Initial Environmental Examination

Document stage: Draft
Project number: 49329-006
February 2019

BAN: Second City Region Development Project – Dhaka Region Roads (Araihazar) PART A

Package No: CRDP-II/LGED/NARAYANGANJ/ARAIHAZAR/NCB/2018/W-02

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

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CURRENCY EQUIVALENTS

(as of 15 July 2018)

Currency unit - BDT
BDT 1.00 = $ 0.0122
$1.00 = BDT 82

ABBREVIATION

ADB	-	Asian Development Bank
BDT	-	Bangladesh Taka
BOQ	-	Bill of Quantities
CRDP	-	City Region Development Project
DOE	-	Department of Environment
EARF	-	Environmental Assessment and Review Framework
ECR	-	Environmental Conservation Rules
EIA	-	environmental impact assessment
EMP	-	environmental management plan
GRC	-	Grievance Redress Committee
GRM	-	grievance redress mechanism
IEE	-	initial environmental examination
LGED	-	Local Government Engineering Department
MDSC	-	Management, Design and Supervision Consultant
NGO	-	nongovernment organization
NOC	-	no objection certificate
O&M	-	operations and maintenance
PIU	-	Project Implementation Unit
PMCU	-	Project Management Coordination Unit
REA	-	rapid environmental assessment
ROW	-	right of way
SPS	-	safeguard policy statement

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Executive Summary

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

Subproject Scope. This initial environmental examination (IEE) report has been prepared for one of the subprojects of Second CRDP that is covered by Package NumberCRDP-II/LGED/Narayanganj/Araihazar/NCB/2018/W-02 This package includes combination of construction and rehabilitation of the following road alignments in the Araihazar Upazila in Dhaka region: a) Government Safar Ali College - Araihazar Upazila Porishod - RHD via Mohila College road (Ch.0-1000m) (Road ID 4095) including 799m link road, b) RHD Araihazar bazar - Araihazar Purinda road (Ch.0-1126m) (Road ID 4094) including 517m link road, c) Laskardi - Langardi Bazar road (Ch.0-2200m) (Road ID 4072), d) Kalibari bazar - Panchrukhy road (Ch.0-3520m) (Road ID 4081) and e) Dhuptara - Buntim Pullah road (Ch. 0 - 3007m) (Road ID 4077). Development of these roads shall include improvement of the road surfaces, improvement/ construction of drains, and ancillary facilities like cross drainages, culverts, hard shoulders/walkways and slope protection works. All improvements will be constructed within the existing vacant road width (right-of-way) of the road.

Categorization. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for environmental assessment are described in ADB Safeguard Policy Statement (SPS), 2009. Using ADB Rapid Environmental Assessment Checklist, the subproject is classified as Environmental Category B as per the ADB SPS, 2009 as no significant impacts are envisaged. Accordingly, this IEE has been undertaken, which assesses in more detail the likely environmental impacts of the subproject and provides an environmental management plan (EMP) specifying the required mitigation and monitoring measures to ensure that these impacts are managed to acceptable levels. This IEE also emphasizes the need to incorporate pollution prevention and control technologies during the design, construction, and operation of the subproject and adhere to internationally recognized standards such as the World Bank Group's Environment, Health and Safety Guidelines.

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

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

The total length of the 5 (five) subproject roads is 12.169 km. The subproject road alignments pass more or less through built-up areas of small and medium enterprises, markets or bazars, agricultural or open fields, sporadically scattered rural human settlements and various ponds, ditches and low-lying areas on both sides; and traverse along and/or cross some

canals. These subproject roads are expected to establish more efficient connectivity within the Dhaka region.

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

The subproject does not involve any special considerations regarding location since the roads occupy existing right-of-ways (ROWs). There will be no road widening beyond these ROWs, and therefore no land acquisition is required. No private property will be affected and the methods to be used for site preparation, construction and commissioning, as well as associated arrangements to ensure sound environmental management and safety at all times, are to be defined by the Contractor in a Site-specific Environmental Management Plan (SEMP) based on the EMP of this IEE. Contractor will submit its SEMP for approval to the project implementation unit (PIU). These will cover the following areas of impact which are potentially significant but can be mitigated by the adoption of good practice: (i) impedance of traffic, (ii) noise pollution and vibration, (iii) waste generation (iv) release of silt from excavations, (v) water pollution, (vi) air and dust pollution, (vii) community health and safety risks, and (viii) occupational health and safety.

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

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

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

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

Conclusion. The overall finding of this IEE is that the subproject will result in significant environmental benefits because the current conditions of roads will be improved and will be much better for local residents. Severe traffic congestion will be lessened and thereby reducing vehicle noise (honking of horns) and air pollution (idling vehicles) in the subproject areas. Ultimately, the subproject will result in significant economic benefit because the road network could cater to more inclusive and environmentally sustainable economic growth in the Dhaka region. The subproject will not have significant adverse environmental impacts and the potential adverse impacts identified are associated with the construction phase, which can be managed through effective implementation of the EMP. No further environmental assessment is therefore required and the classification of Category B per ADB SPS is confirmed.

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

I. INTRODUCTION

A. Background

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

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

3. Second CRDP has been classified as environmental category B per ADB SPS.[3] A project preparatory technical assistance (PPTA 49329-BAN) was approved by ADB to assist Government of Bangladesh prepare Second CRDP for ADB financing. Part of this PPTA is the preparation of environmental assessment and review framework (EARF) and initial environmental examination (IEE) reports in accordance with the requirements of ADB Safeguard Policy Statement (SPS), 2009. Further support was provided by ADB in preparing the EARF and IEE reports to meet the requirements for projects proposed under a sector loan modality.

4. This initial environmental examination (IEE) report has been prepared for the subproject covered by Package Number Second CRDP/LGED/Narayanganj/Araihazar/NCB/2018/W-02, which includes combination of construction and rehabilitation of the following road alignments or components in the Araihazar Upazila in Dhaka region: a) Improvement of road from Government Safar Ali College - Araihazar Upazila Porishod - RHD via Mohila College road

[1] ADB. 2015. Comprehensive Integrated Multimodal Economic Corridor Network (CIMECON): Bangladesh. Manila.
[2] https://www.adb.org/projects/49329-006/main#project-pds
[3] A project's category is determined by the category of its most environmentally sensitive component, including direct, indirect, cumulative, and induced impacts in the project's area of influence. Each proposed project is scrutinized as to its type, location, scale, and sensitivity and the magnitude of its potential environmental impacts. Projects are assigned to one of the following four categories: (i) **Category A.** A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment is required. (ii) **Category B**. A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination is required. (iii) **Category C**. A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed. (iv) **Category FI**. A proposed project is classified as category FI if it involves investment of ADB funds to or through a financial intermediary.

(Ch.0-1000m) (Road ID 4095) including 799m link road, b) Improvement of road RHD Araihazar bazar - Araihazar Purinda road (Ch.0-1126m) (Road ID 4094) including 517m link road, c) Improvement of road Laskardi - Langardi Bazar road (Ch.0-2200m) (Road ID 4072), d) Improvement of road Kalibari bazar - Panchrukhy road (Ch.0-3520m) (Road ID 4081) and e) Improvement of road Dhuptara - Buntim Pullah road (Ch. 0 - 3007m) (Road ID 4077).

B. Purpose of the IEE

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

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

Figure 1: Location Map of Subproject on Google Map (Yellow Lines)

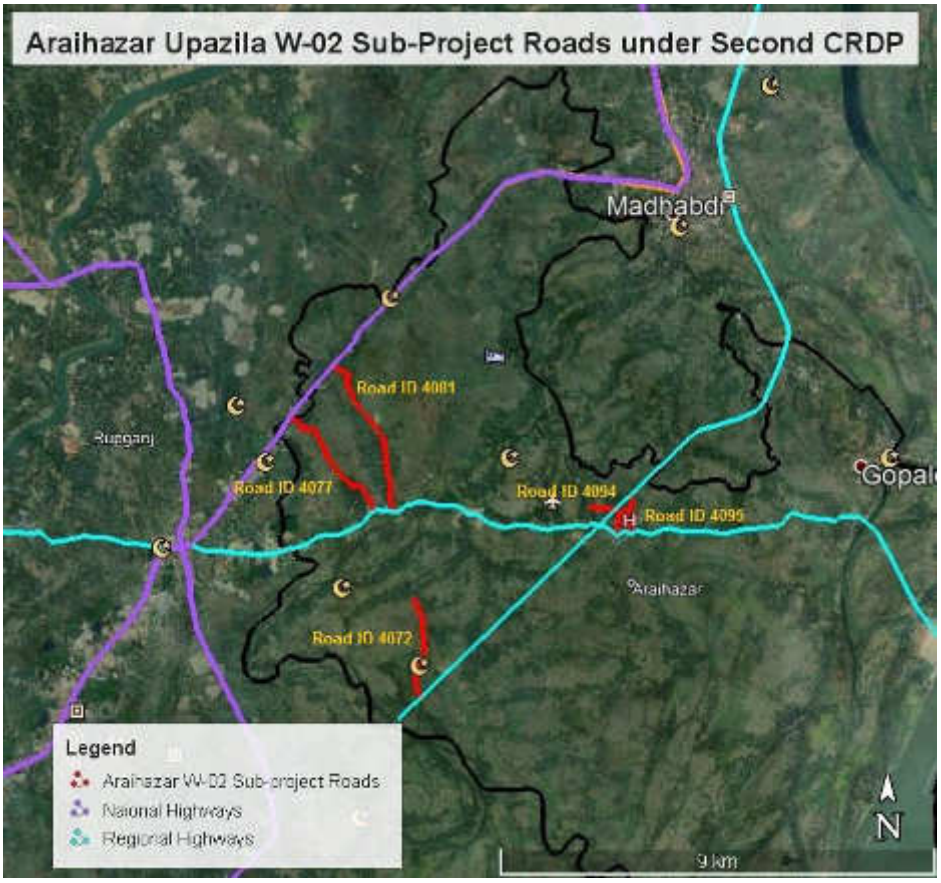
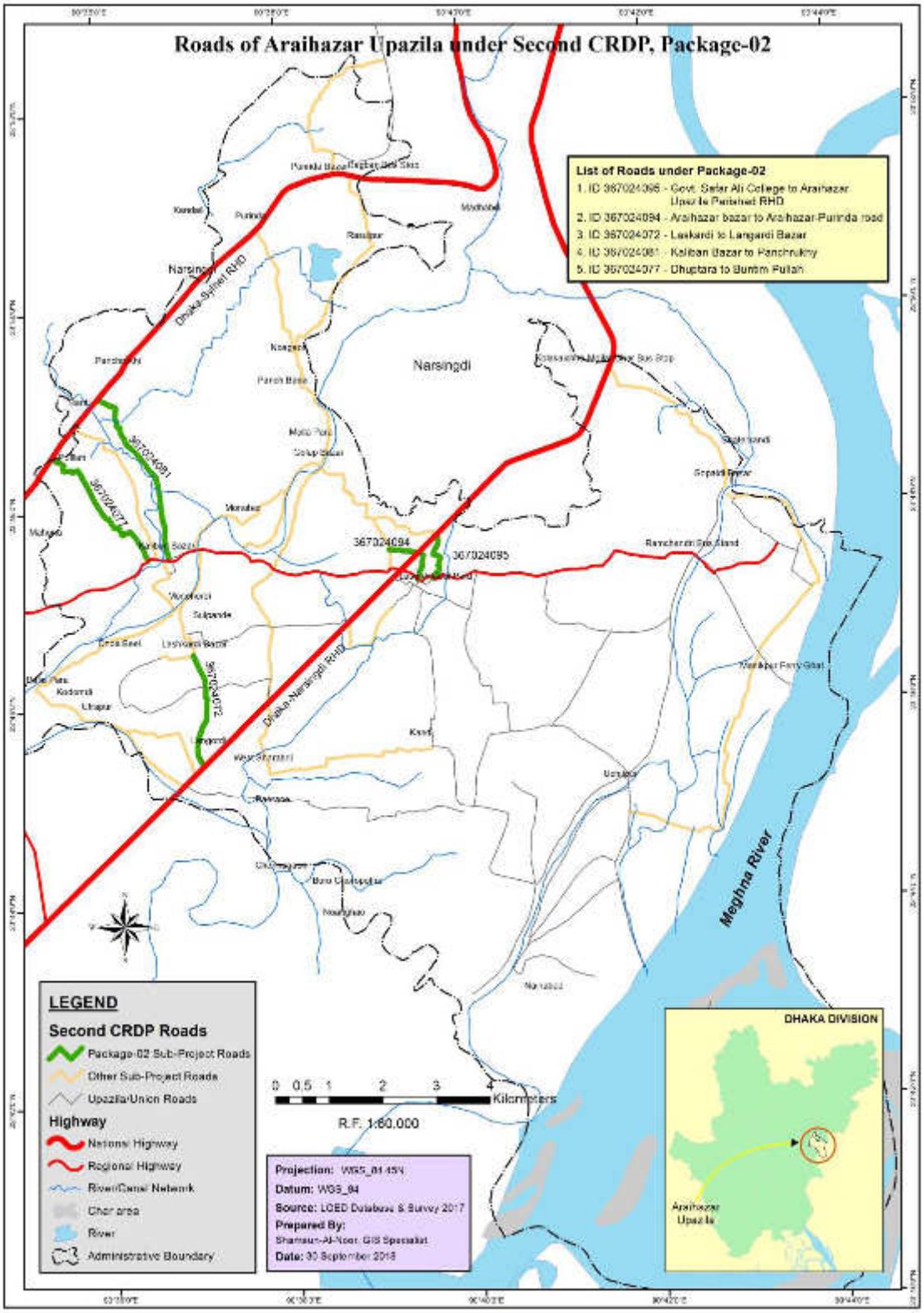


Figure 2: Location Map of Subproject (Green Lines)



C. Extent of the Study

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

D. Methodology

8. This IEE has been carried out using reconnaissance survey, field visits, consultation with stakeholders and others, NGOs, review of existing data, assessment to identify adverse impacts and preparation of EMP and monitoring program at all stages of subproject implementation. Physical assessments were made for entire corridors with respect to terrestrial and aquatic resources, including physical cultural resources and other natural and man-made infrastructures.

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

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

A. ADB Safeguard Policy Statement

10. ADB SPS requires borrowers to meet a set of requirements (Safeguards Requirements 1) when delivering environmental safeguards for projects supported by ADB. The objectives are to ensure the environmental soundness and sustainability of projects, and to support the integration of environmental considerations into the project decision-making process. Hence, CRDP2 is required to comply with these requirements. Summary of the step by step process is discussed below in this section. Detailed discussions are provided in the ADB SPS. [4]

11. **Screening and Categorization.** Subprojects are to be screened for their expected environmental impacts, and are assigned to a specific category (footnote 3). Categorization is to be based on the most environmental sensitive component. However, for subproject(s) with component(s) that can trigger Category A or with potentially significant adverse impacts that are diverse, irreversible, or unprecedented, PMCU shall examine alternatives to the subproject's location, design, technology, and components that would avoid, and, if avoidance is not possible, minimize adverse environmental impacts and risks, and to meet Category B categorization. The rationale for selecting the subproject location, design, technology, and components will be properly documented, including, cost-benefit analysis, taking environmental costs and benefits of the various alternatives considered into account. The "no action" alternative will be also considered. In general, criteria that can trigger subproject's 'Category A' are discussed in Section II of the EARF.

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

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

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

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

14. **Public Disclosure**. LGED, through PMCU, shall submit to ADB for disclosure on ADB website so affected people, other stakeholders, and the public can provide meaningful inputs into the subproject design and implementation: [5]

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

15. **Consultation and Participation.** PMCU and Araihazar PIU shall carry out meaningful consultation[6] 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.

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

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

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

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

[6] 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.

19. **Pollution Prevention and Control Technologies**. During the design, construction, and operation of the subproject the PMCU and Araihazar PIU shall apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines. These standards contain performance levels and measures that are normally acceptable and applicable to subprojects. When the Government of Bangladesh regulations differ from these levels and measures, the subproject shall achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific subproject circumstances, LGED through PMCU will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

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

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

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

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

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

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

[8]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.

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

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

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

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

B. National Environmental Impact Assessment Law

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

28. **Environmental Conservation Rules (ECR), 1997**. The Rules outline the processes and requirements of environmental clearances for specific type of projects indicated therein, and stipulates that "no industrial unit or project shall be established or undertaken without obtaining,

[10] 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.

in the manner prescribed by rules, an ECC from the Director General" of the DOE. Schedule 1 of the Rules classifies industrial units and projects into four categories according to their site and impact on the environment, namely (i) green, (ii) orange-A, (iii) orange–B, and (iv) red. The rules specify the procedures for issuing ECC for the various categories of projects. **Table 1** summarizes the requirements for environmental clearance application for each category.

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

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

[a]A Guide to Environmental Clearance Procedure, DOE, Bangladesh Ministry of Environment and Forests, August 2010

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

Table 2: Government of Bangladesh Classification of the Subproject

	Subproject	Component	Equivalent in Schedule I of ECR	DOE Classification
1.	Roads	Roads	Construction, re-construction and extension of road (feeder road, local road)	Orange – B
		Bridges and culverts	Construction, re-construction and extension of bridge/culvert (length below 100 meters)	Orange – B

C. Application for Environmental Clearance

30. The application and requirement for issuance of ECC are described in the ECR, 1997 and summarized in **Table 1**. This involves the completion and submission of an application using a form available from the DOE website,[11]which is revised from time to time. See **Appendix 2** for template being used for environmental clearance from DoE. The accomplished application form is submitted to DOE together with requirements as enumerated in **Table 1**. The proponent is also required to pay equivalent application fee prescribed in Schedule 13 of ECR, 1997.

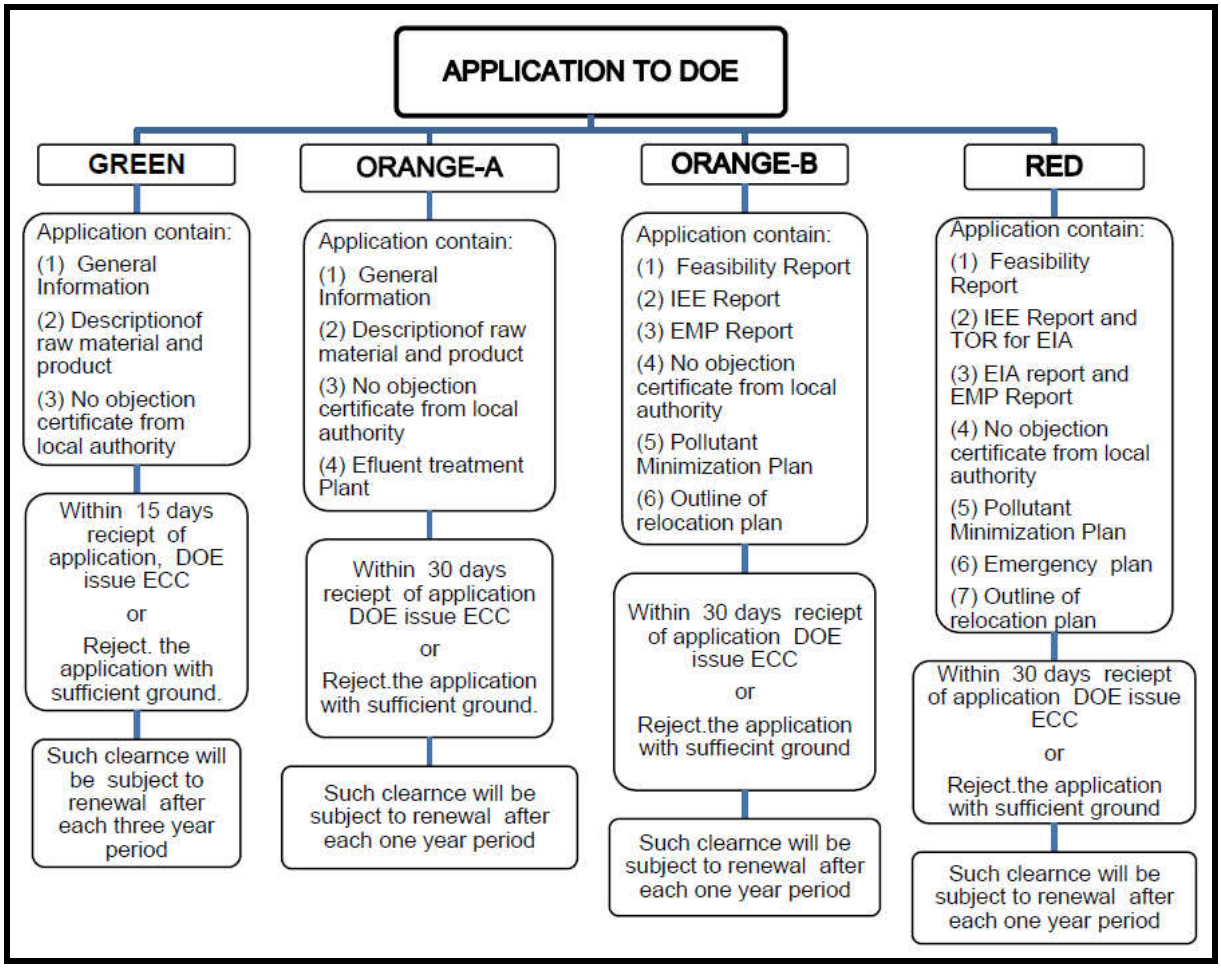
31. For the purpose of obtaining the environmental clearance certificate (ECC) from DOE for the Second CRDP, an application was filed by PMCU vide LGED memo 46.02.000.913.99.001. 1-07; dated 30/08/2018 and 27/12/2018. Accordingly DOE issued an Environmental Clearance Certificate for Second CRDP subprojects (up through Orange B) involving construction and rehabilitation of roads and associated drainage subprojects in Dhaka region by means of a letter No. DOE/ Clearance/5194/2013/ (clearance Certificate Number 53)/ issue Date 10/02/2019 (**Appendix 19**). Construction and Rehabilitation of Roads and associated drainage improvements of Rupganj Package W-02 subprojects are categorized as Orange B category projects, and are exempt from further review requirements under DOE rules. [12]

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

[11] www.doe-bd.org

[12]By PMCU, the required fee for ECC application and other necessary documents was submitted to DOE on 30 August, 2018.

Figure 3: Government Environmental Clearance Process



D. Applicable Environmental Standards

33. The ECR, 1997 also provides the environmental standards applicable to Second CRDP. Schedule 2 of the ECR presents the national standards for ambient air quality and Schedule 4 of the ECR presents the national standards for ambient noise. Following requirements of ADB SPS, the subproject shall apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in EHS Guidelines. When the Government of Bangladesh regulations differ from these levels and measures, the subproject shall achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific subproject circumstances, LGED through PMCU will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS. In view of this, **Table 3** and **Table 4** show the ambient air quality standards and noise level standards to be followed by the subproject.

Table 3: Ambient Air Quality Standards

Parameter	Location	Bangladesh Ambient Air Quality Standard ($\mu g/m^3$)[a]	WHO Air Quality Guidelines ($\mu g/m^3$)		Applicable Per ADB SPS[d] ($\mu g/m^3$)
			Global Update[b] 2005	Second Edition[c] 2000	
TSP	Industrial and Mixed	500	-	-	500
	Commercial and Mixed	400			400
	Residential and Rural	200			200
	Sensitive	100	-	-	100
PM_{10}	Industrial and Mixed	-	50 (24-hr)	-	50 (24-hr)
	Commercial and Mixed	-	50 (24-hr)		50 (24-hr)
	Residential and Rural	-	50 (24-hr)		50 (24-hr)
	Sensitive	-	50 (24-hr)	-	50 (24-hr)
PM_{25}	Industrial and Mixed	-	25 (24-hr)	-	25 (24-hr)
	Commercial and Mixed	-	25 (24-hr)		25 (24-hr)
	Residential and Rural	-	25 (24-hr)		25 (24-hr)
	Sensitive	-	25 (24-hr)	-	25 (24-hr)
SO_2	Industrial and Mixed	120	20 (24-hr)	-	20 (24-hr)
	Commercial and Mixed	100	20 (24-hr)	-	20 (24-hr)
	Residential and Rural	80	20 (24-hr)		20 (24-hr)
	Sensitive	30	20 (24-hr)	-	20 (24-hr)
NO_2	Industrial and Mixed	100	200 (1-hr)	-	100
	Commercial and Mixed	100	200 (1-hr)	-	100
	Residential and Rural	80	200 (1-hr)		80
	Sensitive	30	200 (1-hr)	-	30
CO	Industrial and Mixed	5,000	-	10,000 (8-hr) 100,000 (15-min)	5,000
	Commercial and Mixed	5,000	-	10,000 (8-hr) 100,000 (15-min)	5,000
	Residential and Rural	2,000	-	10,000 (8-hr) 100,000 (15-min)	2,000
	Sensitive	1,000	-	10,000 (8-hr) 100,000 (15-min)	1,000

[a] Schedule 2 of ECR, 1997

[b] Source: WB Environmental, Health and Safety General Guidelines, 2007.

[c] Source: Air Quality Guidelines for Europe, Second Edition, 2000; WHO Regional Office for Europe, Copenhagen

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

Table 4: Ambient Noise Quality Standards

Receptor/ Source	National Noise Standard Guidelines, 1997[a] (dB)		WHO Guidelines Value For Noise Levels Measured Out of Doors[b] (One Hour LA_{eq} in dBA)		Applicable Per ADB SPS[c] (dBA)	
	Day	Night	07:00 – 22:00	22:00 – 07:00	Day time	Night time
Industrial area	75	70	70	70	70	70
Commercial area	70	60	70	70	70	60
Mixed Area	60	50	55	45	55	45
Residential Area	50	40	55	45	50	40
Silent Zone	45	35	55	45	45	35

[a] Schedule 4 of ECR, 1997

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

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

E. Other Relevant National Laws

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

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

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

Laws, Regulations, and Standards	Details	Relevance
15 Oct 2009, and; Pourashava Act 2009, 6 Oct 2009.		
National Forestry Policy, 2016	This policy specifically states the following relevant objectives (among many other objectives): (i)to arrest deforestation, and degradation of forest resources, enrich and extend areas under tree cover, through appropriate programmes and projects, to ensure that at least 20% of the country comes under tree cover by 2035, with at least a canopy density of 50%; and (ii) to significantly increase tree cover outside state forest, through appropriate mechanisms, in both public and private land including urban areas.	Second CRDP subproject on Dhaka urban roads and drainage will have potential tree cutting activities during construction or rehabilitation works. However, the subproject EMP will ensure to implement measures to comply with and support the policy objectives.
Bangladesh Labor Act, 2006	The Bangladesh Labor Act, 2006 provides the guidance of employer's extent of responsibility and workmen's extent of right to get compensation in case of injury by accident while working.	Provides for security and safety of work force during construction period. Compliance with this law will be included in the responsibility of the Contractor.

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

F. International Environmental Agreements

35. **Table 6** below lists the relevant international environmental agreements that Government of Bangladesh is party to, and their relevance to the subproject.

Table 6: International Environmental Agreements Relevant to Second CRDP

International Environmental Agreement	Year Ratified	Details	Relevance
United Nations Framework Convention on Climate Change (UNFCCC)	1997	Parties to take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects.	The subproject is subject to impact of climate change. Engineering designs of the subproject consider climate change impacts, such as flooding and river water level rise. A climate change vulnerability assessment has been conducted for the geographic coverage of the entire Second CRDP, which covers the location of the subproject.
Paris	1983	Parties to ensure the protection	The road and drainage works

International Environmental Agreement	Year Ratified	Details	Relevance
Convention on Protection of the World Cultural and Natural Heritage, 1972		and conservation of the cultural and natural heritage situated on territory of, and primarily belonging to, the State	may impact undiscovered cultural and natural heritage relics during construction phase. The subproject EMP ensures measures for chance finds.
Ramsar Convention on Wetlands of International Importance, 1971	1992	Parties to conserve and wisely use wetlands (i.e., maintaining their ecological character) as a contribution towards achieving sustainable development locally and throughout the world	Road and drainage construction works may impact wetlands. The subproject EMP ensures measures are in place to protect significant wetland and prevent draining or filling into the wetlands during construction.
Convention on Biological Diversity, 1992	1997	Parties to require the environmental assessment of projects that are likely to have significant adverse effects on biological diversity with a view of avoiding or minimizing such effects	Biodiversity sites and species not previously identified might be discovered during construction works along the alignments. The subproject EMP ensures measures to protect biodiversity, if any, during construction and post-construction activities.

III. DESCRIPTION OF THESUBPROJECT

A. Subproject Scope and Components

36. The proposed subproject is a combination of construction and rehabilitation of the following road alignments or components: (i) Road 1: Improvement of Road from Govt. Safar Ali College - Araihazar Upazila Parishod - RHD via Mohela College (Road ID 4095); (ii) Road 2: Improvement of road from RHD Araihazar Purinda (Road ID 4094); (iii) Road 3: Improvement of Road from Laskardi – Langardi Bazar. (Road ID 4072); (iv) Road 4: Improvement of Road from Kalibari bazar – Panchrukhy Road. (Road ID 4081) and (v) Road 5: Improvement of Road from Dhuptara to Buntim Pullah (Road ID 4077). Description of road works is presented in **Table *7***. All construction works and improvements will be conducted within existing right-of-ways (ROWs).The road widths along the alignments will be varied at different chainage depending on the available space within the existing ROWs to ensure that no encroachment to private properties.

Table 7: Roadway Improvement Components

Road No.	Description	Length, (km)	Existing Carriageway Width, (m)	Existing Road Width, (m)
Road-1	Improvement of Road from Government Safar Ali College - Araihazar Upazila Porishod - RHD via Mohila College road (Ch.0-1000m) (Road ID 4095) including 799m link road	1.799	2.5 ~ 4.0	4.0 – 9.2
Road-2	Improvement of road from RHD Araihazar bazar - Araihazar Purinda road (Ch.0-1126m) (Road ID 4094) including 517m link road	1.643	3.0	3.7 – 10.2
Road-3	Improvement of Road from Laskardi - Langardi Bazar road (Ch.0-2200m) (Road ID 4072	2.200	3.0	5.0 – 7.7
Road-4	Improvement of Road from Kalibari bazar - Panchrukhy road (Ch.0-3520m) (Road ID 4081)	3.520	3.0	4.3 – 7.2
Road-5	Improvement of Road from Dhuptara - Buntim Pullah road (Ch. 0 - 3007m) (Road ID 4077)	3.007	4.2	6.0 - 9.8

B. Existing Condition of Subproject Components

Road 1: Improvement of Road Govt. Safar Ali College - Araihazar Upazila Parishad - RHD via Mohila College (Road ID 4095)

37. **Road Location**: This subproject road is 1.799 km long, and starts at Govt. Safar Ali College and ends near Chota Bari Para Jame Mosque. It stretches from starting coordinates of N 23^0 47' 16.27" and E 90^0 39' 34.54" to ending coordinates of N 23^0 47' 41.56" and E 90^0 39' 37.79". This road passes through villages, markets or bazars and open agricultural fields. This road stretches along various ponds, ditches and low-lying areas on both sides; and traverses along and crosses a canal at one section. This canal only serves as rainwater conveyance or passageway during monsoon seasons and practically dry grassy ditches during summer seasons.

38. **Road Condition**: The proposed road subproject is an important existing road of the Upazila that connects the urban and peri-urban areas, and growth centers. This road has varying carriageway width ranging from 2.5 m to 4.0 m in different sections. The road condition is varying in different section. Major portion of the road is bituminous carpeted, and a small

portion is of RCC. Major part of the road has suffered wear and tear with cracks, pot-holes, broken edges and depressions. The distressed condition of the road is mainly due to improper drainage facilities and movement of heavy vehicular traffic for a long time without any proper maintenance work. There are several sub-standard horizontal curves. **Figure 4** shows some of the existing conditions of this road.

39. **Drains:** There is no functional roadside drain along the alignment of this road. Currently, rain water during monsoon season flows toward the sides of the road which have lower elevation and then flows to nearby canals or ponds. Construction of RCC Pipe Drain (of varying diameter ranging from 1000 mm to 1200 mm) at sections has been proposed alongside the road.

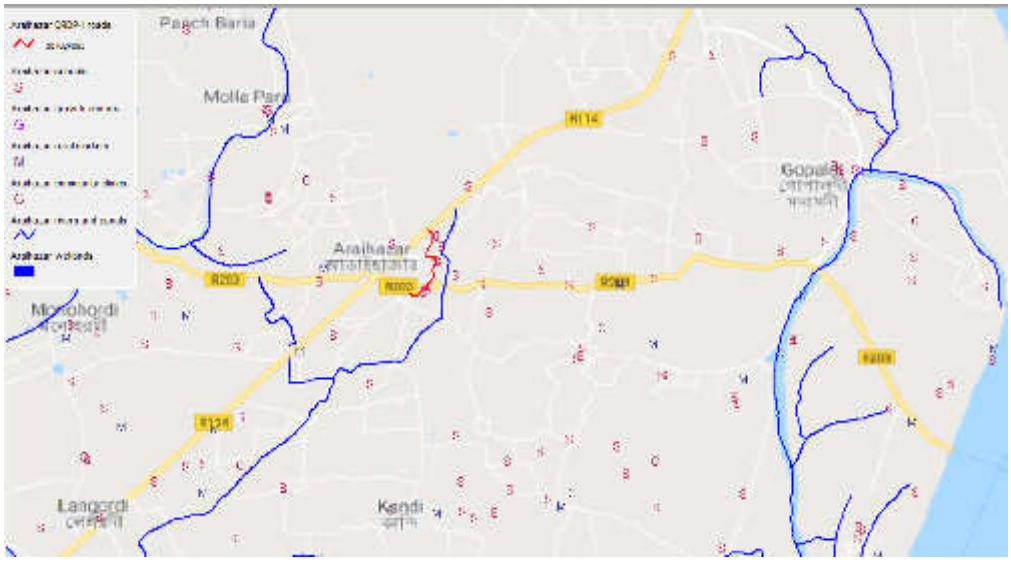
40. **Structures:** There are two structures in the form of Box culverts for cross drainage purpose – one Box culvert is of size: 3.0 m x 3.0 m at Ch. 660 m and the other one is of size 2.5 m x 2.5 m at Ch. 91 m (Link-02). As these two Box-culverts are in poor condition and are of inadequate sizes for the purpose, their replacement with bigger size has been proposed.

41. **Existing Alignment and Right-of-Ways (RoW)***:* The existing subproject road will be improved within existing alignment / RoW. The vacant road width varies between 4.0 ~ 9.2 m and includes carriageway of which width varies between 2.5 ~ 4.0 m. The side slope of road embankment will be of 1:1.5. From field investigation, no tree is found along the proposed carriageway. No trees will be cut and all trees found along the sides of the proposed carriageway will be preserved per detailed design.

42. **Strip Map**. The strip map showing the locations of the structures along this alignment is in **Appendix 3**. The strip map was drawn as a result of the field surveys conducted along the alignment and show that no physical cultural resources will be encroached or affected.

43. **GIS Map**. The GIS map site photographs of Road from Govt. Safar Ali College - Araihazar Upazila Parishod - RHD via Mohela College (Road ID 4095) are displayed here below to exhibit the environmental attributes alongside the road.

GIS maps showing Environmental Features around the existing Road sides



Location of schools, commercial areas, community clinics, streams and canals

44. As regards the Environmental Features, namely school, growth centre, market, community clinic etc. around the existing road alignment, GIS map shows that there are three schools are found to exist at a distance of 50 to 100 m away the roar alignment. Hence no environmental impact issue is envisaged due to the above mentioned environmental attributes.

Figure 4: Site Photographs from Govt. Safar Ali College - Araihazar Upazila Parishad - RHD via Mohila College (Road ID 4095)

Existing road condition at chainage 600

Road 2: Improvement of road from RHD Araihazar Bazar - Araihazar Purinda (Road ID 4094)

45. **Road Location**: This subproject road is 1.643 km long, and starts at Araihazar Bazar and ends near Dashpara steel bridge. It stretches from starting coordinates N 23^0 47' 16.52" and E 90^0 39' 26.37" and ends at coordinates N 23^0 47' 34.18" and E 90^0 39' 07.91". This road passes through built-up areas such as markets or bazars, agricultural or open fields, sporadically distributed rural residential settlements and some low-lying ponds, ditches or canals areas on both sides of the road alignment. The canals only serve as rainwater conveyance or passageway during monsoon seasons and practically dry grassy ditches during summer seasons. Likewise, the ponds are only rainwater containment ponds during monsoon seasons and practically grassy or dry open fields during summer seasons.

44. **Road Condition**: The proposed road subproject is an important existing road of the upazila that connects the urban/peri-urban areas and growth centers. This road has carriageway of width 3.0 m all through the road. Entire portion of the road is of Rigid Pavement (RCC), and most of the road has suffered wear and tear with cracks, pot-holes, broken edges and depressions. The distressed condition of the road is due to mainly improper drainage facilities and movement of heavy vehicular traffic for a long time without any proper maintenance work. There are several sub-standard horizontal curves. **Figure 5** shows some of

the existing conditions of this road.

45. **Drains:** There is no functional roadside drain along the alignment of the road. Construction of RCC Pipe Drain (of varying diameter ranging from 1000 mm to 1600 mm) has been proposed alongside the road.

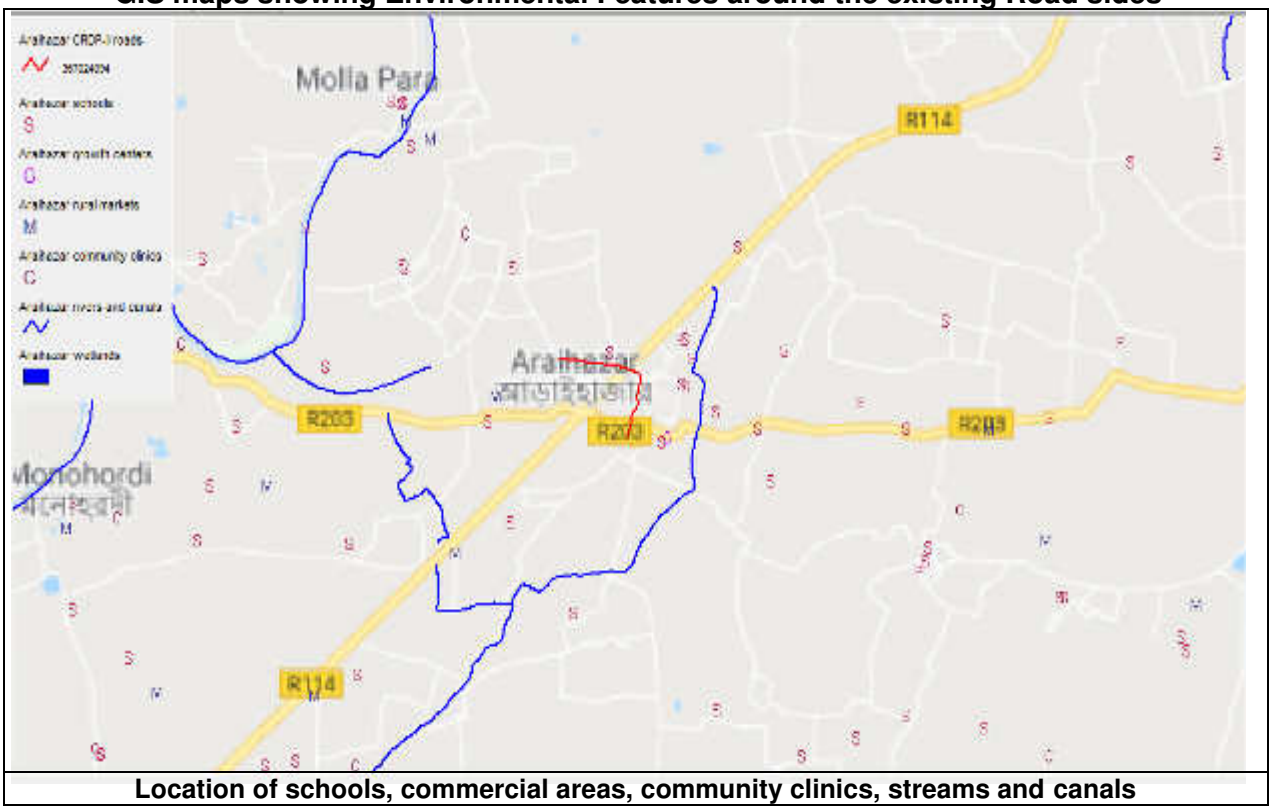
46. **Drainage Structures:** There are no cross drainage structures along the entire road length.

47. **Existing Alignment and Right-of-Ways (RoW)*:*** The existing subproject road will be improved within existing alignment / RoW. The vacant road width varies between 3.7 m ~ 10.2 m and will includes carriageway of width 3.0 m. The side slope of road embankment will be of 1:1.5. From field investigation, no tree is found along the proposed carriageway. No trees will be cut and all trees found along the sides of the proposed carriageway will be preserved per detailed design.

48. **Strip Map**. The strip map showing the locations of the structures along this alignment is in **Appendix 4**. The strip map was drawn as a result of the field surveys conducted along the alignment and show that no physical cultural resources will be encroached or affected.

49. **GIS Map**. The GIS map site photographs of Road from RHD Araihazar Bazar-Araihazar Purinda (Road ID 4094) are displayed here below to exhibit the environmental attributes alongside the road.

GIS maps showing Environmental Features around the existing Road sides



Location of schools, commercial areas, community clinics, streams and canals

50. As regards the Environmental Features, namely school, growth centre, market, community clinic etc. around the existing road alignment, GIS map shows that there exists one school at a distance of about 100 m away the road alignment. Hence no environmental impact issue is envisaged due to the above mentioned environmental attributes.

Figure 5: Site Photographs from RHD Araihazar Bazar - Araihazar Purinda (Road ID 4094)

Existing road condition at chainage 130 of Link 5

Road 3: Improvement of Road from Laskardi – Langardi Bazar (Road ID 4072)

51. **Road Location**: This subproject road is 2.200 km long, and starts at Langardi More and ends Laskardi Bazar. It stretches from starting coordinates N 23^0 45' 25.97" and E 90^0 37' 02.71" and ends at coordinates N 23^0 46' 32.98" and E 90^0 36' 57.49". This road passes through some industrial establishments, markets or bazars, low-lying agricultural or open fields, sporadically scattered rural residential settlements and some low-lying ditches or ponds on both sides of the road alignment. The ditches only serve as rainwater conveyance or passageway during monsoon seasons and practically dry grassy areas during summer seasons. Likewise, the ponds are only rainwater containment ponds during monsoon seasons and practically grassy or dry open fields during summer seasons.

52. **Road Condition**: The proposed road subproject is an important existing road of the Upazila that connects the urban/peri-urban areas and growth centers. The road contains carriageway of width 3.0 m. The road condition is varying at different sections. Entire portion of the road is bituminous carpet, and most of the road has suffered wear and tear with cracks, pot-holes, broken edges and depressions. The distressed condition of the road is mainly due to poor drainage system and movement of heavy vehicular traffic for a long time without any proper maintenance work. There are several sub-standard horizontal curves. **Figure 6** shows some of the existing conditions of this road.

53. **Drains:** There is no functional roadside drain was found to exist along the alignment of the subject road.

54. **Drainage Structures:** There is an Open Foundation Culvert (OFC) at Ch. 1430 m. Replacement of this OFC with a Box Culvert of size 5.00m X 5.00m has been proposed. Also a 7 m Single Lane Bridge exists at Ch. 864 m, and is in good condition.

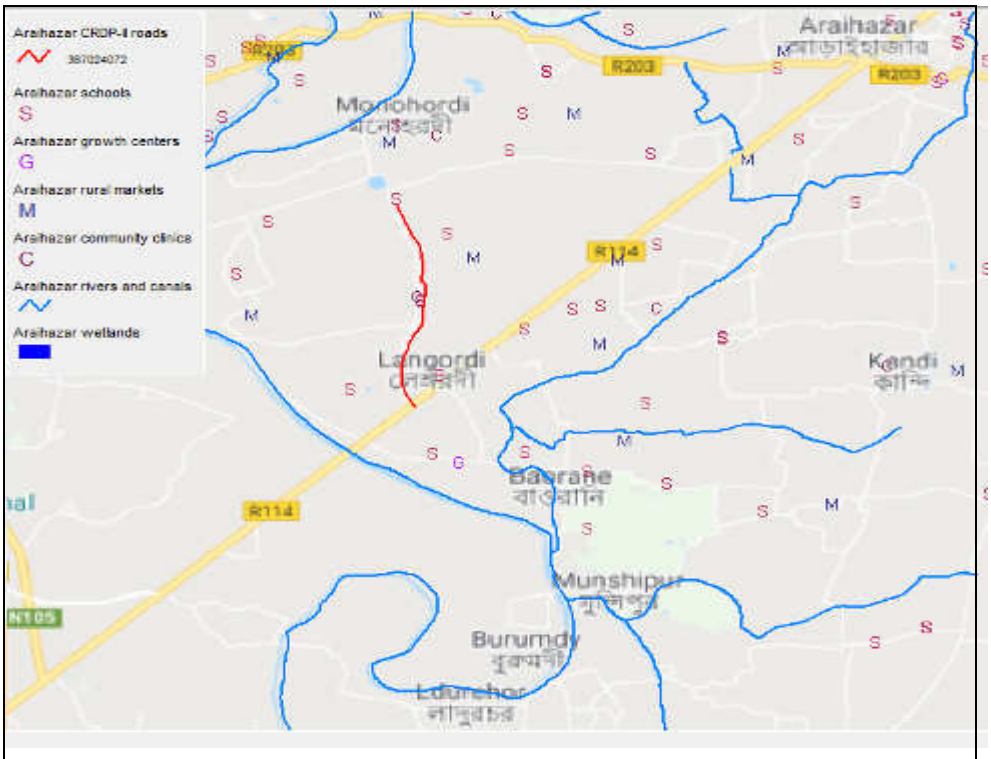
55. **Existing Alignment and Right-of-Ways (RoW)*:*** The existing subproject road will be improved within existing alignment / RoW. The vacant road width is varying in between 5.0 ~ 7.7 m and includes carriageway of width 3.0 m. The side slope of road embankment will be of 1:1.5. From field investigation, no tree is found along the proposed carriageway. No trees will be cut and all trees found along the sides of the proposed carriageway will be preserved per detailed design.

56. **Strip Map**. The strip map showing the locations of the structures along this alignment is in **Appendix 5**. The strip map was drawn as a result of the field surveys conducted along the alignment and show that no physical cultural resources will be encroached or affected.

57. **GIS Map**. The GIS map site photographs of Road from Laskardi – Langardi Bazar. (Road ID 4072) are displayed here below to exhibit the environmental attributes alongside the road.

58.

GIS maps showing Environmental Features around the existing Road sides



Location of schools, commercial areas, community clinics, streams and canals

58. As regards the Environmental Features, namely school, growth centre, market, community clinic etc. around the existing road alignment, GIS map shows that there exist two schools and one community at a distance between 50 m to 100 m from the road alignment. Hence no environmental impact issue is envisaged due to the above mentioned environmental attributes.

Figure 6: Site Photographs from Laskardi – Langardi Bazar (Road ID 4072)

Existing condition of road at chainage 915

Road 4: Improvement of Road from Kalibari bazar – Panchrukhy Road. (Road ID 4081)

59. **Road Location***:* This subproject road is 3.520 km long, and starts at Kalibari Bazar and ends at Panchrukhy on Dhaka Sylhet Highway. It stretches from starting coordinates N 23^0 47' 32.2" and E 90^0 36' 43.0" and ends at coordinates N 23^0 49' 08.4" and E 90^0 35' 59.9". This road passes through some business/commercial establishments, markets or bazars, low-lying agricultural or open fields, sporadically scattered rural residential settlements and some low-lying ditches or ponds on both sides of the road alignment. The canals only serve as rainwater conveyance or passageway during monsoon seasons and practically dry grassy ditches during summer seasons. Likewise, the ponds are only rainwater containment ponds during monsoon seasons and practically grassy or dry open fields during summer seasons.

60. **Road Condition**: The proposed road subproject is an important existing road of the Upazila that connects the urban/peri-urban areas and growth centers. The existing carriageway width for the entire road length is 3.0 m. The road condition is varying at different section. Entire portion of the road is bituminous carpet, and most of the road has suffered wear and tear with cracks, pot-holes, broken edges and depressions. The distressed condition of the road is mainly due to stagnation of rainwater in broken portions or potholes and worsened by continuous movement of heavy vehicles for a long time without any proper maintenance work. There are several sub-standard horizontal curves. **Figure 7** shows some of the existing conditions along this alignment.

61. **Drains:** There is no functional road side drain along the alignment of the subject road. During monsoon season, rainwater flows to the low-lying side sections of this road alignment. No road side drain has been proposed for this alignment.

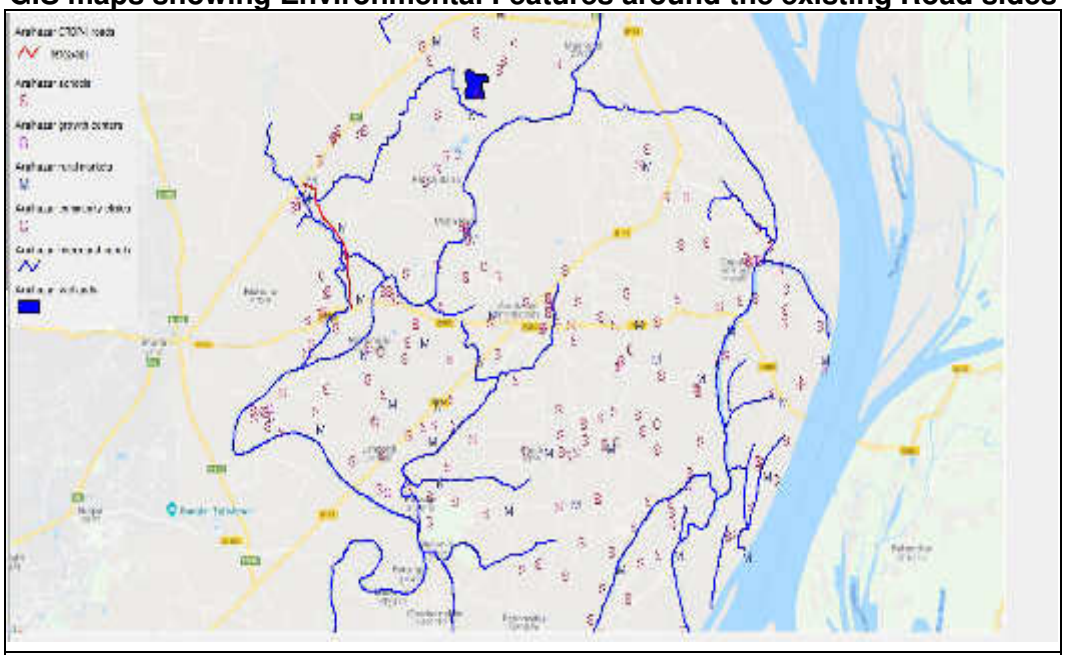
62. **Drainage Structures:** There exists 3 (three) drainage structures (Box culverts) along this road alignment, and these are at Ch. 1295 m, Ch. 2870 m and Ch. 3507 m. The Box Culvert at Ch. 3507 m is in good condition, but replacement of the other 2 (two) has been proposed with bigger size culverts.

63. **Existing Alignment and Right-of-Ways (RoW)*:*** The existing subproject road willl be improved within existing alignment / RoW. The vacant road width is varying in between 4.30 ~ 7.2 m and includes carriageway of width 3.0. No trees were found to exist within the road alignment / Row. The side slope of road embankment will be of 1:1.5..From field investigation, no tree is found along the proposed carriageway. No trees will be cut and all trees found along the sides of the proposed carriageway will be preserved per detailed design.

64. **Strip Map**. The strip map showing the locations of the structures along this alignment is in **Appendix 6**. The strip map was drawn as a result of the field surveys conducted along the alignment and show that no physical cultural resources will be encroached or affected.

65. **GIS Map**. The GIS map site photographs of Kalibari bazar – Panchrukhy Road (Road ID 4081) are displayed here below to exhibit the environmental attributes alongside the road.

GIS maps showing Environmental Features around the existing Road sides



Location of schools, commercial areas, community clinics, streams and canals

66. As regards the Environmental Features, namely school, growth centre, market, community clinic etc. around the existing road alignment, GIS map shows that there exist three markets at a distance between 50 m to 100 m from the road alignment. Hence no environmental impact issue is envisaged due to the above mentioned environmental attributes.

Figure 7: Site Photographs from Kalibari bazar – Panchrukhy Road (Road ID 4081)

Existing road condition at chainage 138

Road 5: Improvement of Road from Dhuptara to Buntim Pullah (Road ID 4077)

67. **Road Location***:* This subproject road is 3.007 km long, and starts at Rishipara More and ends at Buntim Pullah More on Dhaka Sylhet Highway. It stretches from starting coordinates N 23^0 47' 30.86" and E 90^0 36' 29.21" and ends at coordinates N 23^0 48' 34.15" and E 90^0 35' 27.61". This road passes through some business/commercial establishments, markets or bazars, low-lying agricultural or open fields, sporadically scattered rural residential settlements and some low-lying ditches or ponds on both sides of the road alignment. The canals only serve as rainwater conveyance or passageway during monsoon seasons and practically dry grassy ditches during summer seasons. Likewise, the ponds are only rainwater containment ponds during monsoon seasons and practically grassy or dry open fields during summer seasons.

68. **Road Condition**: The proposed road subproject is an important existing road of the Upazila that connects the urban/peri-urban areas and growth centers. The existing carriageway width for the entire road length is 4.2 m. The road condition is varying at different section. Entire portion of the road is bituminous carpet, and most of the road has suffered wear and tear with cracks, pot-holes, broken edges and depressions. The distressed condition of the road is mainly due to stagnation of rainwater in broken portions or potholes and worsened by continuous movement of heavy vehicles for a long time without any proper maintenance work. There are several sub-standard horizontal curves. **Figure 8** shows some of the existing conditions along this alignment.

69. **Drains:** There is no functional road side drain along the alignment of the subject road. During monsoon season, rainwater flows to the low-lying side sections of this road alignment. No road side drain has been proposed for this alignment.

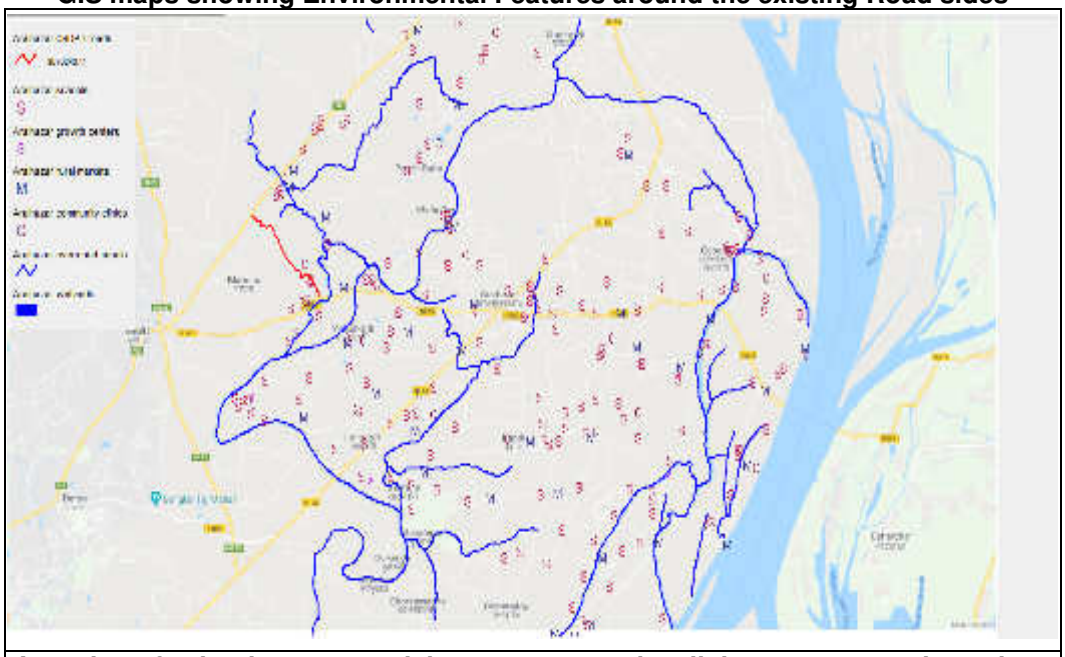
70. **Drainage Structures:** There are 3 (three) Box culverts along this road alignment, and these are at Ch. 293 m, Ch. 1505 m and Ch. 1856 m. The two of these Box Culverts at Ch. 293 m and Ch. 1505 m are in good condition, but replacement of the other one at Ch. 1856 m has been proposed with bigger size culvert. Also a 9 m Single Lane Bridge exists at Ch. 2630 m, and is in good condition.

71. **Existing Alignment and Right-of-Ways (RoW)*:*** The existing subproject road will be improved within existing alignment / RoW. The vacant road width is varying in between 6.0 ~ 9.8 m and includes carriageway of width 4.2 m. No trees were found to exist within the road alignment / Row. The side slope of road embankment will be of 1:1.5..From field investigation, no tree is found along the proposed carriageway. No trees will be cut and all trees found along the sides of the proposed carriageway will be preserved per detailed design.

72. **Strip Map**. The strip map showing the locations of the structures along this alignment is in **Appendix 7**. The strip map was drawn as a result of the field surveys conducted along the alignment and show that no physical cultural resources will be encroached or affected.

73. **GIS Map**. The GIS map site photographs of Dhuptara to Buntim Pullah Road (Road ID 4077) are displayed here below to exhibit the environmental attributes alongside the road.

GIS maps showing Environmental Features around the existing Road sides



Location of schools, commercial areas, community clinics, streams and canals

74. As regards the Environmental Features, namely school, growth centre, market, community clinic etc. around the existing road alignment, GIS map shows that there exist one school and one community clinic at a distance between 50 m to 100 m from the road alignment. Hence no environmental impact issue is envisaged due to the above mentioned environmental attributes.

Figure 8: Site Photographs from Dhuptara to Buntim Pullah (Road ID 4077)

Existing condition of road at chainage 2840

C. Proposed Interventions or Development

Road 1: Improvement of Govt. Safar Ali College - Araihazar Upazila Parishad - RHD via Mohila College Road (Road ID 4095)

75. Proposed interventions planned for the Existing Road (ID No. 4095) Govt. Safar Ali College - Araihazar Upazila Parishod - RHD via Mohela College of length 2.554 km (Ch.0+000m to 2+554 m) are as follows:

(i) Improvement of the existing 2-lane road, including hard shoulders on both sides of the road within the ROW;

(ii) Construction of BC carriageway of width 3.0 m ~ 5.5 m and RCC carriageway of width 2.5 m ~ 3.0 m as per design, and it will include hard shoulder/s or walkway/s and soft shoulders on either sides depending on the availability of vacant road width;

(iii) Construction of RCC Pipe Drain with or without footpath with drain pits and catch pits on the right side or centre line of the road alignment to remove the roadside rainfall and run-off stagnant water:

- at Ch.00 – 450 m (1200 mm ∅ RCC pipe drain on Right side with Footpath);
- at Ch.450 – 655 m (1200 mm ∅ RCC pipe drain on Right sides, without Footpath);
- at Ch.655 – 900 m (1000 mm ∅ RCC pipe drain through the centre line of the road alignment);

(iv) Reconstruction and replacement of the existing Box Culverts at Ch. 960 m.
(v) Pavement works comprising construction of sub-grade, sub-base, base binder course and wearing course;
(vi) Road improvement based on design that considers road safety requirement per LGED published guidelines and standards; and
(vii) Protection works (pallisading) to be undertaken at locations where ditches and ponds adjacent to the road embankment are found. These will protect road edges from being eroded or sliding. Locations and lengths of proposed protection works at different sections are shown in **Table 8** below.

Table 8: Locations and Lengths of Proposed Protection Works along Safar Ali College - Araihazar Upazila Parishad - RHD via Mohila College Road (Road ID 4095)

Sl.no	Left side Chainage and Length	Right side Chainage and Length
1	775 - 800 (25 m)	775 - 835 (60 m)
2	850 - 940 (90 m)	847 - 887 (40 m)
3	090 -134 (44 m)	888 - 930 (42 m)
Total length	**(159 m)**	**(142 m)**

The existing status with proposed development interventions of this road component is summarized in **Table 9.**

Table 9: Summary of Improvement Works for Govt. Safar Ali College - Araihazar Upazila Parishad - RHD via Mohila College Road (Road ID 4095)

Name of Subprojects	Length / Area	Subproject Components	Details of Proposed Works	Existing condition
Road-1 **Improvement of Govt. Safar Ali College - Araihazar Upazila Parishad - RHD via Mohila College Road (Road ID 4095)**	2.554 km	a. BC & RCC Pavement with hard shoulder (H/S) & footpath b. drainage c. slope protection works d. 2 (two) Box Culverts	**Road:** a. BC Road with 5.5m carriageway from Ch.00-430m with footpath. b. BC Road with 3.7m carriageway from Ch.00-130m (Link-01) c. BC Road with 3.0m carriageway from Ch.00-114m with H/S (Link-02) d. RCC Road with 3.0m carriageway from Ch.430-1000m with H/S & Ch.130-300m without H/S (Link-01) e. RCC Road with 2.5m carriageway from Ch.00-230m (Link-03) & Ch. 00-155m (Link-04) **Box Culvert:** 4.0m X 4.0m Box Culvert at Ch.660m **Slope Protection Works:** at 6 (six)sections (for details **Table 8** may be referred).	**Road:** a. BC Road with 3.0m carriageway from Ch.00-1000m, Ch.00-130m (Link-01), Ch.00-155m (Link-04), & Ch.00-114m (Link-02) b. BC Road with 3.7m carriageway from Ch.130-300m (Link-01) **Box Culverts:** 3.0m X 3.0m Box Culvert at Ch.660m
Construction of Drain-1 **Govt. Safar Ali College - Araihazar Upazila Parishod Road**	900 m	**Drainage**	**Drains:** • at Ch.00 – 450 m (1200 mm ∅ RCC pipe drain on Right side with Footpath); • at Ch.450 – 655 m (1200 mm ∅ RCC pipe drain on Right sides, without Footpath); • at Ch.655 – 900 m (1000 mm ∅ RCC pipe drain through the centre line of the road alignment);	**Drain:** There is no functional road side drain along the alignment of the subject road.

Construction of Drain-2 **RHD Araihazar Bazar – Dakkhin Para Ucha Bridge**	1112 m	**Drainage**	• at Ch.00 – 250 m (1200 mm ∅ RCC pipe drain with drain pits & catch pits through the centre line of the road alignment); • at Ch.250 – 900 m (1400 mm ∅ RCC pipe drain with drain pits & catch pits through the centre line of the road alignment); • at Ch.00 – 112 m of Link-01 (1000 mm ∅ RCC pipe drain with drain pits & catch pits through the centre line of the road alignment);	There is no functional road side drain along the alignment of the subject road.
Construction of Drain-3 Araihazar Gol Chakkar Box Culvert – Dakkhin Para Steel Bridge	960 m	**Drainage**	• at Ch.15 – 250 m (1200 mm ∅ RCC pipe drain on Right side with Footpath); • at Ch.250 – 425 m (1400 mm ∅ RCC pipe drain on Right side with Footpath); • at Ch.425 – 975 m (1600 mm ∅ RCC pipe drain on Right side with Footpath);	There is no functional road side drain along the alignment of the subject road

The typical section for the roadway design considerations with their cross-sections are shown in **Figures 9, 10, 11, 12,13 and 14.**

Figure 9: Typical cross section of the Road (Ch. 0+000 - 0+430 km)

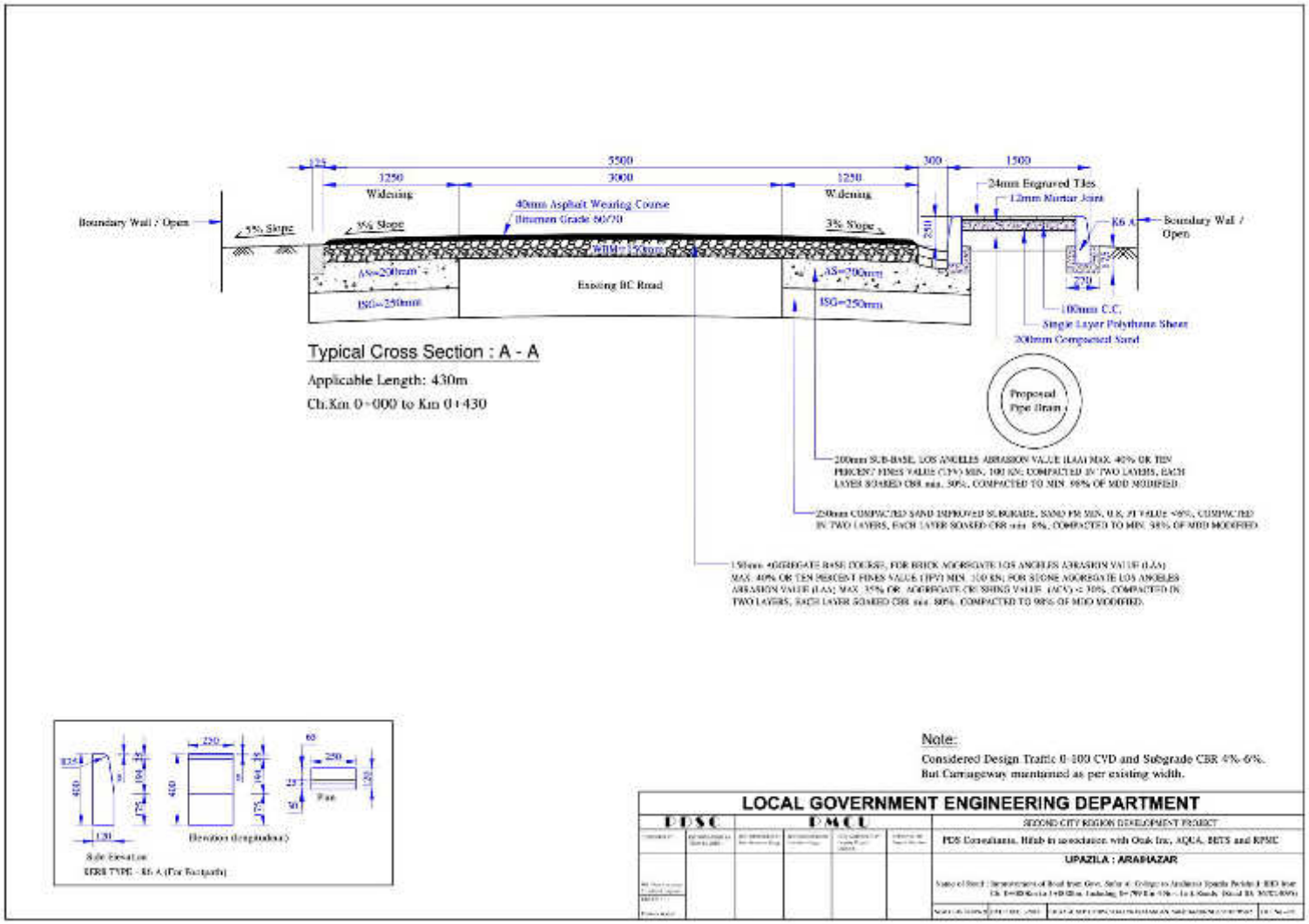


Figure 10: Typical Cross section of the Road (Ch. 0+430 - 1+000 km)

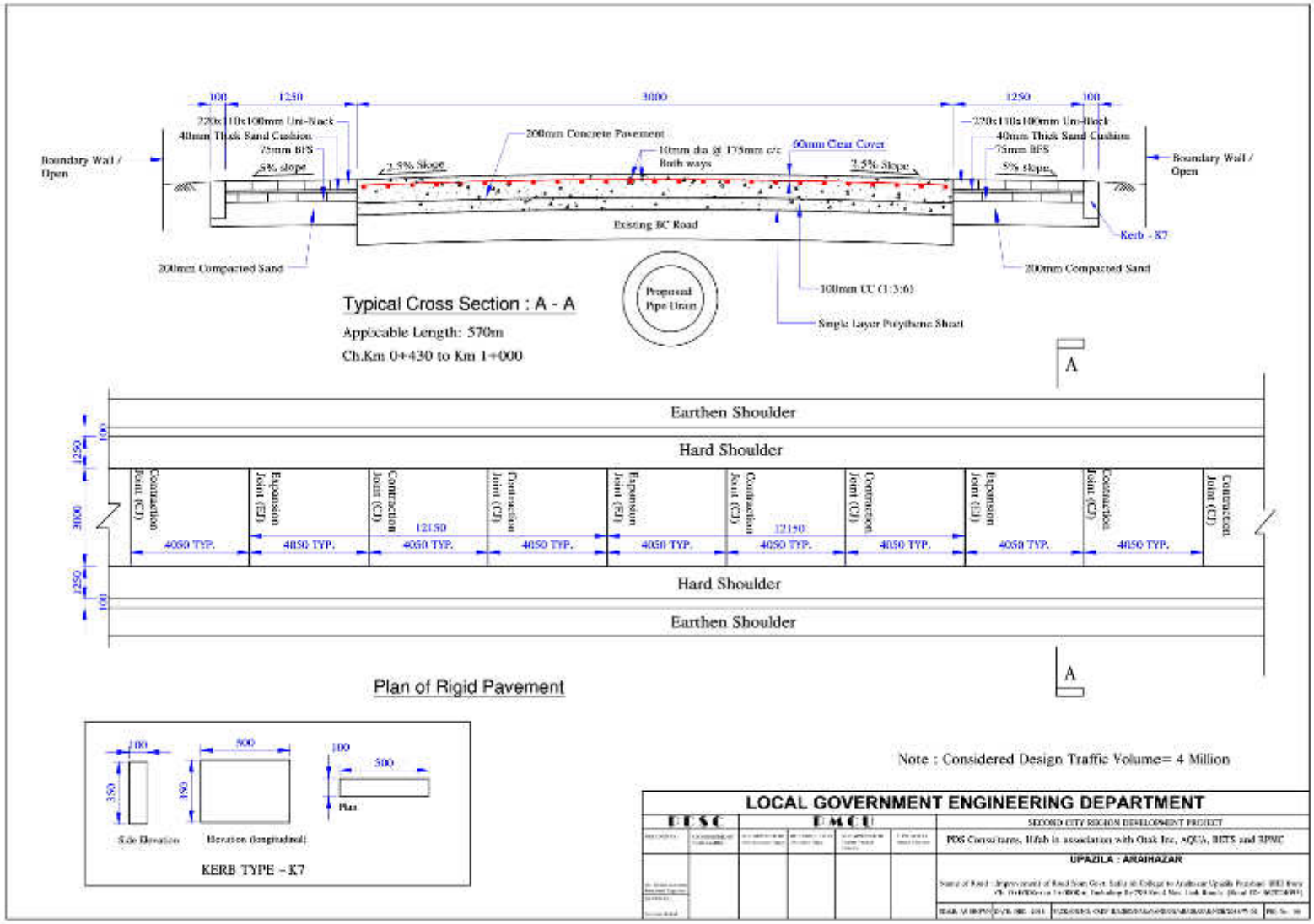


Figure 11: Typical Cross section of the Road (Ch. 0+000 - 0+130 km – Link 01)

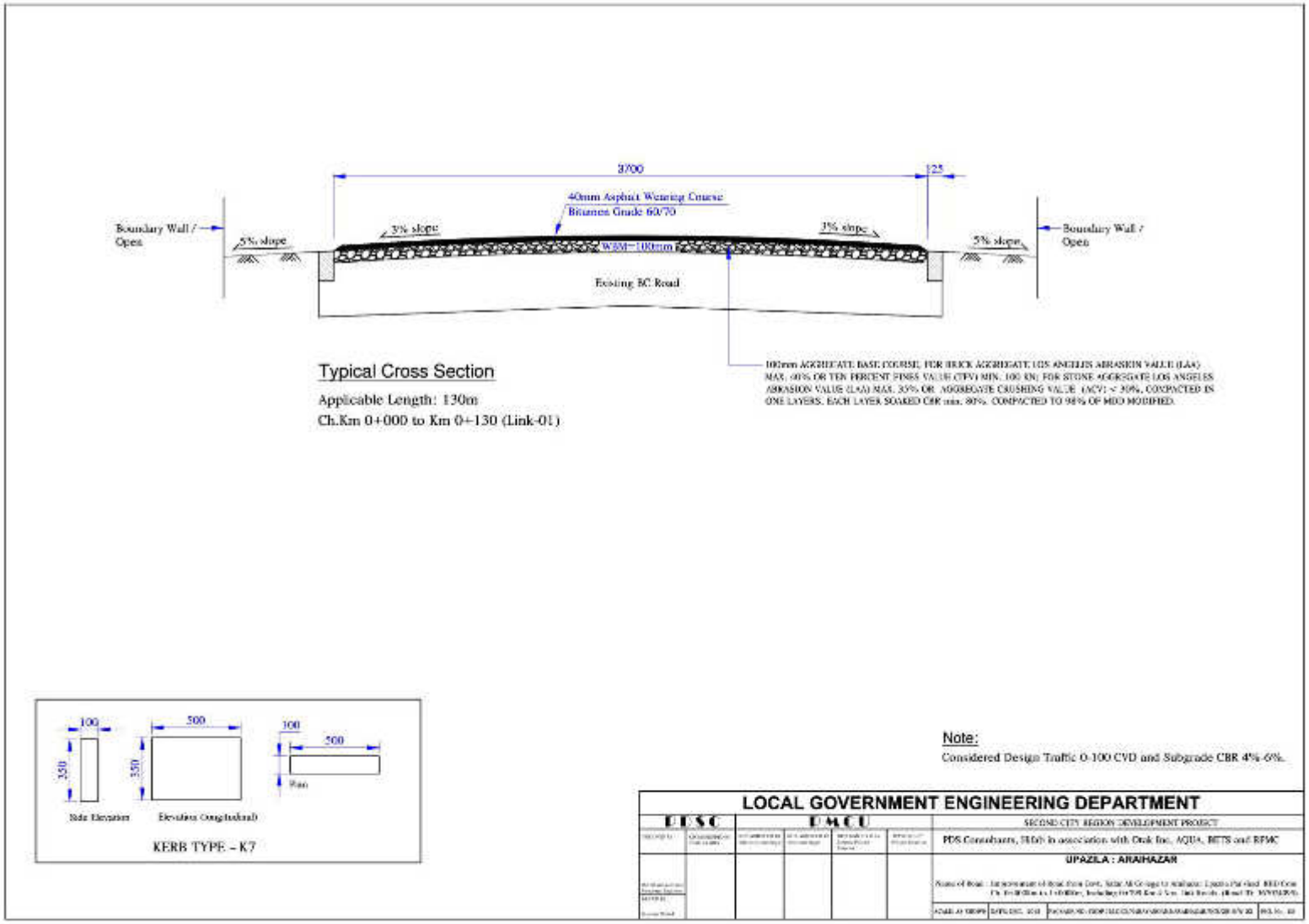


Figure 12: Typical Cross section of the Road (Ch. 0+130 - 0+300 km – Link 01)

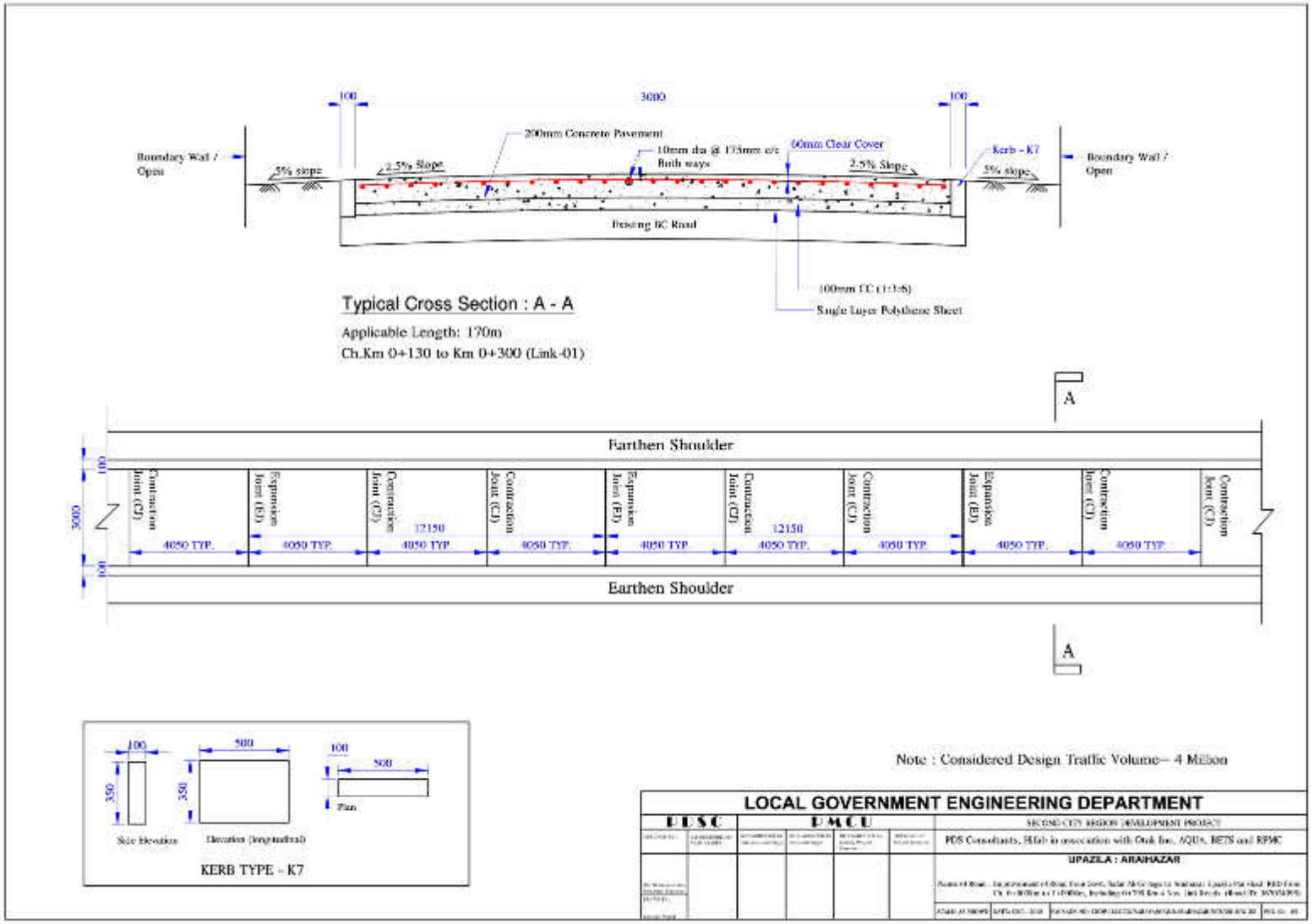


Figure 13: Typical Cross section of the Road (Ch. 0+000 - 0+114 km – Link 02)

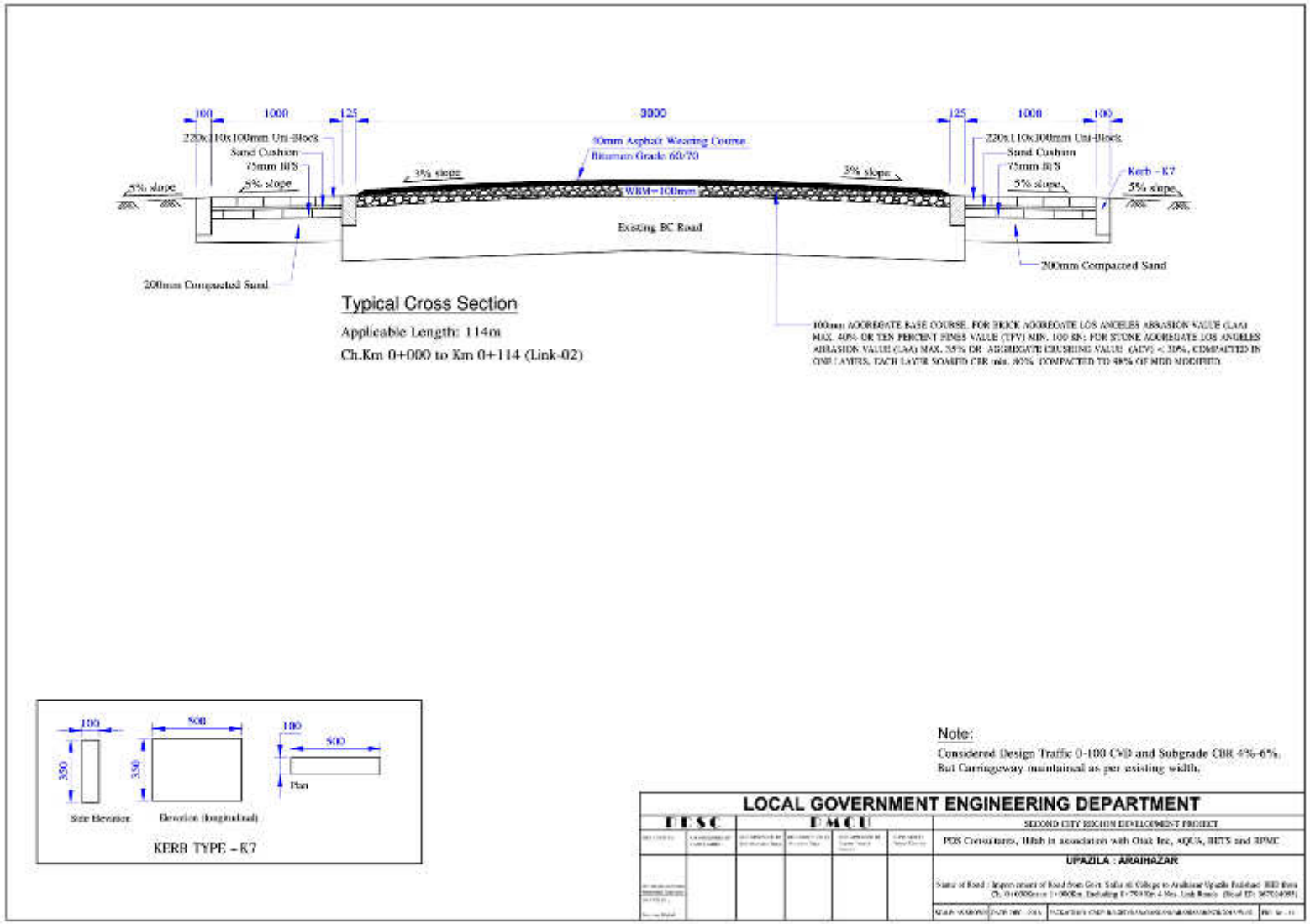
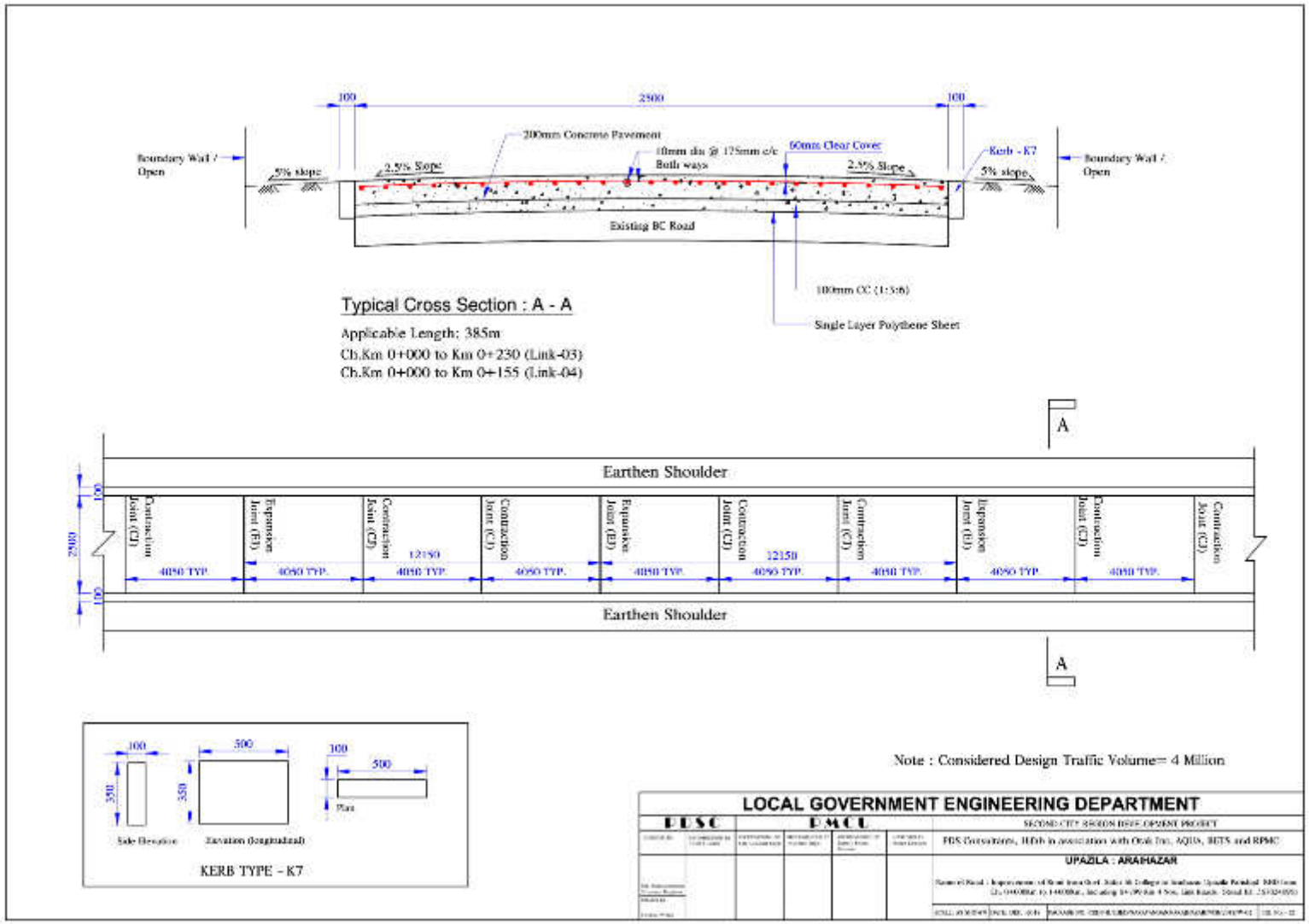


Figure 14: Typical Cross section of the Road (Ch. 0+000 - 0+230 km – Link 03 & Ch. 0+000 - 0+155 km – Link 04)



2. Road 2: Improvement of road from RHD Araihazar Bazar - Araihazar Purinda (Road ID 4094)

76. Proposed interventions planned for the Existing Road (ID No. 4094) RHD Araihazar Bazar - Araihazar Purinda Road of length 2.400 km (Ch.0+000 to 2+400 km) are as follows:

(i) Improvement of the existing 2-lane road, including hard shoulder/s or walkway/s and soft shoulders on either sides of the road within ROW;
(ii) Construction of RCC carriageway of width 3.0 m ~ 6.0 m as per design, and it will include hard shoulder/s or walkway/s and soft shoulders on either sides depending on the availability of vacant road width;
(iii) Construction of RCC Pipe Drain with drain pits and catch pits through the centre line of the road alignment to remove the roadside rainfall and run-off stagnant water:
- at Ch.00 – 576 m (1000 mm ∅ RCC pipe drain through the centre line of the road alignment);

(iv) Pavement works comprising construction of sub-grade, sub-base, base binder course and wearing course;
(v) Road improvement based on design that considers the road safety requirements per LGED published guidelines and standards. This includes planning of cross section, bus and truck stand; and
(vi) Protection works (pallisading) undertaken at locations where ditches and ponds adjacent to the road embankment are found. These will protect road edges from being eroded or sliding. Locations and lengths of proposed protection works at different sections are shown in **Table 10** below.

Table 10: Locations and Lengths of Proposed Protection Works along RHD Araihazar Bazar - Araihazar Purinda Road (Road ID 4094)

Sl.no	Left Side Chainage and Length	Right Side Chainage and Length
1	0+544 - 0+576 m (32 m)	0+475 - 0+542 m (67 m)
2	0+635 - 0+705 m (70 m)	0+626 - 0+652 m (26 m)
3	0+880 - 0+930 m (50 m)	
Total length	**152 m**	**93 m**

74. The existing status with proposed development interventions of this road component is summarized in **Table 11.**

Table 11: Summary of Proposed Improvement Works for RHD Araihazar Bazar - Araihazar Purinda Road (Road ID 4094)

Name of Subprojects	Length / Area	Subproject Components	Details of Proposed Works	Existing condition
Road-2 **Improvement of RHD Araihazar Bazar - Araihazar Purinda Road (Road ID 4094)**	2.400 km	a. RCC Pavement b. drainage c. slope protection works	**Road:** a. RCC Road with 3.0m carriageway from Ch.00-1126m, b. RCC Road with 4.5m carriageway from Ch. 60-112m (Link-01), Ch.00-100 (Link-2), c. RCC Road with 3.7m carriageway from Ch.100-250m (Link-02) d. RCC Road with 6.0m carriageway from Ch.00-60m (Link-01) & Ch.00-155m (Link-03) **Slope Protection Works:** at 5 (Five)sections (for details **Table 10** may be referred).	**Road:** a. BC Road with 3.0m carriageway from Ch.00-1126m. b. CC Road with 3.7m carriageway from Ch.100-250m (Link-02) c. CC Road with 4.5m carriageway from Ch.60-112m (Link-01) & Ch.00-100m (Link-02) d. CC Road with 6.0m carriageway from Ch.00-60m (Link-01) & Ch.00-155m (Link-03) **Box Culverts:** 3.0m X 3.0m Box Culvert at Ch.660m
Construction of Drain **RHD Araihazar Bazar - Araihazar Purinda Road (Road ID 4094)**	576 m	**Drainage**	**Drains:** • at Ch.00 – 576 m (1000 mm ∅ RCC pipe drain through the centre line of the road alignment)	**Drain:** There is no functional road side drain along the alignment of the subject road.

The typical section for the roadway design considerations with their cross-sections are exhibited in the following **Figures 15, 16, 17 and 18.**

Figure 15: Typical Cross section of the Road (Ch. 0+000 - 1+126 km)

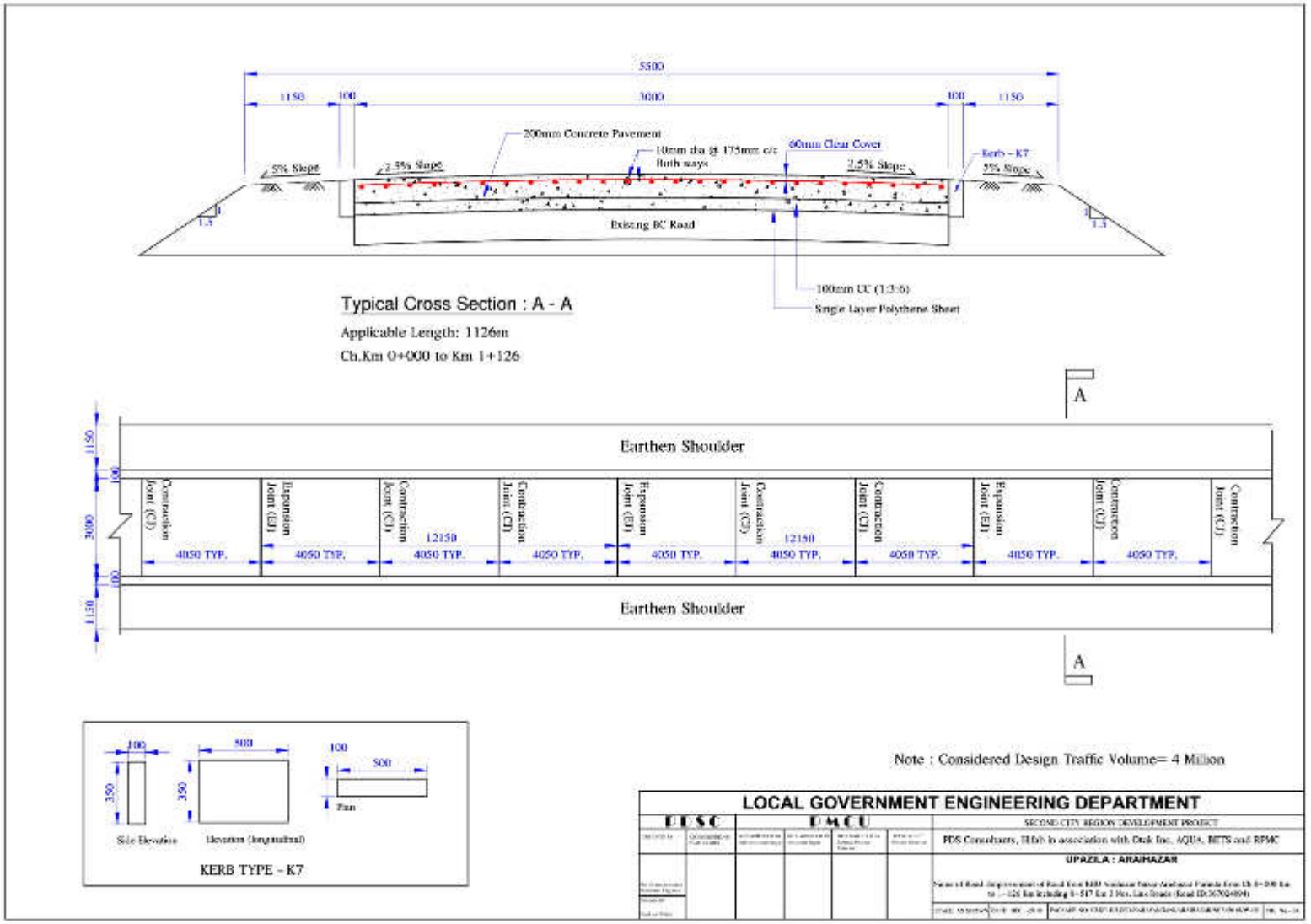


Figure 16: Typical Cross section of the Road (Ch. 0+000 - 0+060 km – Link 01 & Ch. 0+000 - 0+155 km – Link 03)

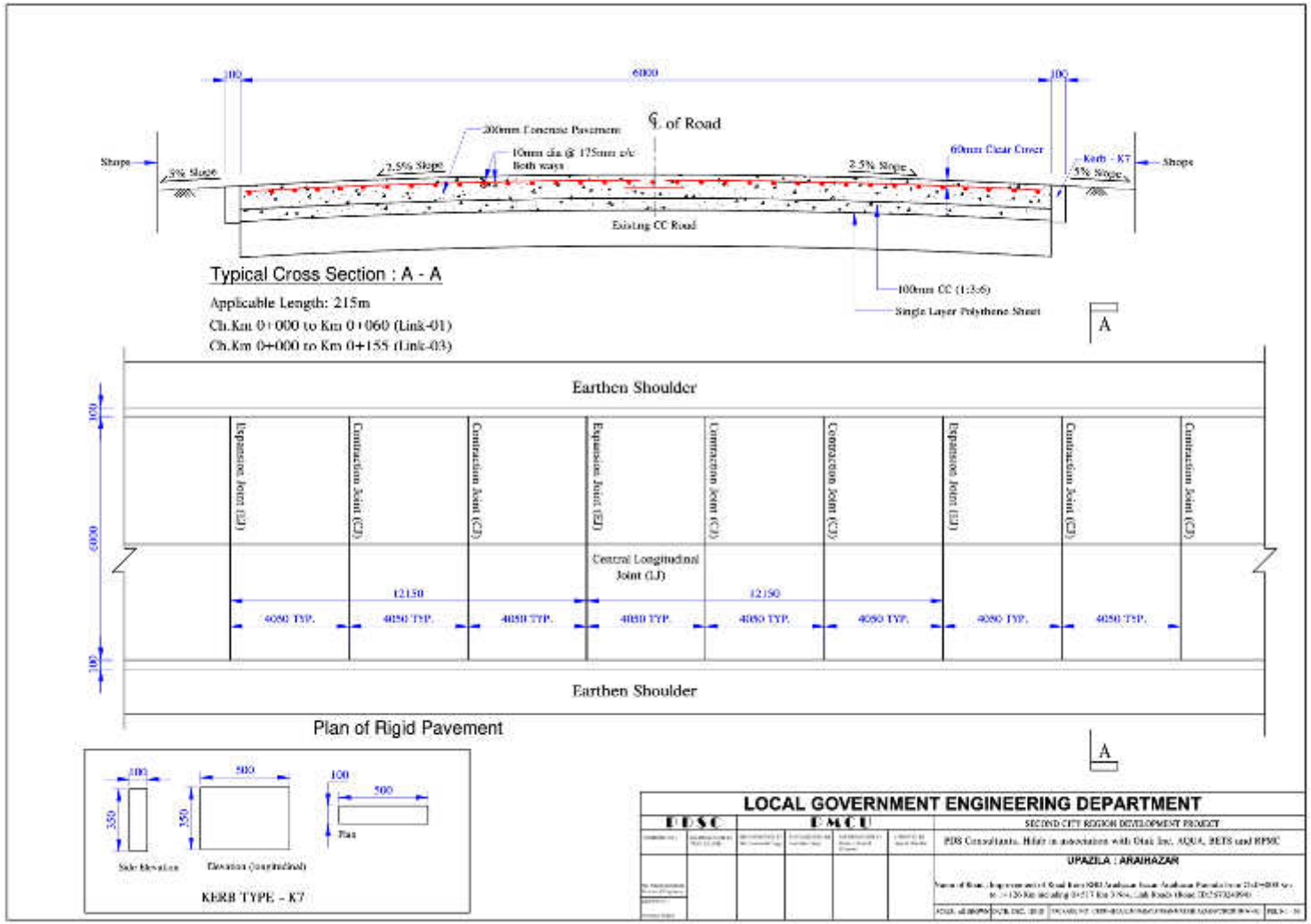


Figure 17: Typical Cross section of the Road (Ch. 0+060 - 0+112 km-Link 01 & Ch. 0+000-0+100 km-Link 02)

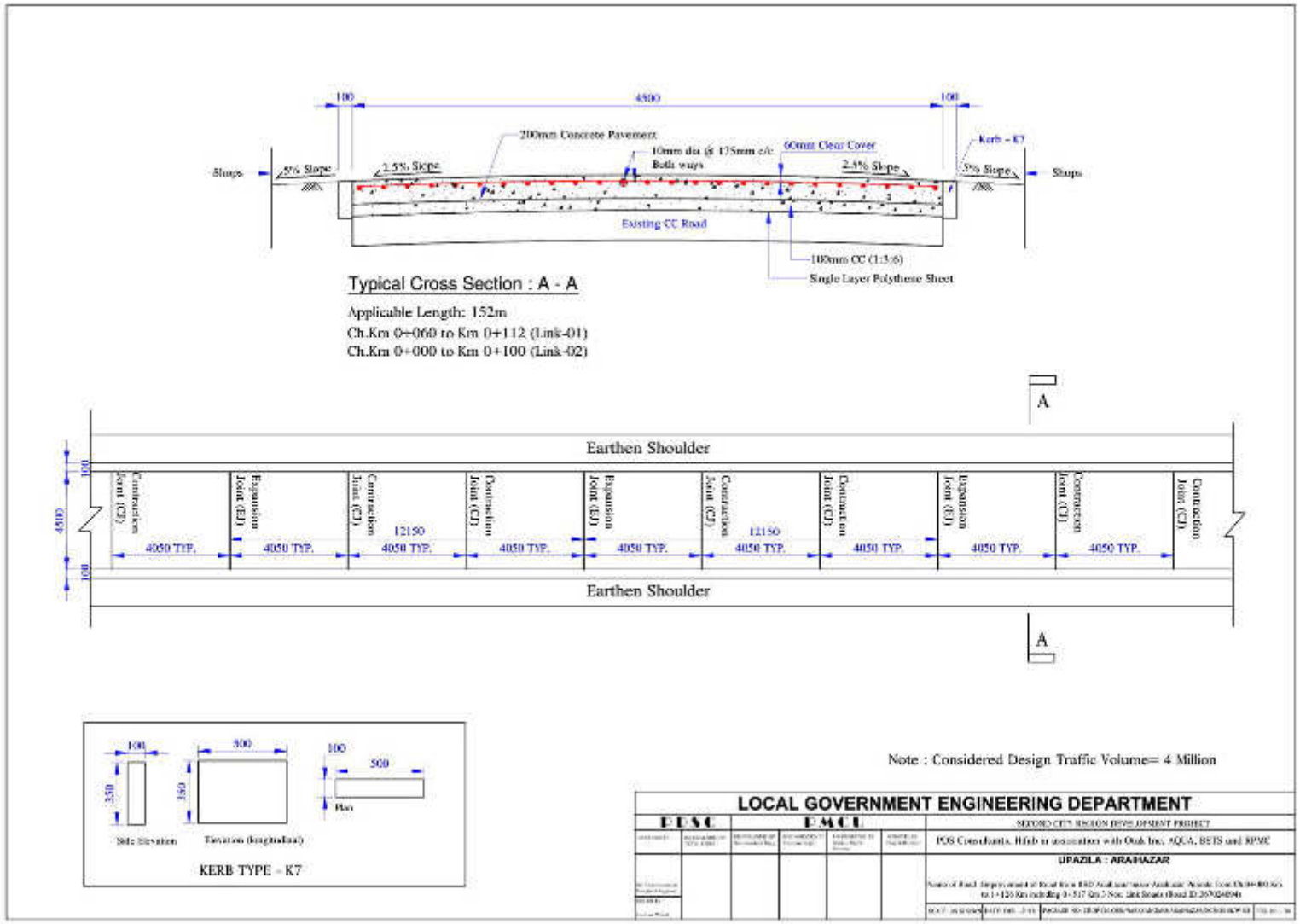
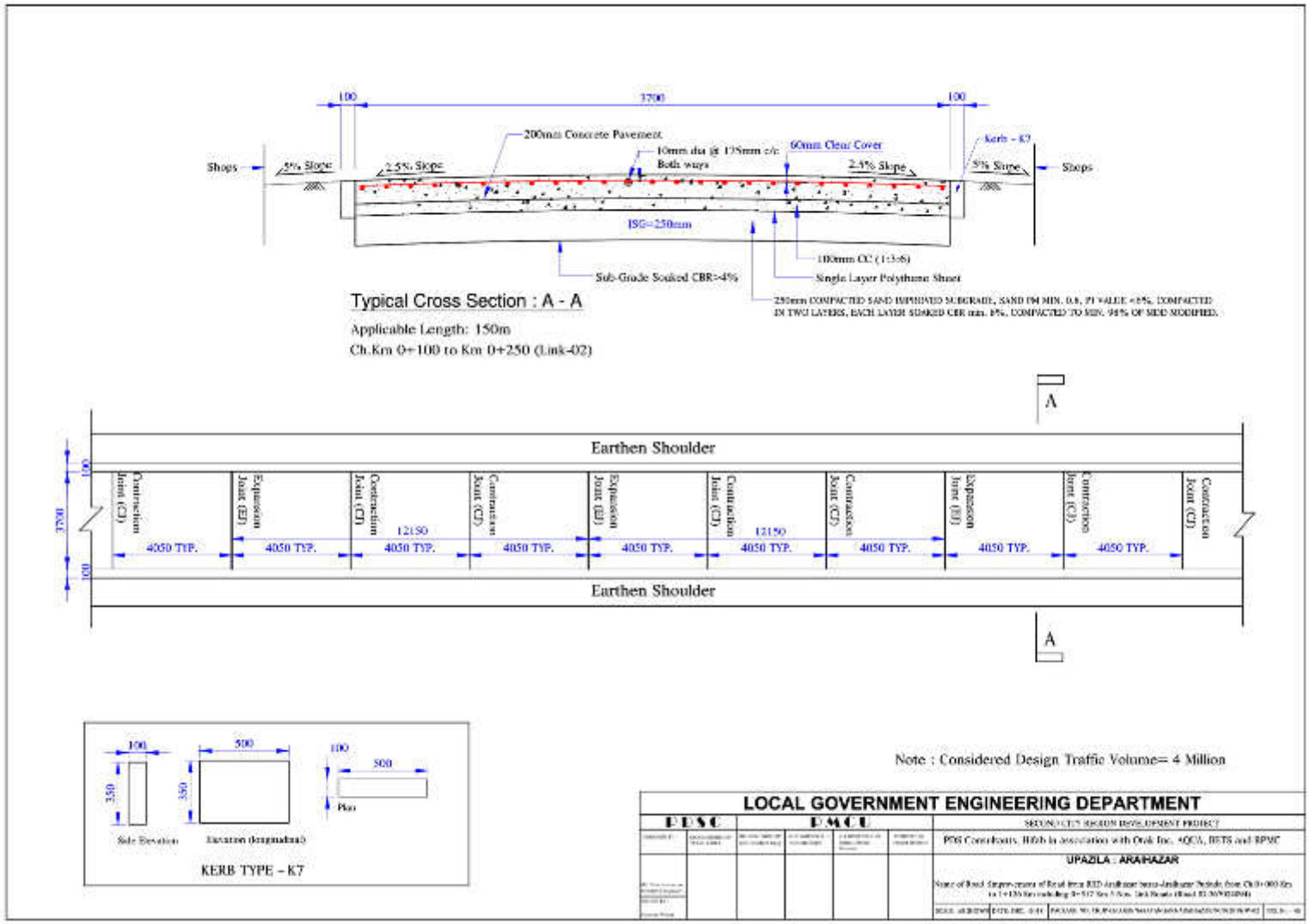


Figure 18: Typical Cross section of the Road (Ch. 0+100 - 0+250 km - Link 02)



3. Road 3: Improvement of Road from Laskardi – Langardi Bazar (Road ID 4072)

75. Proposed interventions planned for the Existing Road (ID No. 4072) Laskardi – Langardi Bazar Road of length 2.200 km (Ch. 0+000m to 2+200 km) are as follows:

(i) Improvement of the existing single lane road, including soft shoulders on both sides which are within ROW;
(ii) Construction of BC/RCC carriageway of width 3.0 m as per design, and it will include soft shoulder/s or walkway/s on either sides depending on the availability of vacant road width;
(iii) Construction of Box Culverts of size 5.0m x 5.0m at Ch. 1430 m;
(iv) Pavement works comprising construction of sub-grade, sub-base, base binder course and wearing course;
(v) Road improvement based on design that considers the road safety requirements per LGED published guidelines and standards; and
(vi) Protection works(pallisading) undertaken at locations where ditches and ponds adjacent to the road embankment are found. These will protect road edges from being eroded or sliding. Locations and lengths of proposed protection works at different sections are shown in **Table 12** below.

Table 12: Locations and Lengths of Proposed Protection Works at Laskardi – Langardi Bazar (Road ID 4072)

Sl.no	Left Side Chainage and Length (m)	Right Side Chainage and Length (m)
1	0+038 - 0+052 (14 m)	0+025 - 0+044 (19 m)
2	0+060 - 0+069 (09 m)	0+123 - 0+165 (42 m)
3	0+075 - 0+083 (08 m)	0+255 - 0+347 (92 m)
4	0+265 - 0+278 (13 m)	1+127 - 1+223 (96 m)
5	0+308 - 0+338 (30 m)	1+870 - 1+955 (85 m)
6	0+340 - 0+353 (13 m)	1+973 - 2+047 (74 m)
7	0+355 - 0+388 (33 m)	
8	0+473 - 0+516 (43 m)	
9	0+556 - 0+565 (09 m)	
10	0+840 - 0+864 (24 m)	
11	1+628 - 1+662 (34 m)	
12	1+760 - 1+779 (19 m)	
Total length	**=(249 m)**	**= (408 m)**

The existing status with proposed development interventions of this road component is summarized in **Table 13.**

Table 13: Summary of Proposed Improvement Works for Laskardi – Langardi Bazar (Road ID 4072)

Name of Subprojects	Length / Area	Subproject Components	Details of Proposed Works	Existing condition
Road-3 **Improvement of Laskardi – Langardi Bazar (Road ID 4072)**	2.200 km	a. BC & RCC Pavement b. Drainage c. slope protection works	Road: a. RCC Road with 3.0m carriageway from Ch.00-865m & Ch.1850-2200m, b. BC Road with 3.0m carriageway from Ch.865-1850m. Slope Protection Works: At 18 (eighteen) sections (for details Table 12 may be referred). Box Culverts: 5.0m X 5.0m Box Culvert at Ch.1430 m	**Road:** **a.** BC Road with 3.0m carriageway from Ch.00-2200m**.** . **Bridge:** 7m Single Lane Bridge at Ch.864m. **Open Foundation Culvert (OFC):** OFC at Ch.1430m.
Construction of Drain-1 **RHD Araihazar Bazar - Araihazar Purinda Road (Road ID 4094)**	576 m	**Drainage**	Drains: • at Ch.00 – 576 m (1000 mm ∅ RCC pipe drain through the centre line of the road alignment)	**Drain:** There is no functional road side drain along the alignment of the subject road.

The typical section for the roadway design considerations with their cross-sections are exhibited in the following **Figures 19 and 20**.

Figure 19: Typical Cross section of the Road (Ch. 0+000 - 0+865 km & Ch. 1+850 - 2+200 km)

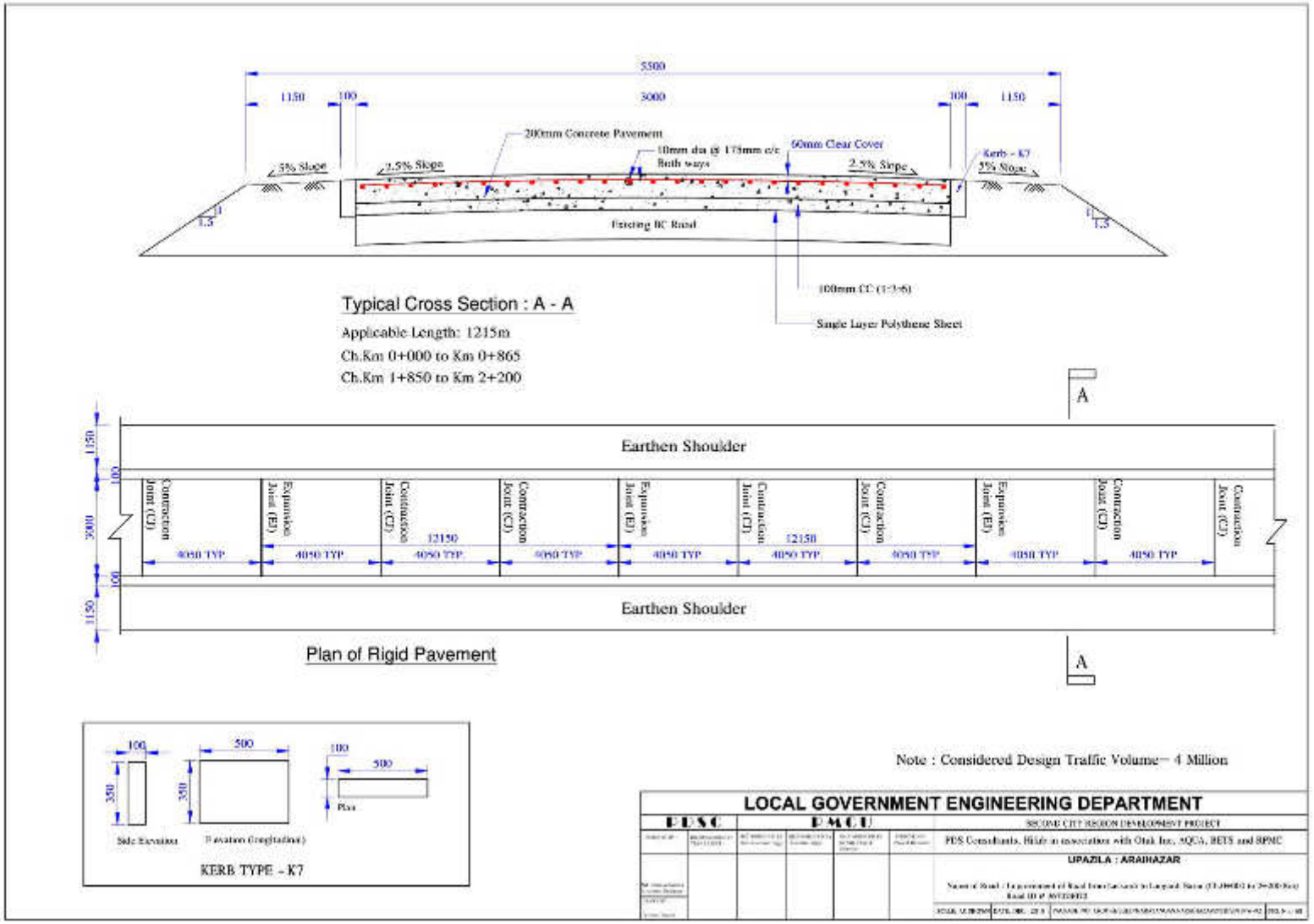
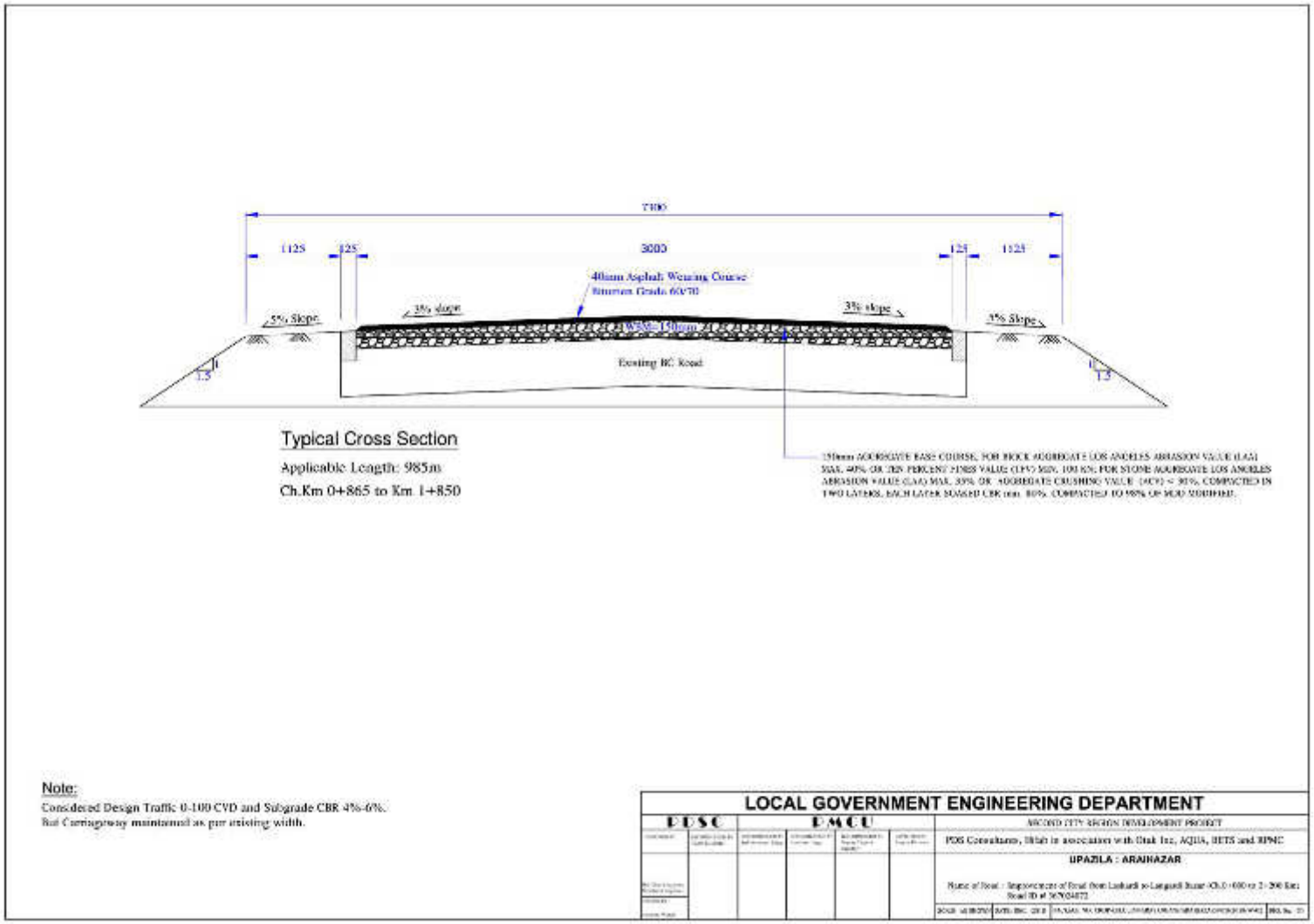


Figure 20: Typical Cross section of the Road (Ch. 0+865 - 1+850 km)



4. Road 4: Improvement of Road from Kalibari bazar – Panchrukhy (Road ID: 4081)

76. Proposed interventions planned for the Existing Kalibari bazar – Panchrukhy Road of length 3.520 km (Ch. 0+000 to 3+520 km) are as follows:

(i) Improvement of the existing single lane road, including soft shoulders on both sides of the road which are within ROW;
(ii) Construction of BC/RCC carriageway of width 3.0 m as per design, and it will include soft shoulder/s or walkway/s on either sides depending on the availability of vacant road width;
(iii) Construction of 2 (two) Box Culverts –
    1) of size 2 V x 4.6 m x 4.6 m at Ch. 1295 m;
       and
    2) of size 3 V x 4.5 m x 4.5 m at Ch. 2870 m;
(iv) Pavement works comprising construction of sub-grade, sub-base, base binder course and wearing course.
(v) Road improvement based on design that considers the road safety requirements per LGED published guidelines and standards. This includes planning of cross section, bus and truck stand.
(vi) Protection works (pallisading) undertaken at the locations where ditches and ponds adjacent to the road embankment are found. These will protect road edges from being eroded or sliding. Locations and lengths of proposed protection works at different sections are shown in **Table 14** below:

Table 14: Locations and Lengths of Proposed Protection Works along Kalibari bazar – Panchrukhy (Road ID: 4081)

Sl.no	Left Side Chainage and Length (m)	Right Side Chainage and Length (m)
1	0+584 to km 0+607 (23 m)	0+836 to km 0+885 (49 m)
2	0+792 to km 0+828 (36 m)	0+910 to km 0+945 (35 m)
3	1+468 to km 1+488 (20 m)	1+056 to km 1+092 (36 m)
4	1+493 to km 1+507 (14 m)	1+495 to km 1+516 (21 m)
5	1+554 to km 1+580 (26 m)	2+340 to km 2+358 (18 m)
6	1+630 to km 1+650 (20 m)	2+448 to km 2+474 (26 m)
7	2+206 to km 2+258 (52 m)	2+475 to km 2+506 (31 m)
8	2+263 to km 2+295 (32 m)	2+885 to km 2+925 (40 m)
9	2+880 to km 2+920 (40 m)	3+065 to km 3+109 (44 m)
10		3+113 to km 3+155 (42 m)
11		3+167 to km 3+203 (36 m)
12		3+212 to km 3+255 (43 m)
13		3+260 to km 3+300 (40 m)
Total length	**= (263 m)**	**= (461) m**

The existing status with proposed development interventions of this road component is summarized in **Table 15.**

Table 15: Summary of Proposed Improvement Works for Kalibari bazar – Panchrukhy Road (Road ID: 4081)

Name of Subprojects	Length / Area	Subproject Components	Details of Proposed Works	Existing condition
Road-4 **Improvement of Kalibari bazar – Panchrukhy Road (Road ID: 4081)**	3.520 km	a. BC & RCC Pavement b. Drainage c. slope protection works	**Road:** a. RCC Road with 3.0m carriageway from Ch.00-300m & 2870-3450m, b. BC Road with 3.0m carriageway from Ch.300-2870m & Ch.3450-3520m, **Box Culverts:** Construction of 2 (two) Box Culverts railing & wheel guard – 1) at Ch. 1295m, 2 V x 4.6 m x 4.6 m, and 2) at Ch. 2870m, 3 V x 4.5 m x 4.5 m **Slope Protection Works:** at 22 (twenty two) sections (for details **Table 14** may be referred).	**Road:** a. BC Road with 3.0m carriageway from Ch.00-3520m. **Box Culverts:** 4 (four) Box Culverts – at Ch.1295m, Ch.2115m, Ch.2870m & Ch. 3507m.

The typical section for the roadway design considerations with their cross-sections are exhibited in the following **Figures 21 and 22.**.

Figure 21: Typical Cross section of the Road (Ch. 0+000 - 0+300 km & Ch. 2+870 - 3+450 km)

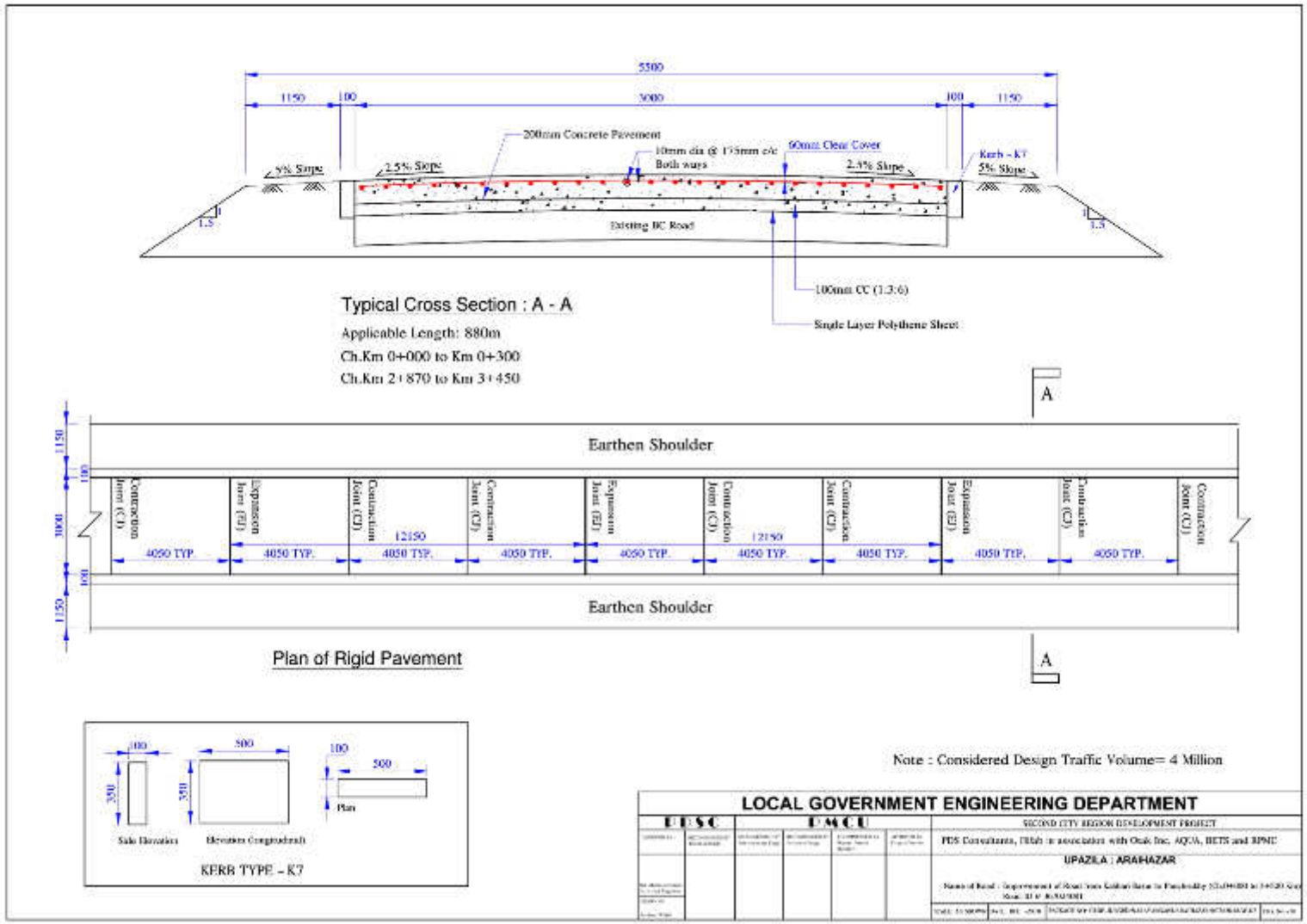
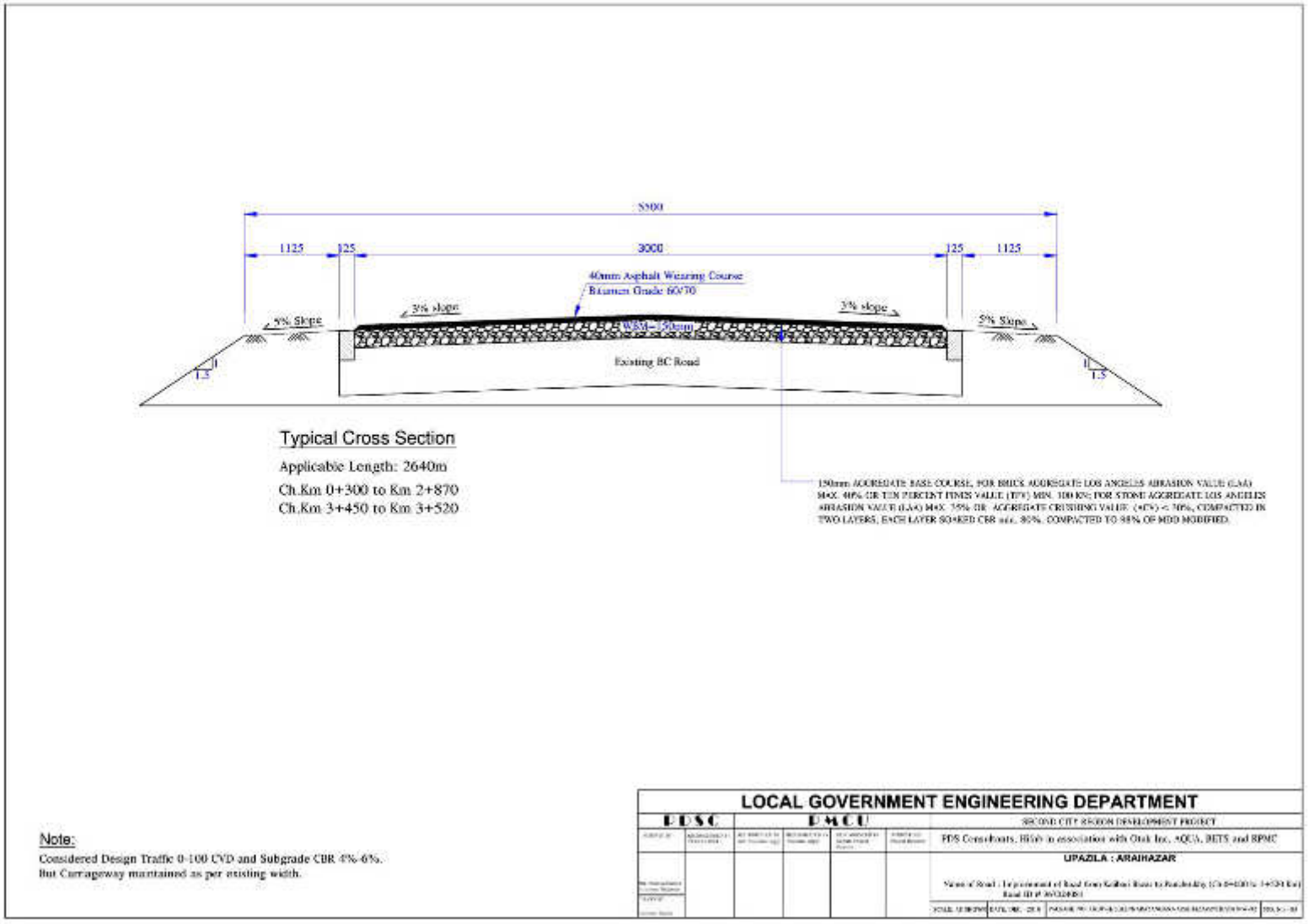


Figure 22: Typical Cross section of the Road (Ch. 0+300 - 2+870 km & 3+450 - 3+520 km)



5. Road 5: Improvement of Road from Dhuptara to Buntim Pullah (Road ID: 4077)

77. Proposed interventions planned for the Existing Dhuptara to Buntim Pullah Road of length 3.007 km (Ch. 0+000 to 3+007 km) are as follows:

(ii) Improvement of the existing 2-lane road, including soft shoulders on both sides of the road which are within ROW;

(vii) Construction of BC/RCC carriageway of width 5.5 m as per design, and it will include soft shoulder/s or walkway/s on either sides depending on the availability of vacant road width;

(viii) Construction of 2 (two) Box Culverts –
1) of size 1V x 4.5 m x 4.5 m at Ch. 1856 m,
and
2) of size 2V x 5.0 m x 5.0 m at Ch. 2630 m;

(ix) Pavement works comprising construction of sub-grade, sub-base, base binder course and wearing course.

(x) Road improvement based on design that considers the road safety requirements per LGED published guidelines and standards. This includes planning of cross section, bus and truck stand.

(xi) Protection works (pallisading) undertaken at the locations where ditches and ponds adjacent to the road embankment are found. These will protect road edges from being eroded or sliding. Locations and lengths of proposed protection works at different sections are shown in **Table** 14**16** below:

Table 16: Locations and Lengths of Proposed Protection Works along Dhuptara to Buntim Pullah Road (Road ID: 4077)

Sl.no	Left Side Chainage and Length (m)	Right Side Chainage and Length (m)
1	0+615 to km 0+718 (103 m)	0+540 to km 0+567 (27 m)
2	0+775 to km 0+810 (35 m)	0+570 to km 0+610 (40 m)
3	0+945 to km 1+000 (55 m)	0+688 to km 0+717 (29 m)
4	1+130 to km 1+140 (10 m)	0+875 to km 0+895 (20 m)
5	1+500 to km 1+542 (42 m)	0+944 to km 0+967 (23 m)
6	2+295 to km 2+380 (85 m)	0+973 to km 0+997 (24 m)
7	2+770 to km 2+830 (60 m)	1+135 to km 1+162 (27 m)
8		1+505 to km 1+605 (100 m)
9		1+610 to km 1+645 (35 m)
10		2+037 to km 2+110 (73 m)
11		2+134 to km 2+160 (26 m)
12		2+190 to km 2+248 (58 m)
13		2+355 to km 2+400 (45 m)
14		2+645 to km 2+765 (120 m)
15		2+785 to km 2+830 (45 m)
Total length	**= (390 m)**	**= (692) m**

The existing status with proposed development interventions of this road component is summarized in **Table 157.**

Table 17: Summary of Proposed Improvement Works for Dhuptara to Buntim Pullah Road (Road ID: 4077)

Name of Subprojects	Length / Area	Subproject Components	Details of Proposed Works	Existing condition
Road-5 **Improvement of Dhuptara to Buntim Pullah Road (Road ID: 4077)**	3.007 km	a. BC & RCC Pavement b. Drainage c. slope protection works	**Road:** a. RCC Road with 5.5m carriageway from Ch.00-570m b. BC Road with 5.5m carriageway from Ch.570-3007m **Box Culverts:** Construction of 2 (two) Box Culverts – 1) at Ch. 1856m, 4.5 m x 4.5 m and 2) at Ch. 2630m, 2 x 5.0 m x 5.0 m **Slope Protection Works:** At 22 (twenty two) sections (for details **Table 16** may be referred).	**Road:** a. BC Road with 4.0m carriageway from Ch.00-3007m . **Bridge:** 9m Single Lane Bridge at Ch.2630m. **Box Culverts:** 3 (three) Box Culverts – at Ch.293m, Ch.1505m, & Ch. 1856m.

The typical section for the roadway design considerations with their cross-sections are exhibited in the following **Figures 23 and 24**.

Figure 23: Typical Cross section of the Road (Ch. 0+000 - 0+570 km)

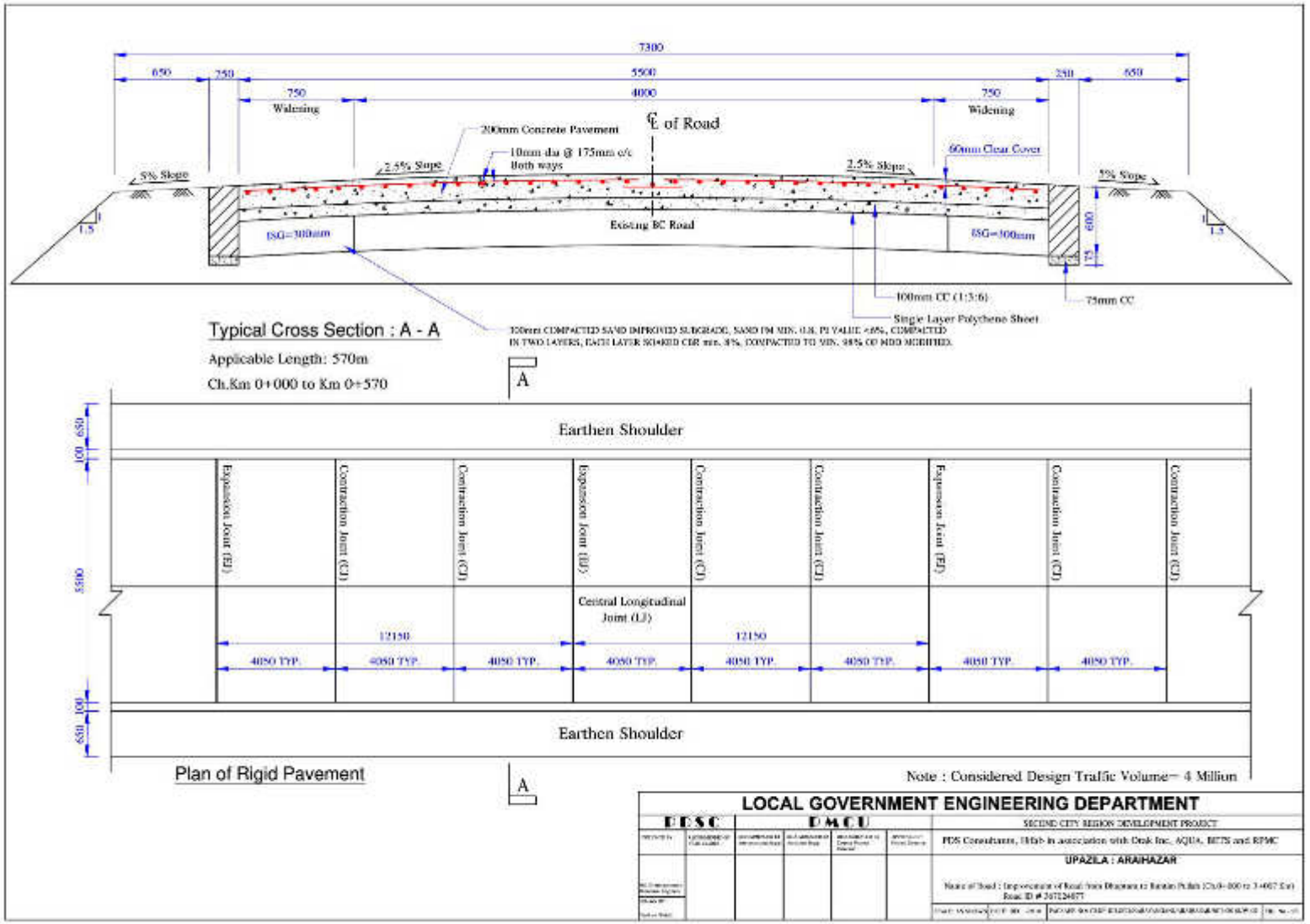
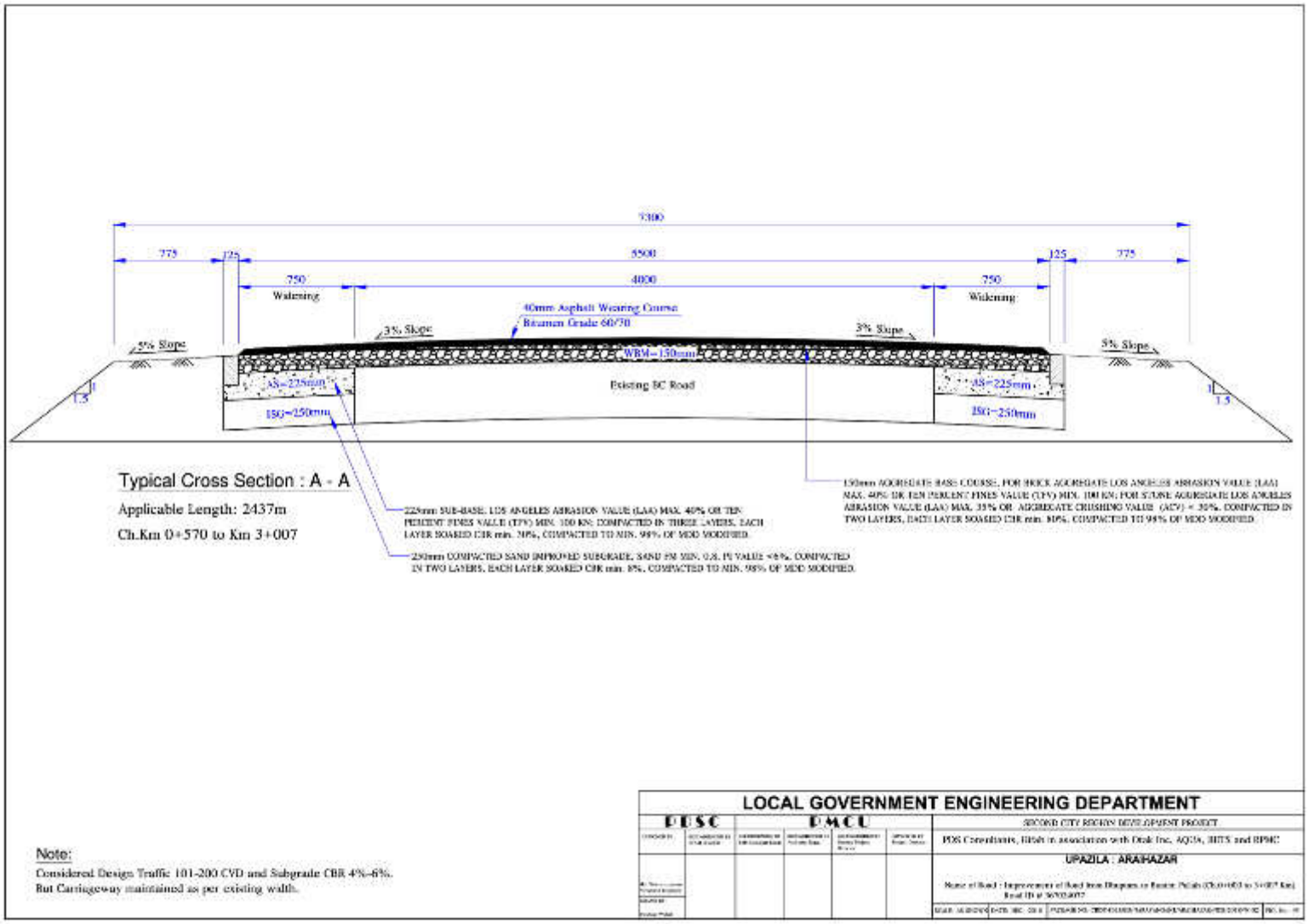


Figure 24: Typical Cross section of the Road (Ch. 0+570 - 3+007 km)



IV. DESCRIPTION OF THE ENVIRONMENT

A. Physical Resources

75. **Location and Extent.** The proposed subproject is located in Araihazar Upazila of Narayanganj District in the division of Dhaka, Bangladesh, and it is in between 23°40' and 23°53' north latitudes and in between 90°35' and 90°45' east longitudes. .It is bounded by Narsingdi Sadar Upazila on the north, Homna Upazila on the south, Banchharampur Upazila on the east and Rupganj and Sonargaon Upazilas on the west. Total area of the Upazila is area 183.35 sq km.

76. **Topography, Soil and Geology.** The area is generally flat and poorly drained and its elevation is about 7 meters above mean sea level and the area is nearly slope from west to east. Soils are somewhat porous allowing for some seepage of surface water into the soil, but in general the area is subject to seasonal flooding.

77. **Climate.** The temperature at Araihazar ranges from 22 to 32 degrees Celsius, and the monthly rainfall averages 15 mm during winter season and 430 mm during monsoon season.

78. **Air Quality.** No information is available on local air quality. Population density within the subproject area of the Upazila is high and there are many motor vehicles operating on the subproject roads and other roads within the Upazila. It is expected that the subproject will not cause significant deterioration of air quality in the area. Close vegetation is observed in and around the project area. Prior to construction activities, subproject contractors will conduct air quality measurements as baseline. During construction, contractors will be required to conduct air quality measurements and ensure that the subproject does not cause deterioration of ambient air quality. This is included in the environmental management plan hereof.

79. **Surface Water**. Shitalakshya river and Meghna river are the majorchannels of the area, which is the ultimate discharge point of all smaller streams within the Upazila. Shitalakshya river is more than 10 km to the west of the subproject area, while Meghna river is more than 6 km to the eastern side of subproject area. Canals and streams flowing through the Upazila area flow toeither these two rivers. **Figure 25** below shows the location of the subproject sites from these river system.

80. **Ground Water.** Groundwater is abundant in Bangladesh. Water tables are generally shallow and aquifers are productive. The main aquifer, which is the source of water supply, is found at a depth of greater than 50 m.

Figure 25: Map showing location of subproject sites relative to Shitalakshya and Meghna rivers

B. Ecological Resources

1. Terrestrial Ecosystem

81. **Terrestrial Flora.** The ecological setting is mostly settled countryside with typical homestead and roadside vegetation. There are no extensive forested areas in the near vicinity, yet tree cover from cultivated species could be as high as 50% in some areas. There is no natural forest located alongside any of the subproject road of Araihazar Upazila. Only roadside trees are found which are largely maintained by the community or social forestry program. Social forestry program would mean any reforestation initiatives among government, non-government, institutional or peoples organizations. Main crops grown inside the subproject area include paddy, jute, peanut, onion, garlic, chilli and other vegetables.

82. **Terrestrial Fauna.** The diversified habitat and ecosystem in the proposed area support various types of animals. Most of the amphibians, reptiles and mammals were identified by using books and description of the local people during the field survey by LGED and these species are common in many areas of Bangladesh. The subproject area is considered a developed and modified urban setting. There are no endangered or critical species and critical habitats found during the field surveys.

Aquatic Ecology

83. **Aquatic flora.** Different types of aquatic flora species were recorded in the study areas. These are found in canals and ponds in the area and grow abundantly during monsoon season or when these canals and ponds are filled with rain water. The most abundant hydrophytes in the project area are Kochuripana *(Eichhorniacrassipes),* Topapana *(Pistia stratiotes),* Khudipana *(Lemna minor)* PataJhajii *(Vallisneria spiralis),* Shapla *(Nymphaea sp.),* Kolmi *(Ipomoea aquatica),* Helenchaa *(Enhydra fluctuant),* and Duckweed *(Spiredella* sp.). Numerous algae (e.g. *Spirogyra* and *Scytonema)* and amphibian plant, Dholkolmi (Ipomoea*fistulosa)* are also found in the road side water bodies. There are no endangered aquatic flora species found in water bodies in the subproject areas.

84. **Aquatic Fauna.** There are 70 species of fishes and 3 species of shrimp were found in project road area. The fishery grounds in the subproject area comprise of ponds, beels, rivers, flood lands, borrow pits, and canals. There are no endangered aquatic fauna species found in water bodies in the subproject areas. These water bodies are normally full during monsoon seasons, while some dry up during summer or dry seasons.

Economic Development

85. **Land Use.** Per rough estimation, the total agricultural land is approximately 15,000 hectares, fallow land is approximately 1,000 hectares; single crop 10%, double crop 60% and triple crop land 30%. Land under irrigation is 45%. As regards the ownership of agricultural land – landowner 45% and landless 55%; cultivable land per head is 0.15hectare.

86. **Industry and Agriculture.** There are few small and medium size industries of different types (Rice mill, flour mill, Jute mill, cotton mill, paper mill, hosiery industry, bakery, bidi factory etc.) and cottage industries (Goldsmith, blacksmith, weaving, wood work, embroidery etc.) in operation in the Upazila area. As observed from field visit at proposed subproject site, no industries were found to encroach the ROW for the proposed development. Main crops grown in the area are paddy, wheat, potato, brinjal, patal, cauliflower, sugarcane and mula (radish). Extinct or nearly extinct crops are kaun and sesame.

87. **Infrastructure, Transport and Communications.** Existing infrastructure in Araihazar Upazila includes many roads that are poorly maintained, degraded in condition and often impassable except at very slow speeds. Itemized these include 355.02 km paved, 251.29 km earthen road, 0.35 km brick drain and 35 km natural drain. Regular bus services are available to travel other areas of Bangladesh. Internal movement is met by rickshaw, auto-rickshaw, easy-bike, maxi (laguna) and rickshawvan.

Social and Cultural Resources

88. **Demography.**[13]The population of Rupganj Upazila is 331566 (male 171482, female 160084; Muslim 319854, Hindu 116553, Buddhist 22, Christian 28 and others 9). It has 52963 households with average household size is 7.1. The population density is 2,053 persons per sq km, Information obtained from the Upazila suggests that the main occupations of general people are agriculture 28.48%, non-agricultural laborer 8.29%, commerce 20.19%, transport and communication 4.84%, industry 15.13%, service 5.96%, construction 1.40%, religious service 0.26%, rent and remittance 3.44% and others12.01%.

[13]Banglapedia. The National Encyclopedia of Bangladesh. http://en.banglapedia.org/index.php?title=Araihazar_Upazila

89. **Local Market and Bazar.** There are 34 hats and bazaar in the subproject Upazila; most noted of which are Gopaldi Bazar, Araihazar Bazar (former name Kalibari), Kamrangir Char Bazar, Jangalia Bazar and Radhanagar Bazar. It is noteworthy to point out that Murapara Bazar, Kaladi Bazaar and Handi market are partly or fully fall within the proposed subproject road alignment (footnote 13).

90. **Health and Educational Facilities.** There are numerous health facilities, educational and religious institutions within the Upazila: Health centers include – Hospital 1, satellite clinic 5, family planning clinic 7, health and family welfare center 4, union health center 7, clinic 1. Educational institutions include – college 4, technical college 2, secondary school 24, primary school 104, madrasa 51. Noted educational institutions: Araihazar Pilot School (1897), Satgram Govt. High School (1910), Duptara C.C High School (1912), Central Coronation High School (1912), Sadasardi High School (1913), Gopaldi High School (1919) and Religious institutions include - Mosque 290, temple 10, tomb 3. Noted religious institutions (1919). Average literacy rate within the Upazila area is 37.4% (male 41.2%, female33.4%) (footnote 13)

91. **Water Supply and Sanitation.** There is no piped water supply system in the Upazila. The sources of drinking area include tube-well (94.02%), tap (0.40%), pond (0.21%) and others 5.37%.; and the sanitation facilities are available in the form improved sanitary latrine in 32.62% dwelling households of the Upazila and 33.02% of dwelling households use non-sanitary latrines; 6.87% of households do not have latrine facilities (footnote 13).

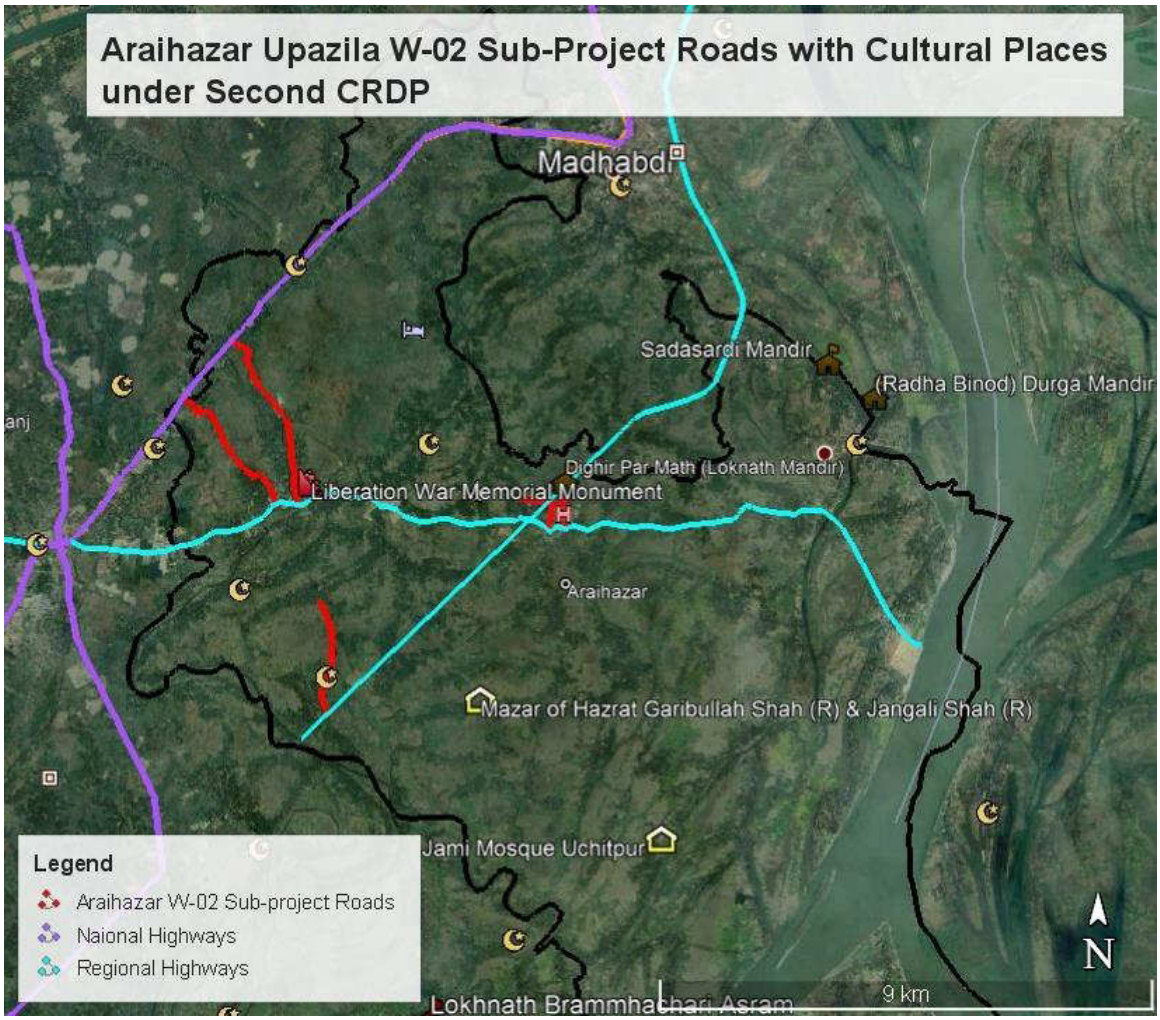
92. **Access to electricity.** All the unions of the Upazila are under rural electrification net-work. However 60.90% % of the dwelling households have access to electricity.

93. **Pollution and Road Safety.** People are concerned about increasing pollution in the subproject area as well as safety of people while crossing the roads. Industries within the subproject road were found discharging the untreated effluent to local drains, canals and water courses which may result in the contamination of the land area and water bodies. Accident is reported to take place now and then on the subproject road due to rough driving as well fast speed and non-availability of safe passage for crossing the road.

History, Culture and Tourism

94. The Upazila area is also enriched with cultural heritage sites and structures such as the following: (i) two-storied building with 108 rooms (Sadasardi), (ii) mazars of Hazrat Garibullah Shah (R) and Jangali Shah(R) at Haizadi, (iii) colored glass decorated Durga Mandir, (iv) house of Zamindar Birendra Roy Chowdhury, (v) Dighipar Math (Araihazar), (vi) single-domed Jami Mosque (Uchitpur), and (vii) marks of the war of liberation (Memorialmonument). These are playing a vital economic role in this Upazila. These archaeological/cultural heritage and relics are generally of local interest and tourist attraction only. None of these sites and structures are included in the list of UNESCO World Heritage Sites or protected monuments by the Bangladesh Department of Archaeology. None of these are located near or along the alignments of the subproject and will not be affected by the proposed roadway improvements. The nearest structure is already more than 500 m by straight line distance from the nearest subproject alignments.Sasardi is already about 5 km northeast of the Araihazar Upazila, while Haizadi and Uchitpur are more than 4 km south of Araihazar Upazila. Based on actual field visits by PMCU in 2017 and 2018, no physical cultural resources are found in the corridor of impacts. **Figure 26** below shows the nearest physical cultural resources and are more than 300 m from the road alignments.

Figure 26: Aerial Map Showing the Locations of Cultural Heritage Sites Relative to the Subproject Alignments



Socio-economic benefits from the Road Improvement Schemes

95. Expected outcomes after implementation of the schemes will be:

(i) Increased property values and revenue income of the Upazila.
(ii) Improved environmental conditions and reduced environmental pollution risk;
(iii) Improved tourist potential, providing an enhanced business environment for local businesses and investment.
(iv) Increased job opportunities in small industries due to expansion of trade and commerce.
(v) Increased economic and financial opportunities
(vi) Creation of short-term employment opportunities in construction work during the period of implementation;
(vii) Improved traffic management, public transport and sustainable environmental conditions;
(viii) Generation of employment opportunities.

96. **Summary of environmental features around the road alignments.**

To understand the effect of the proposed of the subproject to receptors, information on some important environmental key features for all the four subproject roads have been collected and analyzed. From analysis, these roads reveal more or less similar pattern of environmental features around them. **Table 18** summarizes these environmental features.

Table 18: Summary of environmental features around road alignments

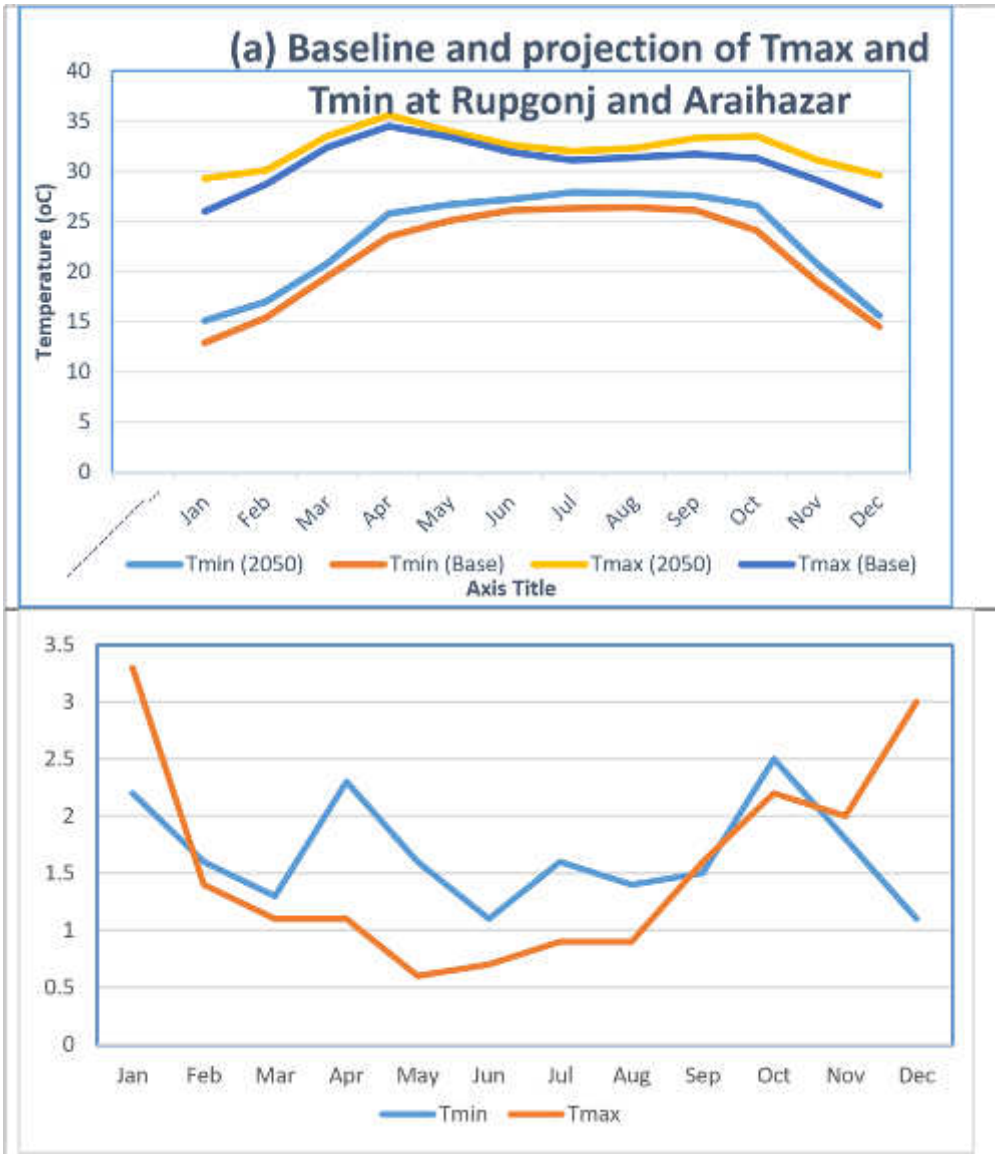
Sl. No.	Environmental Features	Within 100 m from centerline of road	Within 7 km from centerline of road
1	Ecological		
a)	Presence of Wildlife Sanctuary/ National Park	No	No
b)	Reserved Forests	No	No
c)	Wetland/water bodies	Small ponds/ditches. None is protected	1 river (Meghna) /ponds and ditches, but none is protected
d)	Migratory route for wild animals	No	No
e)	Migratory routes for birds	No	No
f)	Migratory routes for fishes	Yes(during rainy season)	Yes (during rainy season)
g)	Presence of Dolphin	No	No
h)	Tree/vegetation cover	Yes. Moderate trees and vegetation. No threatened or endemic tree.	Yes. Moderate trees and vegetation. No threatened or endemic tree.
i)	Birds Nesting	No	No
2.	Archaeological Monuments	No	No
3.	Groundwater	Available at low depth, drinking water at about 50 m below ground.	Available at low depth, drinking water at about 50 m below ground.
4.	Land Use	Agricultural, Rural Settlement, Urban Settlement, Commercial, Industrial	Agricultural, Rural Settlement, Urban Settlement, Commercial, Industrial, Some Rural Community Forests (not protected forests).
5.	Physical Cultural structures and social	Road in some areas passes through few religious structures and/ or graveyard located near the road alignments. However, none of these will be affected.	Road passes through rural-urban and peri-urban areas. Few religious structures and/ or graveyard located near the road alignments.

Source: PMCU/LGED field surveys conducted in 2017 and 2018.

Baseline and Projected Climate

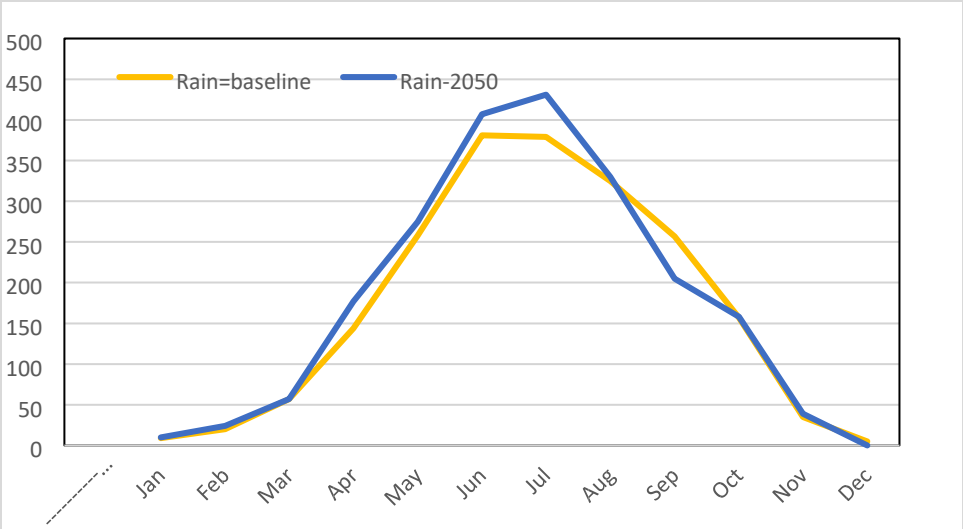
97. A climate change vulnerability and disaster risk assessment was conducted for the various subprojects under Second CRDP.[14] Results of this assessment have been used to design the various subprojects, including the Araihazar roads subprojects. The baseline climate and future projection at 2050 for Tmin, Tmax and Rainfall for Araihazar for RCP 6.0 are shown in **Figure 27** and **Figure 28** respectively, which demonstrate that the temperature is expected to increase in the future; increase of minimum temperature is higher than the maximum temperature. The changes of Tmin and Tmax (^{0} C) and Rainfall (mm) is shown **Table 19.**

Figure 27: Temperature baseline and projection for 2050 (a) and Change of minimum and maximum temperature by 2050 with respect to baseline

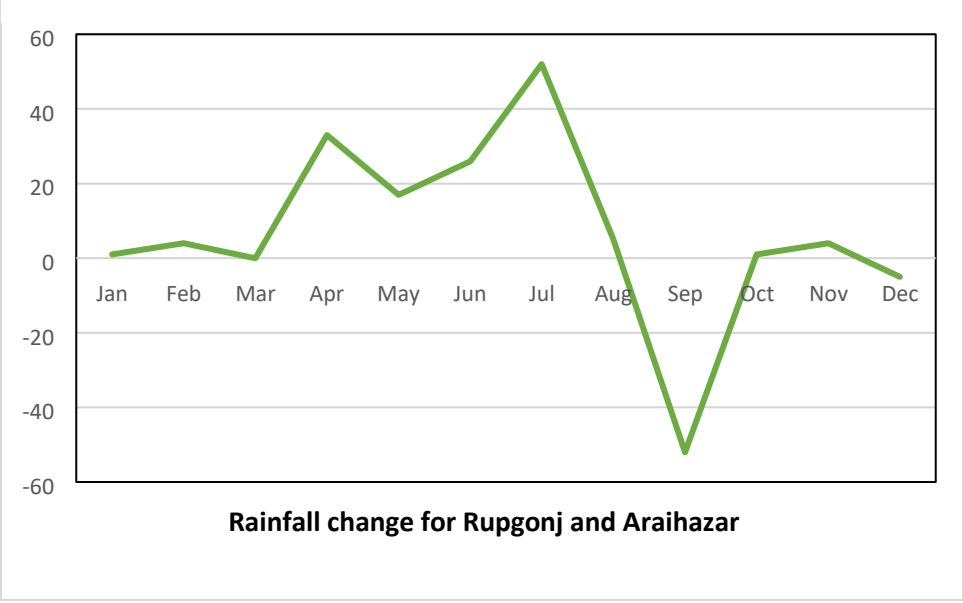


[14]Source: Climate Change Vulnerability and Disaster Risk Assessment: Design Options for Dhaka Region Roads Subprojects. Second CRDP. LGED. 2017

Figure 28: Base line and projection for 2050 of rainfall (a) and the change of rainfall in 2050 with respect to the baseline for Araihazar and Rupganj



(b)Baseline and projected rainfall for Rupganj and Araihazar



Rainfall change for Rupgonj and Araihazar

Table 19: Table showing changes of Tmin and Tmax (0C) and Rainfall (mm) in Rupganj and Araihazar

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

98. For roads, the critical climate parameter is precipitation in terms of volume and intensity, and their impact on occurrences of flooding depending on location. In combination with geology and geography, a related variable is soil moisture as it affects road foundation stability.

99. Hot days temperature is also an important road design consideration, particularly for asphalt roads, due to its effect on stiffness of the pavement. The stiffness modulus of asphalt is affected by temperature. Migration/bleeding of liquid asphalt is a concern at sustained air temperatures above 32°C. For concrete roads, the range of temperature variation determines the proper width of joints, including the composition of the joint sealants.

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

V. ASSESSMENT OF ENVIRONMENTAL IMPACTS AND MITIGATIONMEASURES

A. Compliance with subproject selection criteria

101. The subproject was selected based on the selection criteria in the environmental assessment and review framework (EARF) of Second CRDP. **Table** 20**20** below is a summary of the assessment of compliance with the subproject selection criteria under Second CRDP.

Table 20: Compliance matrix with subproject selection criteria

Criteria	Remarks
1) Complies with all requirements of relevant national, state and local laws, rules and regulations.	Being complied on ongoing basis.
2) Complies with all requirements of ADB Safeguards Policy Statement (SPS) 2009, and follow procedures set down in the EARF.	Being complied on ongoing basis.
3) Does not trigger environmental category A per ADB SPS. In particular, does not encroach any sensitive areas and/or critical habitats per definition of ADB SPS, and does not cause significant adverse environmental impacts that are irreversible, diverse, or unprecedented, which may affect an area larger than the sites or facilities subject to physical works.	Complied.
4) Does not include and/or involve any activities listed in ADB's Prohibited Investment Activities List (Appendix 5 of ADB SPS). These activities do not qualify for ADB's financing.	Complied.
5) Avoids any work in or near environmentally sensitive locations, including sites with national or international designation for nature conservation, cultural heritage, or any other reason.	Complied.
6) Does not result in destruction of or encroachment onto physical cultural resources such as archaeological monuments; heritage sites; and movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance.	Complied.
7) Alignments or project locations avoid or minimize, when avoidance is not possible, the cutting of trees. Include provisions for compensatory plantation at ten trees per every tree to be cut.	Complied. Included in the EMP.
8) Reflects inputs from public consultation and disclosure for site selection.	Complied. Also, to be complied in future consultations. The IEE provides for this criterion.
9) All the road works shall be designed to blend in with the environment.	Complied.
10) Does not lead to alteration of surface water hydrology of streams/waterways that may result in increased sediment load due to erosion from construction sites.	Complied. Included in the EMP.
11) Provides for appropriate protection/mitigation measures to address noise impacts on adjoining communities, especially	Complied. Included in the EMP.

Criteria	Remarks
sensitive receptors as schools/hospitals along the roads.	
12) Ensure requirements for drainage maintenance measures are incorporated into the operations and maintenance manual and suitable budget allowed for to ensure ongoing performance of measures.	Complied. Included in the EMP.
13) For subproject components that may affect natural streams or rivers, all comments and advice received from PMCU, PIU, design engineers, and appropriate departments are incorporated into the planning, design and construction of the subprojects as far as practicable.	Being complied on ongoing basis.
14) Provides for appropriate protection/mitigation measures to address noise impacts on adjoining communities, especially sensitive receptors as schools/hospitals along the roads.	Complied. Included in the EMP.
15) Ensure requirements for drainage maintenance measures are incorporated into the operations and maintenance manual and suitable budget allowed for to ensure ongoing performance of measures.	Complied. Included in the EMP.
16) Ensures detailed designs and environmental safeguards conditions are included in the planning.	Complied. Included in the EMP.
17) Provides for (i) capacity building of PIU staff composting plant operation and maintenance, and (ii) market study on the users of compost to assess sustainability of the demand for such compost.	Complied. Included in the EMP.

C. Anticipated Impacts and Mitigation Measures - Planning, Location and Design Phase

102. **Impacts due to location.** These Impacts are associated with planning particularly on the site selection. They include impacts due to encroaching on sensitive areas and impacts on the people who might lose their homes or livelihoods due to the development of the proposed site. However, in the case of the road subproject, no significant impacts are anticipated since the road construction and/or rehabilitation works will be done on existing road alignments with ROW and located in built up areas. There will be no road widening works that will encroach any private property. The road shoulders or footpaths to be constructed and/or rehabilitated are also within existing ROW.

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

(i) Likely changes in the climatic conditions with respect to temperature, flooding, salinity, and acidity, including drainage aspects; and

(ii) Likelyimpactsonroadsurfacesandrunoffduetoclimatechange-inducedheavierand more erratic rainfall.

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

(i) Due to climate change, the river water level will rise and as a result, the bridge clearancewillbelower.Thereforeconsiderationofincreasebridgeheightis required;

(ii) The differences in water level between base and future time should be computed as it is needed to estimate the additional road embankment height required in making the roads safer against climate change-induced-flooding; The proposed road area might have to drain a significant additional discharge due to climate change-induced higher rainfall during extreme events. Therefore adequate number of drainage facilities along with comparatively larger openings should be considered in structure for the proposed road; and

(iii) Maximum possible efforts have to be made for minimizing cutting of trees while designing widening option for the proposed road.

105. Apart from the above climate change considerations in the design of the subproject, the other impacts, issues, concerns and mitigation measures during the design phase are illustrated in **Table** 21**21** below.

Table 21: Issues, Concerns and Mitigation Measures During Design Phase

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsibility
Detailed design			
Incorporation of sloped areas in subproject design	Soil erosion and slope instability	• Incorporate measures and sites for handling excessive spoil materials • Incorporate drainage plan in final design	PMCU, PDSC
Incorporation of community health and safety measures in the design	Road accidents	• Ensure to include in the design the following: (i) road sign pages in critical areas or curves, (ii) speed limiters such as humps, (iii) barricades or similar structures in accident-prone areas, and (iv) pedestrian crossing lanes, among others.	PMCU, PDSC
Location trees, utilities and other infrastructures before construction.	Disruption of utility services; False claims from people; Water quality changes due to construction. Interference with	• Avoid alignments that will run over trees and utilities such as electric poles, etc. • Innovate and design footpaths that will avoid cutting of trees.	PMCU, PDSC

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsibility
	other utilities and other infrastructures, including heritage areas, if any, during construction	• Provide budget for restoration/replacement of damaged utilities • Provide budget for tree planting as replacement activity for cut trees, if any. • Avoid placing alignment near heritage buildings and religious structures. • Photograph all sites within heritage areas to enable before and after comparison (note: all roads are to be reinstated to original character especially in heritage areas) • Ensure compliance with any Department of Archaeology rules during design.	
Construction in the vicinity of residential areas	Nuisance to nearby receptors. Impacts to qualities of ambient air, surface water, groundwater, and land. Impacts to health and safety of community and workers.	• Ensure compliance with national or international standards on noise, ambient air and effluent, whichever are more stringent. • Ensure all bid and contract documents prepared and finalized have copy of the IEE as attachment.	PMCU, PDSC
O&M Manual preparation	Impacts to health and safety of community.	• Prepare a comprehensive O&M manual to include periodic inspection and maintenance of roads, conduct of road repairs, etc.	PMCU, PDSC
Site selection of sources of construction materials such as sand and gravels.	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated	• Procure construction materials such as sand, gravels, or aggregates from government-authorized dealers	PMCU, PDSC

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsibility
	erosion; Disturbance in natural drainage patterns, ponding and water logging, and water pollution.	only. • If quarrying is to be the source, ensure to conduct at sites authorized by the government such as the Bangladesh Water Resources Development Board for sand quarrying.	
Spoil management and disposal	Inappropriate disposal of spoils will cause nuisances to affected properties, including siltation of canals.	• Identify designated disposal sites approved by the upazila. • A spoil management plan will be developed (**Appendix 8**).	PMCU, PDSC
Construction camps	Inappropriate location for construction camps will impact the general welfare and health and safety of the workers.	• Identify construction camp sites that are strategically located relative to the work sites. • Ensure these camp sites can be easily provided with the basic amenities for the workers.	PMCU, PDSC

D. Anticipated Impacts and Mitigation Measures – Construction Phase

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

2. Construction Method.

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

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

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

Impact on Physical Resources

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

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

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

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

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

(i) confine earthworks according to excavation segmentation plan that should be part of site-specific environmental management plan (SEMP);
(ii) consult with PIU on the designated areas for stockpiling of sand, gravel, and other construction materials;
(iii) bring construction materials (aggregates, sand, etc.) to the construction site as and when required to avoid heavy stockpiling at the sites;
(iv) damp down with water dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary;
(v) if re-surfacing of disturbed roads cannot be done immediately, spread crushed gravel over backfilled surfaces;
(vi) during demolition, water exterior surfaces, unpaved ground in the immediate vicinity and demolition debris;
(vii) place signage at active work sites in populated areas;
(viii) require trucks delivering aggregates and cement to have tarpaulin cover;
(ix) clean wheels and undercarriage of vehicles prior to leaving construction sites;
(x) limit speed of construction vehicles on access roads and work sites to a maximum of 30 km/h;
(xi) prohibit burning firewood in work and labor camps (promote liquefied petroleum gas for cooking purposes and electric heater for heating purposes);

(xii) use vehicles that have government-issued permits and registrations; and
(xiii) prohibit open burning of solid waste.

Noise Levels. Noise-emitting construction activities include earthworks, concrete mixing, demolition works, movement and operation of construction vehicles and equipment, and loading and unloading of coarse aggregates. The significance of noise impact will be higher in areas where noise-sensitive institutions such as health care and educational facilities are situated. Noise levels should not exceed the national standards for noise or WHO noise level guidelines, whichever is more stringent, or result in increase in background noise level of 3 decibels at the nearest receptor location off-site15. The comparative illustration of national standards versus WHO guidelines is in **Table 4** of Section II.

114. To mitigate the impacts, contractors will be required to:
(i) provide prior information to the local public, including institutions such as schools and hospitals, about the work schedule;
(ii) use equipment that emits the least noise, well-maintained and with efficient mufflers. Install silencers if necessary and practical;
(iii) restrict noisy activities to day time;
(iv) avoid use of noisy equipment or doing noisy works at night time;
(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
(viii) not use horns unless it is necessary to warn other road users or animals of a vehicle's approach.

115. **Surface Water Quality.** Some sections of the road alignments are located along or cross water bodies, exposing these water bodies to risks of pollution caused by: (i) poorly managed construction sediments, and waste materials; (ii) poor sanitation practices of construction workers; and (iii) improper storage of petroleum products or chemicals used during construction such as fuel, oil and lubricants. Although construction works will be scheduled during dry season, any unavoidable excavation or construction works during monsoon season will wash down these pollutants to the water bodies.

116. To mitigate these impacts, the contractor will be required to:
(i) dispose excess spoils per the Spoil Management Plan attached in **Appendix 8**;
(ii) locate temporary storage areas on flat grounds and away from main surface drainage routes;
(iii) shield temporary storage areas with sandbags;
(iv) provide adequate water supply and sanitation facilities at work sites;
(v) provide impervious bunded areas with 110% volume for storage of petroleum products used during construction, such as fuel, oils, and lubricants; and
(vi) provide orientation and training to assigned workers on the correct handling of petroleum-based products, clean up of equipment, and response measures in case spills or emergencies.

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

[15] https://www.ifc.org/wps/wcm/connect/06e3b50048865838b4c6f66a6515bb18/1-7%2BNoise.pdf?MOD=AJPERES

(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, mobil, burnt oils, etc. at the construction site; and
(iv) consultation with PIU on the proper disposal of all residual wastes.

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

119. However, as a precautionary measure, the mitigation measures for avoiding seepage of pollutants to the groundwater will be in place. Contractors will be required to provide impervious bunded areas with 110% volume for storage of petroleum products used during construction, such as fuel, oils, and lubricants. This will ensure these chemicals will not seep into the ground and eventually affecting groundwater quality.

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

121. These impacts are negative but short-term and reversible by mitigation measures. As mitigation measures, contractors will be required to:
(i) dispose excess spoils per the Spoil Management Plan attached in **Appendix 8**;
(ii) avoid stockpiling of excess excavated soils as far as possible;
(iii) avoid disposal of any debris and waste soils in or near water bodies/rivers;
(iv) coordinate with PIU for beneficial uses of excess excavated soils or immediately dispose to designated areas;
(v) recover used oil and lubricants and reuse or remove from the sites;
(vi) manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; and
(vii) remove all wreckage, rubbish, or temporary structures which are no longer required;

122. **Impact on Ecological Resources.** Subproject sites are located near and within the town area. There is no biodiversity or natural habitat in these sites. As such, no impact on ecological resources is envisaged.

123. **Impacts on Terrestrial Ecology.** Haphazard site clearing, parking, and movement of construction vehicles and equipment stockpiling, will result in disturbance to the land in the subproject area. However, the subproject area does not include any forest, so the impacts to flora and fauna will be minimal. For trees found along the alignments that will be used for footpaths or drains, the design will ensure that these trees will not be cut.

124. To mitigate these impacts, contractors will be required to:

(i) avoid, or minimize when avoidance is not possible, tree cutting;
(ii) for any tree cut, conduct replacement planting at a ratio of 1:10 consistent with

the approved EARF for Second CRDP and social forestry program of LGED (see **Appendix 9** for LGED Tree Plantation Program);

(iii) protect giant trees and locally-important trees (for religious reasons), if any, during implementation;

(iv) prevent workers or any other person from removing and damaging any flora and fauna found in the subproject sites; and

(v) prohibit employees and workers from poaching animals and cutting of trees for firewood at the subproject sites or their vicinities.

125. **Impacts on Aquatic Ecology.** Some of the subproject sites are near or adjacent to ponds of khals (canals) that have been formed as water bodies and serve as catchment of rainwater during monsoon season. Through the years, these ponds and khals are utilized as fish ponds of the local communities. All aquatic animals in these ponds are not protected species and are grown for livelihood and income purposes by the local communities. Nevertheless, the construction of the subproject may affect these ponds due to siltation and therefore may impact the quality of the water and eventually the productivity and harvest of these aquatic resources.

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

(i) provide temporary protection at sections adjacent or near ponds or khals to avoid sliding of soils;

(ii) store spoils away from these ponds to avoid being washed down the ponds or khals; and

(iii) undertake no construction works near these sites during the spawning and breeding period between June and September.

127. **Impacts to traffic flow.** During construction, few disturbances will occur. Mitigation measures include the preparation and implementation of a traffic management plan in coordination with local authorities and PIU. The traffic management plan 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.

128. **Impacts on physical cultural resources.** The subproject will not encroach into or run over any physical cultural resources. Strip maps showing alignments with physical cultural resources, specifically religious establishment, are shown in **Appendix 10**. As well, the subproject area is not a potential archaeological area and therefore no impact is envisaged.However, as a precautionary approach, the contractor will be required to:

(i) strictly follow the protocol by coordinating immediately with PIU and Bangladesh Department of Archaeology for any suspicion of chance finds during excavation works;

(ii) stop work immediately to allow further investigation if any finds are suspected; and

(iii) request authorized person from the Bangladesh Department of Archaeology to observe when excavation resumes for the identification of the potential chance find, and comply with further instructions.

129. **Impacts on the socioeconomic, environment and resources.** The impacts will result from excavation works, stockpiling, the operation of construction vehicles and equipment, and accidental damage to utilities (e.g., power supply poles, open drains, and water taps or hoses).

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

(i) Prepare a traffic management plan in collaboration with local authorities;
(ii) Where traffic congestion will likely occur, place traffic flagmen during working hours;
(iii) Provide compensation to affected people;
(iv) Manage stockpile;
(v) Manage pumped water from excavations either to drains or drums for later use;
(vi) Relocate the affected power supply poles, and
(vii) Advise the concerned authority during accidental damage to utilities.

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

132. To mitigate these impacts, the contractor will be required to implement its approved SEMP, which should include a community health and safety plan following international best practices on community health and safety such as those in Section 4.3 of World Bank Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities.[16] As a minimum and whichever is applicable, the community health and safety plan shall ensure the following:

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

133. **Occupational health and safety hazards.** Workers will be exposed to the crosscutting threats of the impacts above during construction. Inadequate supply of safe and potable water and inadequate sanitation facilities; poor sanitation practices on site; poor housing conditions; the handling and operation of construction equipment; handling of hazardous substances;

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

exposure to extreme weather and non-observance of health and safety measures pose additional threats to the health and safety of construction workers. Construction workers may be potentially exposed to communicable and transmittable diseases in the community and the workforce.

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

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

(ii) Physical Hazards
   a) Use of personal protective equipment by all workers such as earplugs, safety shoes, hard hats, masks, goggles, etc. as applicable, and ensure these are used properly;
   b) Avoidance of slips and falls through good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths, cleaning up excessive waste debris and liquid spills regularly, locating electrical cords and ropes in common areas and marked corridors, and use of slip retardant footwear;
   c) Use of bracing or trench shoring on deep excavation works;
   d) Adequate lighting in dark working areas and areas with night works;
   e) Rotating and moving equipment inspected and tested prior to use during construction works. These shall be parked at designated areas and operated by qualified and trained operators only;
   f) Specific site traffic rules and routes in place and known to all personnel, workers, drivers, and equipment operators; and
   g) Use of air pollution source equipment and vehicles that are well maintained and with valid permits;

(iii) General Facility Design and Operation
   a) Regular checking of integrity of workplace structures to avoid collapse or failure;
   b) Ensuring workplace can withstand severe weather conditions;

c) Enough work spaces available for workers, including exit routes during emergencies;
d) Fire precautions and firefighting equipment installed;
e) First aid stations and kits are available. Trained personnel should be available at all times who can provide first aid measures to victims of accidents;
f) Secured storage areas for chemicals and other hazardous and flammable substances are installed and ensure access is limited to authorized personnel only;
g) Good working environment temperature maintained;
h) Worker camps and work sites provided with housekeeping facilities, such as separate toilets for male and female workers, drinking water supply, wash and bathing water, rest areas, and other lavatory and worker welfare facilities; and
i) Maintain records and make reports concerning health, safety and welfare of persons, and damage to property. Take remedial action to prevent a recurrence of any accidents that may occur.

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

135. **Impacts to community health and safety.** Once in operation, the improved roads may result to elevated noise level and air emissions from increased vehicular traffic. Increase in carbon monoxide (CO) , sulphur oxides (SOx), particulate matter (PM), nitrous oxides (NOx), and hydrocarbons (HCs) in the air is expected. The construction and rehabilitation of the roads will give way to much faster vehicle speeds which could endanger people and households along the road alignments. Damage to the roads, may also cause accidents to passing vehicles and may inflict harm to the local people.

136. 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.

VI. CONSULTATION, INFORMATION DISCLOSURE, AND GRIEVANCE REDRESS MECHANISM

A. Consultation

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

138. **Preliminary Consultation.** Public consultations were conducted in January 2018 and March 2018 which were attended by various stakeholders. The summary of consultation meeting is attached as **Appendix 11**. The following are some of the concerns discussed:

(i) Local people will support the project activities;

(ii) The main issue arising from the consultation is that the people of this area suffer huge traffic congestion due to movement of heavy container truck. They cannot easily move to the school, hospital, and working places from their residences due to congestion. Hence, the people will benefit from the subproject, especially those who are residing alongside the roads;

(iii) The area is dominated by businesses and is about70%. The people in this area depends largely on these businesses, while the rest on services and agricultural cultivations;

(iv) During the construction period short term, the consultees believe that community activities will be affected. However, the PIU explained that the project will ensure measures shall be put in place to avoid any negative impact to the community;

(v) It was emphasized that no resettlement and land acquisition will be required for the project. However, compensations will be provided to affected persons who will be temporarily disrupted of their businesses during construction;

(vi) It was confirmed with the local stakeholders that there is no protected areas in and around the project areas;

(vii) The project will never impact on natural water body and not contaminate the soil resources. It was explained that he project will implement appropriate mitigation measures to ensure the natural water bodies in the area will not be negatively impacted; and

(viii) The participants assured that they welcome the project, and will support / cooperate in all stages of the project works.

139. **Future consultations during final detailed design stage**. The stakeholder consultations during the final detailed design stage will continue to discuss about the subproject, including the implementation of the EMP and SEMP developed for the subproject. PMCU, PIU and PDSC will ensure that consultations will be conducted as meaningful per definition of ADB SPS (**footnote 17**). Araihazar PIU will ensure that these consultations include participation of the representatives of institutional establishments along the subproject road alignments such as schools, hospitals, and religious establishments and mosques. These religious establishments or mosques are identified in **Appendix 10**.

B. Information Disclosure

140. Information shall be disclosed through public consultation and more formally by making documents and other materials available in a form and at a location in which they can be easily accessed by stakeholders. This normally involves making draft reports available for the public in the subproject locations and providing a mechanism for the receipt of comments, and making documents available more widely by lodging them on ADB and LGED websites. LGED through the PMCU will submit to ADB the following documents for disclosure on ADB's website:[17]

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

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

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

C. Grievance Redress Mechanism

143. Second CRDP will adopt the grievance redress mechanism (GRM) outline of the first CRDP. The GRM shall be set up to register grievances of the people regarding technical, social and environmental aspects. The process will be designed to be transparent, gender responsive, culturally appropriate and commensurate to the risks and adverse impacts of the project, as well as readily accessible to all segments of the affected people. The project GRM will not supersede any legal government grievance procedures. Affected people are to be informed about the mechanism through media and public outlets. This participatory process shall ensure that all views of the people are adequately reviewed and suitably incorporated in the design and implementation process. The GRM will be implemented in three levels. See **Figure 29** for the outline.

[17]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."

144. **First Level**. The first leveland most accessible and immediate venue for the fastest resolve of grievances is the PIU, chiefly through the Environment and/or Social Safeguard Officers and Project Manager (or equivalent), with assistance from the Environmental and Social Safeguard Specialists of the PDSC. The contact phone number will be posted in the project areas and at PMU and PIU websites and notice boards. Grievances will be resolved through continuous interactions with affected persons and the PIU will answer queries and resolve grievances regarding various issues including EMP implementation, land acquisition, structures acquisition, livelihood impacts, entitlements, and assistance. Corrective measures will be undertaken at the field-level itself within five days and feedback provided to the complainant on actions taken for resolution. All grievances will be documented with full information of the person and issue. A sample grievance form that may be used is in **Appendix 12**. The suggested format for record-keeping of grievance is in **Appendix 13**.

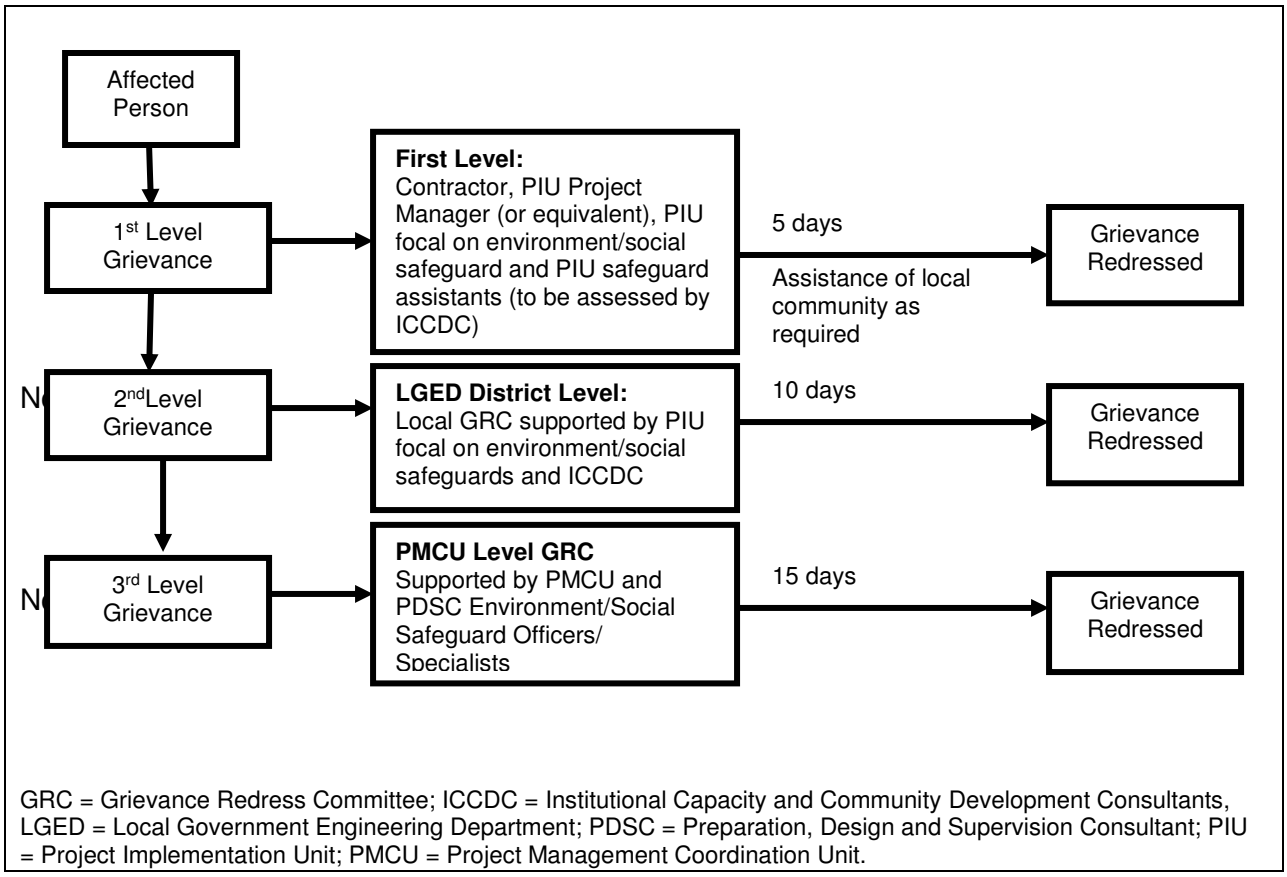
145. **Second Level**. Should the grievance remain unresolved, the PIU Project Manager (or equivalent), will activate the second level of the GRM by referring the issue (with written documentation) to the local Grievance Redress Committee (GRC) of the Pourashava or City Corporation, who will, based on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

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

147. **Third Level**. Should the grievance still remain unresolved, the PIU Head will activate the third level of the GRM by informing the PMCU Project Director who will, based on review of the local GRC minutes and consultation with the local GRC Chair, activate the PMCU level GRC. This committee shall comprise the following representatives: (i) Project Director, PMCU, (ii) Deputy Project Director, PMCU; (iii) Environmental/Resettlement Safeguards Officer of the PMCU; (iv) representative from Land Ministry, (v) representative from DOE; (vi) representative of the affected persons; and (vii) Environmental and/or Social Safeguards officers of the PIU. The Project Director will sign off on all grievances received by the PMCU.

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

Figure 29: Project Grievance Redress Mechanism18



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

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

150. In the event that the established GRM is not in a position to resolve the issue, the affected persons can also use the ADB Accountability Mechanism through directly contacting (in writing) the Complaint Receiving Officer at ADB headquarters. The complaint can be submitted in any of the official languages of ADB's Developing Member Countries. The ADB Accountability Mechanism information will be included in the Project Information Document to be distributed to the affected communities, as part of the project GRM.

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

VII. ENVIRONMENTAL MANAGEMENTPLAN

A. Institutional Arrangements

151. **Project Management Coordination Unit**. LGED will be the executing agency responsible for overall guidance of Second CRDP and implementation of urban roads and solid waste management subprojects. The PMCU, headed by a Project Director will be responsible[19] for planning, management, coordination, supervision and progress monitoring of Second CRDP in the two city regions. The PMCU has the responsibility of fulfilling environmental requirements of the government and conducting required level of environmental assessment as per ADB SPS. To ensure effective implementation of the environmental aspects, one full-time environmental safeguards officer who is a permanent employee of LGED has already been assigned at PMCU. The environmental safeguards officer will primarily be responsible for the compliance to the statutory and legal requirements, including overall supervision of the implementation of the environmental management provisions in the IEEs/EMPs for the subprojects. The PDSC will assist the PMCU in this regard.

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

153. **Preparation, Design and Supervision Consultants**. The Preparation, Design and Supervision Consultants (PDSC) team shall include the following environmental safeguards expertise to effectively implement the EARF and relevant provisions of the IEE reports of the subprojects: (i) an international environmental safeguards specialist (to be hired only on as needed basis), and (ii) national environmental specialists (for duration of implementation). These personnel will provide technical support to the PMCU and Araihazar PIU including implementation of the environmental requirements, according to ADB SPS, and assist in monitoring impacts and mitigation measures associated with subprojects. The PDSC safeguards specialists will support environmental management functions including updating subproject IEEs with respect to environmental management plans, assisting in preparing IEEs, and assist in monitoring impacts and mitigation measures associated with subprojects. The consultants will also provide needed training and capacity building support to the PMCU and Araihazar PIU. The Terms of Reference for project environmental personnel is provided in **Appendix 14**.

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

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

part of the contract documents. Araihazar PIU will monitor contractors' environmental performance.

155. **Table 22** summarizes the overall roles and responsibilities of PMCU, Araihazar PIU, and ADB. More specific roles and responsibilities of these institutions, including the roles and responsibilities of PDSC and contractors shall be defined in the corresponding IEE reports of subprojects.

Table 22: Institutional Roles and Responsibilities

PMCU	PIU	ADB
Pre-construction stage		
Environmental Officer of the PMCU, with assistance from the Environmental Specialist(s) of the MDSC to conduct Rapid Environmental Assessment (REA) for each subproject using checklists available on ADB's website. Based on the REA, categorize the project based on ADB's SPS. Submit all categorization forms to ADB.	MDSC will assist the PIU and conduct IEE (or update existing IEE) for all Category B subprojects, which will include an EMP. PIU with assistance from the Environmental Officer of the PMCU and the Environmental Specialist of the MDSC to carry out public consultation during IEE process and incorporate consultation findings into project designs and IEE.	ADB to review the REA checklists and reconfirm the categorization.
PMCU based on review, will approve the IEE and send to ADB for review and clearance before contract award. The IEE also made available on request. Ensure IEE with the corresponding EMP is part of contract documents for category B subprojects and/or components. If the subproject and/or component is of category 'C', the PMCU to provide generic mitigation measures, if any, to be implemented. For Category C subprojects, no IEE/EIA is required, only a review of the environmental implications.	After the approval of IEE by PMCU and clearance by ADB, PIU with the assistance of MDSC to disclose the IEE and EMP to public information as required by ADB's SPS. MDSC, on behalf of the PIU, to incorporate mitigation measures in project design, specified in IEE and incorporate environmental mitigation and monitoring measures that need to be incorporated into contract document.	ADB will review and grant clearance of IEE/EMPs for subprojects before award of contracts. ADB will disclose cleared and government-endorsed IEEs on its website.
Environmental Officer of PMCU to provide guidance to the PIU to ensure conformance of all subprojects to the regulatory compliance, with regard to environment. This shall include guidance in preparation of the documents as required for the issuance of ECC under the ECR and other necessary clearances such as for example tree cutting permits from the Ministry of Environment and Forests, submission of application forms, and liaising with agencies towards obtaining ECC, tree-cutting permits, and other clearances from	ECR stipulates that for (i) green, (ii) orange-A, (iii) orange–B, and (iv) red category projects, obtaining of environmental clearance certificate from DOE is a prerequisite. The Environmental Support staff of the PIU with assistance from MDSC Environmental Specialists shall compile the necessary information required for submission of application forms for clearances, obtaining NOC from local authorities, etc. Until the obtaining of clearance certificate from DOE, the Environmental Support Staff will interact with the DOE on a regular basis and provide necessary	ADB to ensure that the clearance requirements are included in the contract provisions/EMP.

PMCU	PIU	ADB
relevant government agencies. Environmental Officer of PMCU shall notify the ADB on obtaining of these clearances, including the conditions specified if any in the clearances, and integration of these into the contracts/EMP.	documentation/clarifications as required.	
Environmental Officer of PMCU to ensure that the IEE containing the EMP of each subproject is included in the bid and contract documents. At the same time, the Environmental Officer of PMCU to ensure that the total budget for implementing the EMP is included in the bid and contract documents.	The environmental support staff of PIU to ensure that: (i) each contractor prepares its SEMP based on the EMP in the subproject IEE, and (ii) budget is included in the SEMP.	
Construction stage		
PMCU to review the PIU monthly monitoring reports to ensure that all mitigation measures are implemented. PMCU to consolidate the monthly reports and submit semi-annual reports to ADB for review. Corrective actions to be undertaken if needed.	Contractors to conduct environmental monitoring and implement EMPs. PIU with support of the Environmental Specialist(s) of MDSC to (i) review and approve the contractors' implementation plan for the environmental provisions in the EMP, and (ii) monitor the implementation of mitigation measures by contractor. The MDSC with PIU to prepare monthly progress reports including a section on implementation of the mitigation measures and submit to PMCU for review. PMCU to submit semi-annual monitoring report to ADB.	ADB to review the reports and provide necessary advice/guidance needed to the PMCU.
Operation Stage		
LGED and Araihazar PIU to conduct monitoring, as specified in the environmental monitoring plan of EMP. The DOE to monitor the performance, if required and as specified in monitoring plan of EMP.		ADB to review semi-annual environmental monitoring report and disclose on its website. ADB to prepare Project Completion Report
PMCU to continue submission of semi-annual environmental monitoring report to ADB until ADB issues a Project Completion Report.		

ADB = Asian Development Bank, DOE = Department of Environment, ECC = Environmental Compliance Certificate, ECR = Environmental Conservation Rules, EIA = Environmental Impact Assessment, EMP = Environmental Management Plan, IEE = initial environmental examination, MDSC = Management, Design, and Supervision Consultant, NOC = no objection certificate, PIU = Project Implementation Unit, PMCU = Project Management Coordination Unit, REA = Rapid Environmental Assessment, SPS = Safeguards Policy Statement.

B. Environmental Management Plan

156. An environmental management plan (EMP) has been developed to provide mitigation measures to reduce all negative impacts to acceptable levels. The Environmental Management Plan Matrix is presented in **Table 23**.

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

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