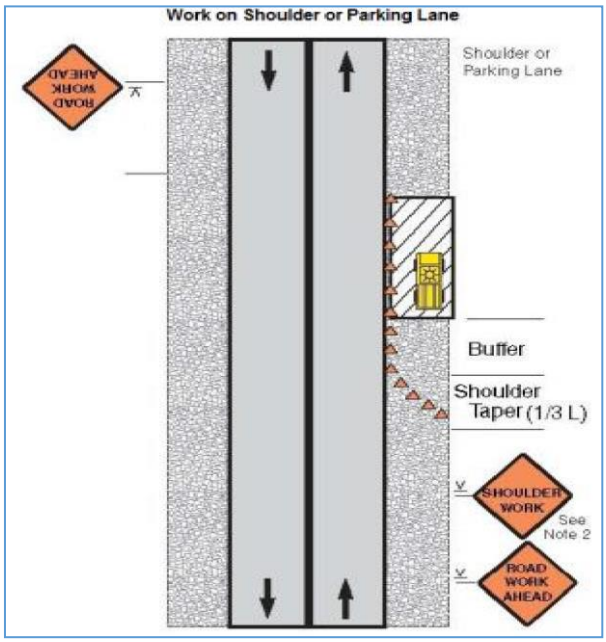


Figure A1 Work with shoulder or Parking area

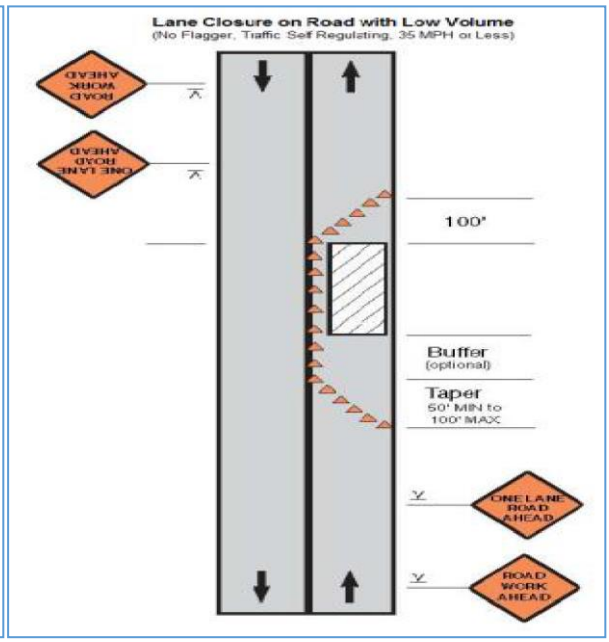


Figure A2Work with land closure: low traffic

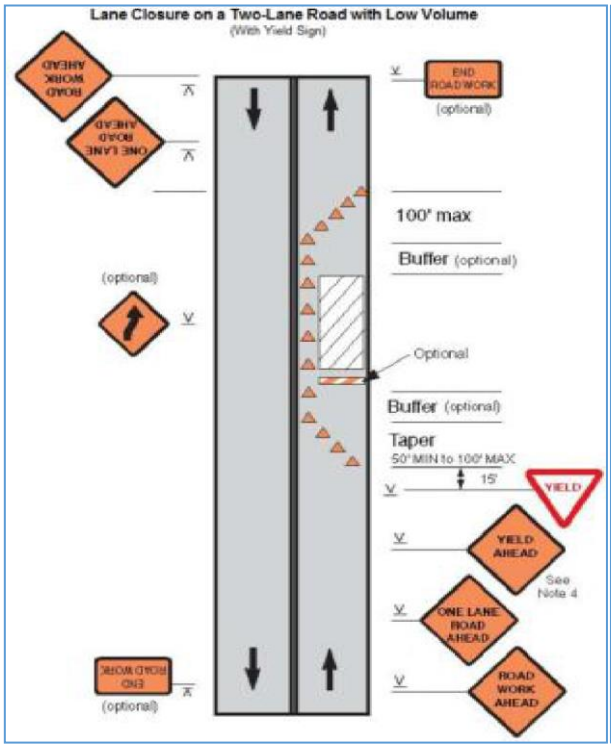


Figure A3 Work on Lane Closure with Yield Sign on Two Lane: Low

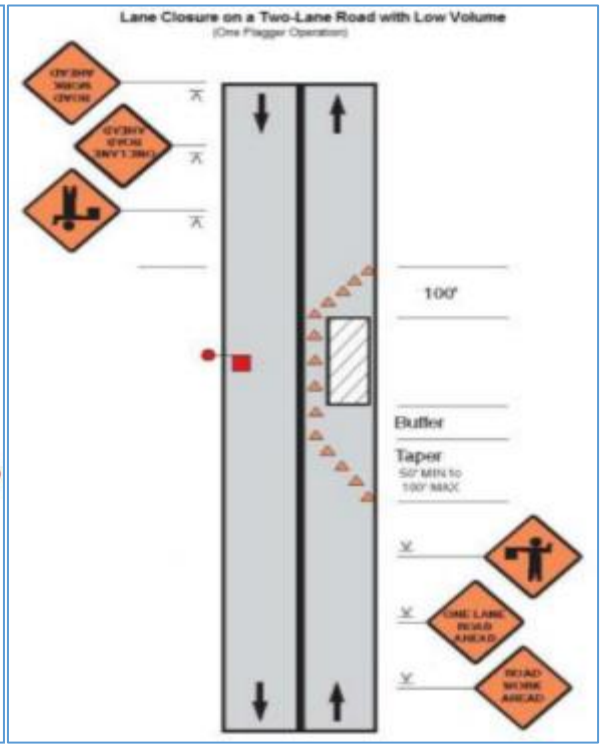


Figure A4 Work on Lane Closure With Single Flag Operator on Two

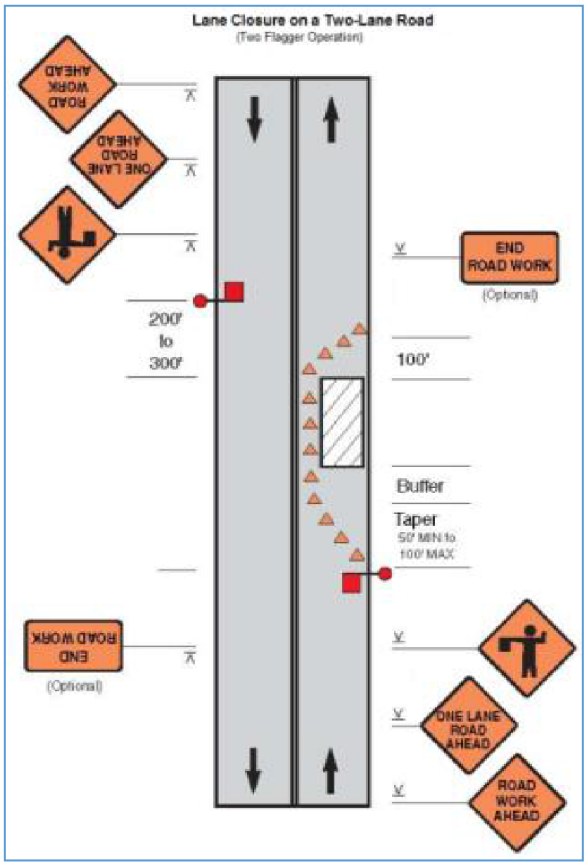


Figure A5 Lane Closure: Two Flag Operators on Two Lane Road

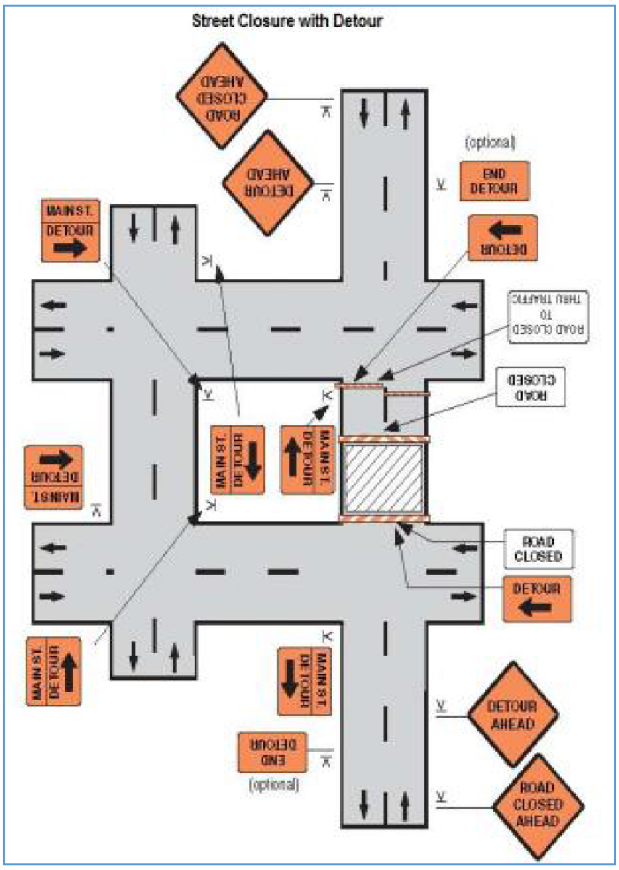
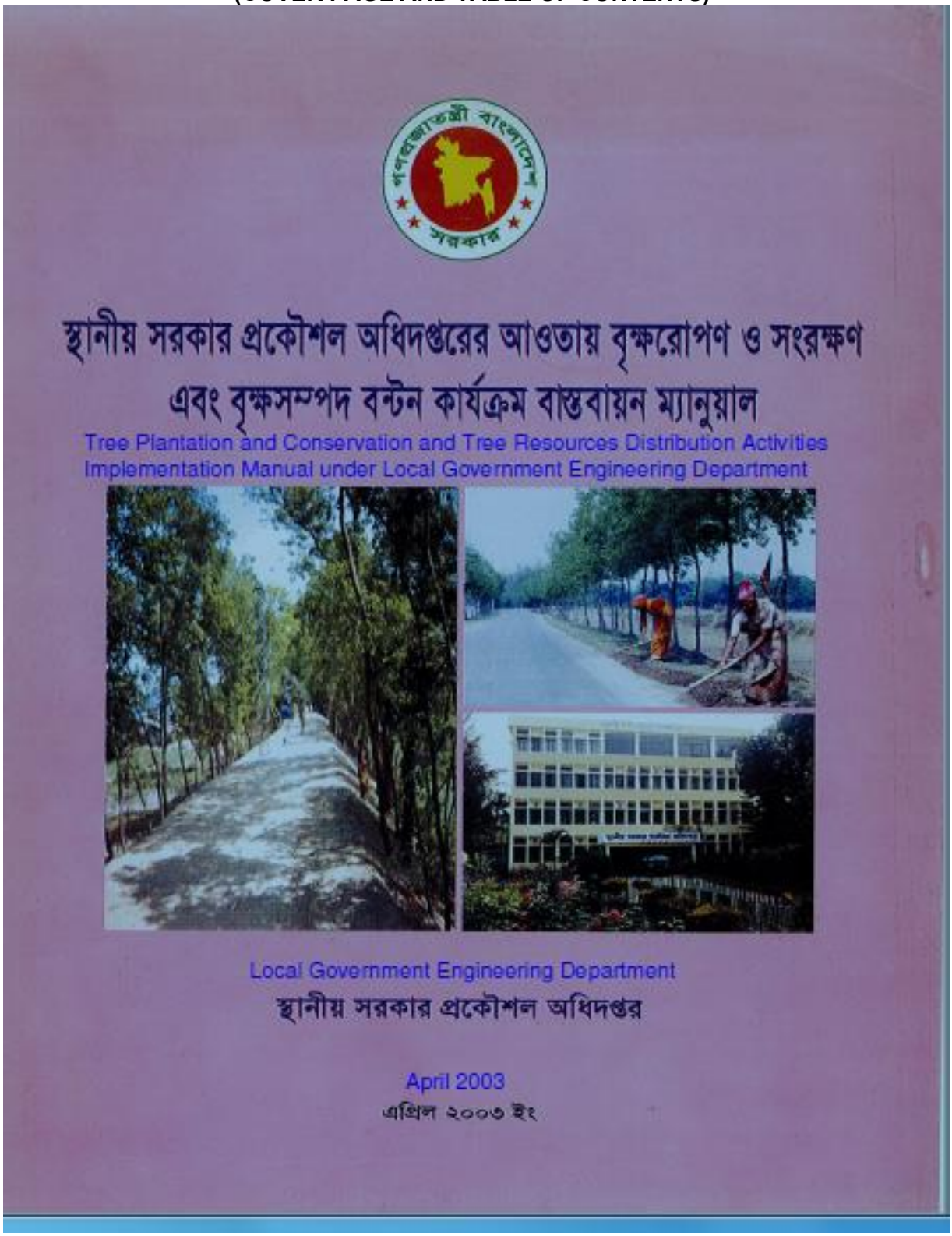


Figure A6Street Closure with Detour

Appendix 6: Local Government Engineering Division Tree Plantation Program Manual (COVER PAGE AND TABLE OF CONTENTS)



Note: Copy of the full manual is available upon request at the LGED or PMU Office.

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

Table of Contents

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

Tree plantation and management plan

Steps	Management initiatives	Records	Reporting	Responsibility
Preparation of the Plantation Area	The open areas near the subproject site will be identified and selected. During the selection of the block plantation sites, the availability of the water in nearby areas will be taken into consideration as the survival of the tree saplings depends on the availability of water or watering facilities.	Demark tree plantation area, record of drawing for proposed tree plantation	Contractor	**Prime Responsibility:** Contractor **Supervising responsibility:** CSE/PIU/PMSC
Preparation of Pits and Sapling Transplantation	The location of each plantation pit will be marked according to the design and distance of the plantation. The size of the plantation pit varies depending upon the species of the plants, height of the saplings. Selection of native fruit bearing plants will be chosen for plantation. Trees will be planted on the alternate rows in a straight line for the prevention of the horizontal dispersion of the pollutants. Hence the pit will be dig accordingly. During the time of placing the tree saplings the roots will be freed from plastic or any type of cover which is normally use for the transplantation of the tree saplings from the seed bed to the tree plantation pits. This exercise will help the root hairs to reach the soil.	Demark tree plantation area, record of drawing for proposed tree plantation	Do	Do
Spacing	For the survivability of the tree species planted spacing between the saplings should be maintained. Spacing which are usually used for teak planting are 2 x 2 m2, 3 x 1m2, 3 x 3 m2, 4 x 2 m2 and 4 x 4 m2, depending on site condition. For the construction site, wider spacing for native fruit bearing plants are suggested for large canopy and ample sunlight.	Record of Tree plantation	Do	Do
Time of Plantation	As per the normal practices followed under the silvicultural guidelines plantation of the tree sapling to be done only after the first shower during the rainy season. The best time for plantation is after 15 days from the day of first shower during rainy season.	Do	Do	Do
Protection of Tree saplings	Circular tree guard should be placed after the plantation of the saplings for the protection of these young plants from the ravages of cattle, sheep and goat and other animals. If tree saplings died or damage occur after placing the circular tree guard, timely	Do	Do	Do

	replacements of damaged plant and thereafter care is important.			
Selection of Tree Species	The contractor will choose the local and Vulnerable, endemic species.	Do	Do	Do
Maintenance (include thinning) : Weeding	Low pruning at 6 months; Thinning: Thinning will start after the stand is 3-4 years old and repeated every 4 years until the stand is 15years old. Between 15-25 years old, thinning should be conducted every 5 years and after25 years old, thinning will be done after every 10 years. When the canopy closes, at about 6years, 30-40% of the stems will be thinned to selectively remove suppressed, diseased and badly formed trees.	Record of Survivability rate	Do	Do

Appendix 7: Summary of public consultation

As part of the DDR, the consultant conducted four focus group discussion with selected group where 87 local people (Male-76 and Female-11). The objective of the FGD's was to further appraise the stakeholders about the current progress of the subproject and to reiterate environmental and social impacts of the proposed subproject and safeguards to mitigate the same. Comments or questions raised by the group were discussed until they were satisfied with the level of information provided.

Key issues discussed were similar to those already voiced during the community consultation meetings and included:

- Community benefits realized as a result of the road schemes;
- Resettlement and social issues and mitigation measures according to Resettlement Framework prepared and approved by ADB and government Bangladesh for this project;
- Generation of construction spoils like debris, gravel, sand, brick cause problem in environment;
- Participation of local community during the construction phase;
- Roles and responsibilities of different stakeholders for realizing desired outcome;
- Potential social and economic impacts of the proposed road construction/ improvement;
- Awareness of the local community about the proposed road subproject;
- Opinion of the local people about its need;
- Disseminate information about project implementation.
- Community support and participation;
- Construction and maintenance of the roads;
- Participation of local people for construction and maintenance
- Benefits from these infrastructures establishments by the community Workers Health & Safety
- Emergency response

Summary of discussion:
Condition of the road network is poor, broken, narrow, low-lying and flood prone, and inconvenient for smooth traffic flow. Local people expressed their deep interest for development of the selected road under the Project. The people appreciated ADB's Resettlement Policy for eligibility criteria, entitlement for compensation and resettlement assistance, as well as the provisions of the approved Resettlement Framework for the project.

Proper improvement/development of the road infrastructures for smooth transport network is their critical needs and also long cherished desire. That is why; local people expressed their deepest interest for development of the selected roads under the sub-project.

The road schemes will improve socio-economic-physical conditions of the local people through creating more opportunity of income, employment, environmental improvement, smooth transportation system as well as exploiting local resources for boosting local productions.

Concern was raised about jobs. Priority for jobs should also be given to those who will have any negative impact due to the project. Both men and women shall be considered with equal opportunity
It was communicated by the project consultants to the participants that any damages caused to the secondary structures eg. boundary wall, stairs, ramps will be reconstructed and repaired by the contractors.

During construction, construction spoils including debris, gravel, sand, bricks and cement shall be disposed of properly. Vigilance against undue water logging and/or water pooling within the area for the purpose, or as a result of, the construction methods, shall be made by the Contractor in avoiding places of mosquito breeding.

Regular removal of trash and general waste generated during the course of the construction and operational stage.

Photos and Attached Attendance Sheet of FGDs

Picture : Consultative meeting with local people at Palpara Morh of ward # 08

Picture : Consultative meeting with local people at Shankarer Morh of ward # 02

Picture : Consultative meeting with local people at Murarikati of ward # 08

Picture : Consultative meeting with local people at Shuvangkarkati Morh of ward # 02

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Coastal Towns Climate Resilience Project

Consultative meeting with local people

Attendance Sheet

Date & Time: 15/05/2024; 5:00pm; Place: Palbari mor, Ward#08

Sl #	Name of Participant	Occupation	Gender	Mobile Number	Signature
01	মো: হামিদ	ব্যবসা	m	01705540928	হামিদ
02	মো: বাবুল হোসেন	ব্যবসা	m	01315976501	বাবু
03	মীর মিঠু হোসেন	ব্যবসা	m	01703580546	মিঠু
04	অজয় কুমার	শ্রমিক	m	01727965885	অজয় কুমার দাস
05	আহেদ আলী	শ্রমিক	m	01926307112	আহেদ আলী
06	ফজলু	শ্রমিক	m	01753539330	ফজলু
07	রাব্বি	রাজ মিস্ত্রী	m	01931648980	রাব্বি
08	হুমায়ুন কবির	শ্রমিক	m	01795169763	হুমায়ুন কবির
09	তানজিরুল ইসলাম	শ্রমিক	m	01709838491	তানজিরুল
10	শেখ সাহিদ হাসান	ব্যবসা	m	0130774423XX	শেখ সাহিদ হাসান
11	মো: মনিরুল ইসলাম	ব্যবসা	M	01756020389	মো: মনিরুল ইসলাম
12	~~মো:~~ ডানিয়েল	শ্রমিক	m	01742102368	ডানিয়েল
13	গোলাম আলী	ব্যবসা	m	01785679727	গোলাম আলী
14	মফিজুল	ভ্যান চালক	m	01906377510	মফিজুল
15	মো: মোহাসিন আলী	ভ্যান চালক	m	01307742410	মোহাসিন আলী
16	ওবায়দুর	কৃষি	m	01947824110	[illegible]
17	আমজাদ	ব্যবসা	m	০১৯৬৮৮২৫৯২৩	আমজাদ
18	কাজী ও বিবায় রহমান	কৃষি	m	01518322538	[illegible]
19	কবি আবদুর রাজ্জাক	কবি	m	01714573982.	[illegible]
20	বাদল	ব্যবসা	m	01715212313	বাদল

(1)

Sl #	Name of Participant	Occupation	Gender	Mobile Number	Signature
21	আব্দুল হোসেন	ব্যাগ শিল্প	m	01990861289	আব্দুল
22	মোঃ হাবিবুর	ফ্রি ব্যবসা	m	01928111571[illegible]	[illegible]
23	হাবিব	আর্কিটেক্ট	m	01731437125	হাবিব
24	[illegible]	চাকরি	m	01723912712	[illegible]
25	মোঃ বিপ্লব হোসেন	ভ্যালে চাঁদর	m	01913937975	বিপ্লব
26	মোঃ জাহিদুল ইসলাম	ব্যবসা	m	01784135607	জাহিদুল
27					
28					
29					
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37					
38					
39					
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41					
42					

(2)

Coastal Towns Climate Resilient Project

Package Number:

Attendance Sheet

Consultative meeting with local people

Name of Pourashava: Kalaroa Pourashava Ward No.: ৭

Name of Place: shankarer mor, Tulshidanga

Date & Time: 14/05/24 ; 6:30pm

Sl #	Name of Participant	Gender	Occupation	Mobile number	Signature
01	তাঃ তালিদ	m	চাকরি	01752311715	
02	[illegible]	m	চাকরি	01860297367	
03	মোঃ জামাত তালুকদার	m	কনস্ট্রাক্টর	01913216261	
04	সুবোধ নাথ	m	ব্যবসা	01728905757	সুবোধের নাথ
04	তাহাজ্জত	m	ব্যবসা	01400223815	তাহাজ্জত
05	[illegible]	m	ছাত্র	01762963139	[illegible]
05	[illegible]	m	রঙ মিস্ত্রী	01927034454	[illegible]
06	[illegible]	F	গৃহিণী	01728905757	[illegible]
07	[illegible]	F	গৃহিণী		সাহিদা
08	[illegible]	F	গৃহিণী	01798265678	[illegible]
09	[illegible]	F	গৃহিণী	01718002701	[illegible]
10	[illegible]	F	গৃহিণী	01947755808	[illegible]
11	মোঃ সাহিদুল ইসলাম	M	চাকুরী	01712700864	[illegible]
12	[illegible]	F	গৃহিণী	—	[illegible]
13	[illegible]	M	ব্যবসা	01911-32 8022.	[illegible]
14					
15					

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Coastal Towns Climate Resilience Project

consultative meeting with local people

Attendance Sheet

Date & Time: 15/05/2024; 6:00pm; Place: Murarikati, Ward #08

Sl #	Name of Participant	Occupation	Gender	Mobile Number	Signature
01	মোঃ মহিদুল ইসলাম	কৃষি	m	–	মহিদুল
02	শেখ রনি	কৃষি	m	01799706775	SkRony
03	আক্কাস আলী	কৃষি	m	01967586033	আক্কাস আলী
04	আহমদ	শ্রমিক	m	–	আহমাদ
05	মো: [illegible]	রং মিস্ত্রী	m	01986673118	[illegible]
06	[illegible]	কৃষি	m	–	[illegible]
07	[illegible] আলী	কৃষি	m	01873433105	[illegible]
08	কামরুল	শ্রমিক	m	–	কামরুল
09	হাসান শেখ	কৃষি	m	01965402237	হাসান
10	শেখ বিপ্লব	ভ্যান চালক	m	01855224647	বিপ্লব
11	লতিফা	গৃহিনী	F	–	লাতিফা
12	ফাতেমা	গৃহিনী	F	–	ফাতেমা
13	জবেদা	গৃহিনী	F	–	জাবেদ
14	[illegible]	ভ্যান চালক	m	01721349204	[illegible]
15	শেখ রাব্বি হাসান	ছাত্র	M	01767-535358	Rabby
16	শেখ [illegible]	ভ্যান চালক	m	01720428913	[illegible]
17	মো: [illegible] আলী	কৃষি	m	0166644560	[illegible]
18	[illegible]	ব্যবসা	m	01728903859	[illegible]
19	[illegible] রহমান	ব্যবসা	m	01729380880	[illegible]
20	শেখ [illegible] ইসলাম	ব্যবসা	M	[illegible]	[illegible]

(1)

Sl #	Name of Participant	Occupation	Gender	Mobile Number	Signature
21	[illegible]	ছাত্র	m	01886769822	[illegible]
22	[illegible]	কৃষি	m	01306748436	[illegible]
23	[illegible]	কৃষি	m	01716134331	[illegible]
24	[illegible]	ব্যবসা	m	01785931935	[illegible]
25	[illegible]	[illegible]	m	01883957018	[illegible]
26					
27					
28					
29					
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35					
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Coastal Town's Climate Resilient Project

Package Number:

Attendance Sheet

Consultative meeting with local people

Name of Pourashava: Kalaroa Pourashava Ward No.: 02

Name of Place: Shuvangkar kate mor

Date & Time: 14/05/24 ; 5:45pm

Sl #	Name of Participant	Gender	Occupation	Mobile number	Signature
01	MD Abdus Sattar	m	Business	01743-97283	
02		m		01956 19424	
03		m		01943519105	
04		m.		01758 33318	
05		m.		01716822020	
06		m			
07		m			
08		m			
09		m		01966-334448	
10		m		01795265201	
11		m		01767-178899	
12		m		01749719814	
13		m			
14		m		01314867231	
15		m			
16.		m.		01320476193	
17.		m		01755937052	
18.		m		01937742883	
19.		m.		01922870260	
		m.		01740653556	

(1)

Appendix 8: Sample Grievance Redress Form
(To be available in English or other local languages)

The LGED welcomes complaints, suggestions, queries, and comments regarding the project implementation. We encourage any person or group with a grievance to provide their name and contact information to get in touch with you for clarification and feedback.

Should you choose to include your 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 details of the grievance (who, what, where, and how): _____ _____ ***Note: You may attach a document, letter, or note in the grievance form.**	
How do you want us to reach you for feedback or updates on your comment/grievance?	

OFFICIAL USE ONLY

Registered by: (Name of official registering grievance)	
If – then mode: 1. Note/Letter 2. E-mail 3. Verbal/Telephonic	
Reviewed by: (Name, Signature, Position)	
Action Taken:(Date, Venue of Meeting, Other details)	
Whether Action Taken Disclosed:	**4. Yes** **5. No**
Means of Disclosure:	

GRIEVANCES RECORD AND ACTION TAKEN

Sr. No.	**Date**	**Name and Contact No. of Complainant**	**Type of Complaint**	**Place**	**Status of Redress**	**Remarks**

Appendix 9: Sample Daily Inspection/Monitoring Checklist of Contractor

Monitoring and Reporting Template
Environmental Health and Safety Monitoring

A. Environmental Health and Safety Checklist

Sl. no.	Item	Exist in the worksite?		Recommendation And/ or Remarks	Time frame to comply
		Yes □	No □		
1	Site readiness (e.g. is worksite fenced and can be distinguished from general establishment? Is an EHS professional at site? Has he/she been fulltime professional? Has he/she been present at site every day?)				
2	Site access (e.g., is site access road wide and easily accessible?)				
3	Signboard with safety warnings (e.g. with general EHS safety signboards, are COVID 19 response signboards visible at every corner of worksite?)				
4	Lighting (e.g. is every corner of the worksite is well lit?)				
5	Appropriate PPEs (Helmet, Safety Shoe, Vest, Ear plug, Musk etc.) e.g. Is every person in site is wearing appropriate PPEs?				
6	Fall protection measures (e.g. is the fall protection measures at worksite appropriate and adequate?				
7	Fire extinguishers (e.g. are they at site? How many? Are they placed at vulnerable/most accessible places?)				
8	Housekeeping (e.g., are all workers health records kept? Is the EMP and EHS manual at site? Has the morning briefing on EHS conducted? Is there any vehicle record/material register/attendance register/complain register kept?)				
9	Garbage bins (e.g., are there garbage bins at site? Are the numbers adequate? Is waste thrown to bins? Are the bins well places?				
10	Drinking water supply (e.g. safe drinking water for worksite been supplied? Is drinking water adequate?				
11	Sanitation facilities (e.g. is there separate male and female toilets established? Are they adequate? Hand wash materials and water being provided at toilets? Are those toilets sanitary?				
12	Dust protection measures (e.g. is mask provided for worksite personnel? Is water sprayed frequently as needed to suppress dust? Are sand class materials covered with plastic sheets?				
13	Noise barrier and reduction equipment (e.g. how much noise is generated by site? Does it exceed maximum human exposure limit? Are workers provided with noise reduction gears such as ear mufflers?)				
14	Shelter (e.g. is there a site office or shelter good enough to take shelter during rain or storm event?)				
15	First aid box (e.g. is there a first aid box at site? Are the contents of the first aid box adequate for primary treatment? Is the first aid box handled by at EHS/medical professional				
16	Toolbox meetings (e.g. are toolbox meeting regularly arranged? Are records kept?)				
17	Others (many other checklists can be formulated by the EHS professional on board)				

COVID -19 protocols on top of usual EHS checklist (this applied to campsite also)					
18	COVID-19 posters/signboards (e.g., are COVID-19 awareness/protocol posters are showing all visible corners of the site?)				
19	Entrance protocol (e.g., Is the COVID-19 worksite entrance protocol been followed as stipulated in the COVID -19 response guidance? Are adequate soaps, water has been kept at site entry? Are workers at entrance que using mask, hand gloves and hard shoes? Are disinfectant spray kept at site entry to disinfect underneath the boots of entering persons?)				
20	Vehicle entry protocol (e.g. has the vehicle disinfection protocol has been initiated?)				
21	Social distancing (e.g. are the workers maintaining social distancing all the time?)				
22	Sharing tools/machineries (e.g. are the tools and machineries are wiped to disinfect before sharing/working?				
23	Disinfecting work area (e.g. is the worksite/ common surfaces, toilets etc. are disinfected before worksite opened in the morning? Has record being kept? Has the worksite been disinfected yesterday after closing for the day?)				
24	Restriction on worksite entry and exit (e.g. has workers being discouraged to travel frequently out of worksite or entering? Has records being kept?)				
25	Stock of disinfectant (e.g. is the stock of disinfectants, soap, PPEs are adequate at worksite?)				

*Attach photos
**Enter additional criteria as required for site specific measures

Reported by (ESC)	Checked by (TL)	Approved by (EA/IA)
Name Designation Signature Date	Name Designation Signature Date	Name Designation Signature Date
Received and agreed to comply by the representative of the contractor	**Name** **Designation** **Signature** **Date**	

B. Accident/ Incident Investigation Report

Class of Incident		Reported
☐ Injure	☐ Property/ Plant Damage	Yes ☐ No ☐ Details:
☐ Near Miss	☐ Environmental	Further Action Required
		☐ Report to Authorities ☐ Other

Details of Incident			
Date of Incident		Time of Incident	am ☐ pm ☐
Witness Name		Witness Contact	
Nature of Incident			
Location of Incident			
Description of Incident			
Details of damage to equipment/property			

Injured Person/s (if applicable)			
Name			
Address Date of Birth Occupation Referred/transferred to		Employer	

Recommended Preventive Action	
Details	

Completed by			
Name		Position	
Signature		Date	

C. Safety patrol/inspection report form

Date						
Inspector						
No	**Location**	**Comment/instruction**	**Photo**	**Corrective action**	**Deadline**	**Responsible person**

Reported by (ESC)	Checked by (TL)	Approved by (EA/IA)
Name Designation Signature Date	Name Designation Signature Date	Name Designation Signature Date
Received and agreed to comply by the representative of the contractor	**Name** **Designation** **Signature** **Date**	

Appendix 10: Sample Inspection Checklist for PMU/Divisional/Regional Office/PIU

SAMPLE INSPECTION CHECKLIST

(Note**:** This checklist is indicative which can be further enhanced depending on the project circumstances.)

[NAME OF ADB PROJECT]
SITE INSPECTION CHECKLIST

Subproject / Location:_____ Date: _____

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 on site?				
2.	The Facilities	Yes	No	NA	
	a. Are there a medical and first aid kits on site?				
	b. Are emergency contact details available on-site?				
	c. Are there PPEs available? What are they?				
	d. Are the PPEs in good condition?				
	e. Are there firefighting equipment on site?				
	f. Are there separate sanitary facilities for male and female workers?				
	g. Is drinking water supply available for workers?				
	h. Is there a rest area for workers?				
	i. Are storage areas for chemicals available and with protection? in safe locations?				
3.	Occupational Health and Safety	Yes	No	NA	
	a. Are the PPEs being used by workers?				
	b. Are excavation trenches provided with shores or protection from landslide?				
	c. Is breaktime for workers provided?				
	d. How many for each type of collection vehicle is in current use?				
4.	Community Safety	Yes	No	NA	
	a) Are excavation areas provided with barricades around them?				
	b) Are safety signages posted around the sites?				
	c) Are temporary and safe walkways for pedestrians available near work sites?				
	d) Is there a record of treated wastewater quality testing/measurement?				
5.	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 storm drains?				
	c) Is any wastewater being treated prior to discharge?				
	d) Are measures in place to avoid siltation of nearby drainage or receiving bodies of water?				
	e) Are silt traps or sedimentation ponds installed for surface runoff regularly cleaned and freed of silts or sediments?				
7.	Dust Control	Yes	No	NA	
	a. Is the construction site watered to minimize generation of dust?				
	b. Are roads within and around the construction sites sprayed with water on regular intervals?				
	c. Is there a speed control for vehicles at construction sites?				
	d. Are stockpiles of sand, cement and other construction materials covered to avoid being airborne?				
	e. Are construction vehicles carrying soils and other spoils covered?				
	f. Are generators provided with air pollution control devices?				
	g. Are all vehicles regularly maintained to minimize emission of black smoke? Do they have valid permits?				
8.	Noise Control	Yes	No	NA	
	a) Is the work only taking place between 7 am and 7 pm, week days?				
	b) Do generators operate with doors closed or provided with sound barrier around them?				
	c) Is idle equipment turned off or throttled down?				
	d) Are there noise mitigation measures adopted at construction sites?				
	e) Are neighboring residents notified in advance of any noisy activities expected at construction sites?				
9.	Traffic Management	Yes	No	NA	
	a) Are traffic signages available around the construction sites and nearby roads?				
	b) Are re-routing signages sufficient to guide motorists?				

MONITORING/INSPECTION QUESTIONS		FINDINGS			COMMENTS / CLARIFICATIONS
	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 11: Semi-annual Environmental Monitoring Report Template

1. Introduction

- Overall project description and objectives
- Environmental category as per ADB Safeguard Policy Statement, 2009

2. Project Safeguards Team

- Identify the role/s of Safeguards Team including schedule of on-site verification of reports submitted by consultants and contractors.

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

3. Overall project and subproject/package progress and status

- Indicate (i) status of design – preliminary design or final design, (ii) status of implementation - under bidding, contract awarded but no works yet, contract awarded with works, civil works completed, or O&M

Package Number	Components/List of Works	Type of Contract *(specify if DBO, DB or civil works)*	Status of Implementation *(specify if Preliminary Design, Detailed Design, On-going Construction, Completed Works, or O&M phase)*[1]	Contract Status *(specify if under bidding or contract awarded)*	If On-going Construction	
					%Physical Progress	Expected Completion Date

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

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

Package Name	IEE Cleared by ADB *(provide date)*	Contractor	HSE Nodal Person	Email Address	Contact Number

4. STATUS OF IEE PER SUBPROJECT/PACKAGE

- Provide status of updated/final IEE[2] per package.

Package-wise Implementation Status

Package Number	Final IEE based on Detailed Design				Site-specific EMP (or Construction EMP) approved by Project Director?[3] *(Yes/No)*	Remarks
	Not yet due *(detailed design not yet completed)*	Submitted to ADB *(provide date of submission)*	Disclosed on project website *(provide link)*	Final IEE provided to Contractor/s *(Yes/No)*		

5. Compliance status with National/State/Local statutory environmental requirements[4]

Package No.	Statutory Environmental Requirements[5]	Status of Compliance *(Specify if obtained, submitted and awaiting approval, application not yet submitted)*	Validity Date(s) *(if already obtained)*	Action Required	Specific Conditions that will require environmental monitoring[6]

6. Compliance status with environmental loan covenants

Schedule No. and Item *(see Project Loan Agreement and list provisions relevant to environmental safeguards, core labor standards and occupational health and safety)*	Covenant	Status of Compliance	Action Required

7. Compliance status with the environmental management plan (refer to EMP tables in approved IEE/s)

- Confirm in IEE/s if contractors are required to submit site-specific EMP (SEMP)/construction EMPs (CEMP). If not, describe the methodology of monitoring each package under implementation.

- Provide over-all compliance of the contractors with SEMP/CEMP. This should be supported by contractors' monthly monitoring reports to PIU(s) and/or verification reports of PIU(s) or project consultants. Include as appendix supporting documents such as **signed** monthly environmental site inspection reports prepared by consultants and/or contractors.

Overall Compliance with SEMP/CEMP

Package No.	Status of SEMP/CEMP Implementation *(Excellent/ Satisfactory/ Partially Satisfactory/ Below Satisfactory)*	Action Proposed and Additional Measures Required

- Provide description based on site observations and records:
  - Confirm if any dust was noted to escape the site boundaries and identify dust suppression techniques followed for site/s.
  - Identify muddy water was escaping site boundaries or muddy tracks were seen on adjacent roads.
  - Identify type of erosion and sediment control measures installed on site/s, condition of erosion and sediment control measures including if these were intact following heavy rain;
  - Identify designated areas for concrete works, chemical storage, construction materials, and refueling. Attach photographs of each area.
  - Confirm spill kits on site and site procedure for handling emergencies.
  - Identify any chemical stored on site and provide information on storage condition. Attach photograph.
  - Describe management of stockpiles in each work site (construction materials, excavated soils, spoils, etc.). Provide photographs.
  - Describe management of solid and liquid wastes on-site (quantity generated, transport, storage and disposal). Provide photographs.
  - Provide information on barricades, signages, and on-site boards. Provide photographs.
  - Provide information on workers labor camp(s). Provide photographs.
  - Provide information on work-related accidents and incidents. Describe actions implemented.
  - Provide information on if there are any activities being under taken out of working hours and how that is being managed.

- Provide list of trainings on environmental safeguards, core labor standards, and OSH conducted during the reporting period. Include ADB-organized workshop, trainings, seminars, etc)

Trainings, Workshops and Seminars Conducted

Date	Topic	Conducted by	No. of Participants (Total)	No. of Participants (Female)	Remarks

- Provide the monitoring results as per the parameters outlined in the approved EMP (or site-specific EMP/construction EMP when applicable).

Summary of Environmental Monitoring Activities (for the Reporting Period)[7]

Impacts *(List from SEMP/CEMP)*	Mitigation Measures *(List from SEMP/CEMP)*	Parameters Monitored *(As identified in the SEMP/CEMP)*	Method of Monitoring *(Visual, Actual Sampling, etc)*	Location of Monitoring *(Provide GPS Coordinates)*[8]	Date of Monitoring Conducted	Person Who Conducted the Monitoring
Design Phase						
Pre-Construction Phase						
Construction Phase						

Impacts *(List from SEMP/CEMP)*	Mitigation Measures *(List from SEMP/CEMP)*	Parameters Monitored *(As identified in the SEMP/CEMP)*	Method of Monitoring *(Visual, Actual Sampling, etc)*	Location of Monitoring *(Provide GPS Coordinates)*[8]	Date of Monitoring Conducted	Person Who Conducted the Monitoring
Operational Phase						

8. Monitoring of environmental IMPACTS on PROJECT SURROUNDINGS
   - Confirm records of pre-work condition of roads, agricultural land or other infrastructure prior to starting to transport materials and construction.

Package No.	Status of Pre-Work Conditions *(Recorded / Not Recorded)*	Baseline Environmental Conditions (air, water, noise) Documented *(Yes / No)*	Action Proposed and Additional Measures Required

   - Provide information on monitoring activities conducted during reporting period. If not conducted, provide justification. Compare results with baseline and internationally recognized standards.[9]

Air Quality Monitoring Results

Site No.	Date of Testing	Site Location *(Provide GPS Coordinates)*[10]	Parameters *(as required by statutory clearances or as mentioned in the IEE)*			Remarks
			PM10 µg/m3	SO2 µg/m3	NO2 µg/m3	

Water Quality Monitoring Results

Site No.	Date of Sampling	Site Location	Parameters *(as required by statutory clearances or as mentioned in the IEE)*						Remarks
			pH	Conductivity µS/cm	BOD mg/L	TSS mg/L	TN mg/L	TP mg/L	

Noise Quality Monitoring Results

Site No.	Date of Testing	Site Location	LA_{eq} (dBA) *(as required by statutory clearances or as mentioned in the IEE)*		Remarks
			Day Time	Night Time	

9. INFORMATION DISCLOSURE AND CONSULTATIONS
   - Confirm PMU/PIU/contractors provide project-related information to stakeholders, communities and/or affected people before and during construction works.[11]
   - Provide information on consultations conducted during reporting period such dates, topics discussed, type of consultation, issues/concerns raised, safeguards team member present. Attach minutes of meetings (ensure English translation is provided), attendance sheet, and photos.

Date of Consultation	Location	Number of Participants *(specify total, male and female)*	Issues/Concerns Raised	Response to issues/concerns

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

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

11. SUMMARY OF KEY ISSUES/CONCERNS IDENTIFIED DURING THE REPORTING PERIOD AND REMEDIAL ACTIONS
   - Provide corrective action plan which should include all issues/concerns, actions required to be implemented, responsible entities, and target dates.

12. STATUS OF CORRECTIVE ACTIONS FROM PREVIOUS SEMR(S)
   - Provide information on corrective actions to be implemented as reported in the previous SEMR(s). Include status of implementation of feedbacks/comments/suggestions as provided by ADB, if any.

Corrective Action Plan Status

Issues/Concerns	Corrective Action	Status	Remarks

13. APPENDIXES
   - Photos
   - Records of consultations
   - Copies of environmental clearances and permits (if not provided in the previous SEMR)
   - Environmental site inspection report (if not provided in the previous SEMR)
   - Other

[1] If on-going construction, include %physical progress and expected date of completion
[2] IEE prepared based on final detailed design and cleared by ADB.
[3] Works will not be allowed until SEMP/CEMP is approved by project implementation unit or project management unit.
[4] All statutory clearance/s, no-objection certificates, permit/s, etc. should be obtained prior to award of contract/s. Attach as appendix all clearance obtained during the reporting period. If already reported, specify in the "remarks" column.
[5] Specify statutory requirements: environmental clearance? Permit/consent to establish? Forest clearance? Workers/Labor permit, etc.
[6] *Example: Environmental Clearance requires ambient air quality monitoring, Forest Clearance/Tree-cutting Permit requires 2 trees for every tree, etc.*
[7] Attach Laboratory Results and Sampling Map/Locations
[8] If GPS coordinate is not available, provide landmark(s) and/or chainage.
[9] ADB Safeguard Policy Statement (SPS) Appendix 1, para 33: During the design, construction, and operation of the project the borrower/client will 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 Environment, Health and Safety Guidelines. These standards contain performance levels and measures that are normally acceptable and applicable to projects. When host country regulations differ from these levels and measures, the borrower/client will achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the borrower/client will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in the SPS.
[10] If GPS coordinate is not available, provide landmark(s) and/or chainage.
[11] Check EMP requirement on information disclosure. At a minimum, PIU thru the contractor should notify communities/affected persons/sensitive receptors 7 days and again 1 day before start of works.