Final Initial Environmental Examination

July 2015

BAN: Third Urban Governance and Infrastructure Improvement (Sector) Project—Rajbari Drainage Subproject (Phase 1)

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

CURRENCY EQUIVALENTS

(as of July 2015)

Currency Unit	=	BDT
BDT1.00	=	$0.0129
$1.00	=	BDT77.775

ABRREVIATIONS

ADB	–	Asian Development Bank
AP	–	affected person
BWDB	–	Bangladesh Water Development Board
DoE	–	Department of Environment
DPHE	–	Department of Public Health Engineering
EARF	–	environmental assessment and review framework
ECA	–	Environmental Conservation Act
ECC	–	environmental clearance certificate
ECR	–	Environmental Conservation Rules
EIA	–	environmental impact assessment
EMP	–	environmental management plan
ETP	–	effluent treatment plant
FGD	–	focus group discussion
GICDC	–	Governance Improvement and Capacity Development Consultant
GRC	–	grievance redressal cell
GRM	–	grievance redress Mechanism
IEE	–	initial environmental examination
LCC	–	location clearance certificate
LGED	–	Local Government Engineering Department
MDSC	–	Management Design and Supervision Consultant
MLGRDC	–	Ministry of Local Government, Rural Development, and Cooperatives
O&M	–	operations and maintenance
PIU	–	project implementation unit
PMO	–	project management office
PPTA	–	project preparatory technical assistance
REA	–	rapid environmental assessment
RP	–	resettlement plan
SPS	–	Safeguard Policy Statement
ToR	–	terms of reference

WEIGHTS AND MEASURES

ha	–	hectare
km	–	kilometer
m	–	meter
mm	–	millimeter

GLOSSARY OF BANGLADESHI TERMS

crore	–	10 million (= 100 lakh)
ghat	–	boat landing station
hartal	–	nationwide strike/demonstration called by opposition parties
khal	–	drainage ditch/canal
khas, khash	–	belongs to government (e.g. land)
katcha	–	poor quality, poorly built
lakh, lac	–	100,000
madrasha	–	Islamic college
mahalla	–	community area
mouza	–	government-recognized land area
parashad	–	authority (pourashava)
pourashava	–	municipality
pucca	–	good quality, well built, solid
thana	–	police station
upazila	–	sub district

NOTES

(i) In this report, "$" refers to US dollars.
(ii) —BDT refers to Bangladeshi Taka

Asian Development Bank

Government of the People's Republic of Bangladesh
Local Government Division
Local Government Engineering Department

FINAL REPORT

Name of Project :
Third Urban Governance and Infrastructure Improvement Sector Project (UGIIP-III)

(39295 - 032 BAN)
TA - 8339 BAN

INITIAL ENVIRONMENTAL EXAMINATION
(IEE FOR DRAINS)

Pourashava : Rajbari

Package No. : UGIIP-III-I/RAJB/DR/01/2014

Joint Venture of

Hifab International AB, Sweden
KS Consultants Ltd., Bangladesh
BETS Consulting Services Ltd., Bangladesh

29 October 2014

CONTENTS

Appendixes

EXECUTIVE SUMMARY

1. After the successful implementation of the First and Second Urban Governance and Infrastructure Improvement Projects (UGIIP I and II)[1] in 74selected *pourashavas*, the Local Government Engineering Department (LGED) within the Ministry of Local Government, Rural Development and Cooperatives (MLGRDC) with the financial assistance of Asian Development Bank (ADB) have planned to implement the third phase of the project titled the Third Urban Governance and Infrastructure Improvement Project (UGIIP-3) in selected 30 *pourashavas* over a period of 6 years (2014 to 2020).

2. The impact will be improved living environment in project towns. The outcome will be improved municipal service delivery and urban governance in project towns. Project towns are pre-selected 30 towns to be supported in an integrated manner under the project.

3. A sector-lending approach will be used for the project as it has been well established and successfully practiced in the UGIIP I and II.

4. The Local Government Engineering Department (LGED) and the Department of Public Health Engineering (DPHE), both under the Local Government Division (LGD) of the Ministry of Local Government, Rural Development and Cooperatives (MLGRD&C) and having extensive experience in managing urban and water supply projects financed by ADB, will be the executing agencies of the project.

5. The Rajbari drainage subproject is one of the subprojects proposed under UGIIP-3. ADB requires the consideration of environmental issues in all aspects of the Bank's operations, and the requirements for environmental assessment are described in ADB's Safeguard Policy Statement (SPS, 2009). This is the draft Initial Environmental Examination (IEE) based on the feasibility study and preliminary engineering designs prepared during project preparation. This IEE will be finalized during detailed design stage to reflect any changes and latest subproject designs.

6. **Categorization.** An environmental assessment using ADB's Rapid Environmental Assessment (REA) checklist for drainage and flood control (**Appendix 1**) was conducted and results of the assessment show that the subproject is unlikely to cause significant adverse impacts. Rajbari drainage subproject is classified as environmental category B as per ADB SPS. This initial environmental examination (IEE) has been prepared in accordance with ADB SPS's requirements for environment category B projects and provides mitigation and monitoring measures to ensure no significant impacts as a result of the subproject.

7. As per Government of Bangladesh Environment Conservation Act, 1995 (ECA, 1995) and Environment Conservation Rules (ECR, 1997), Rajbari drainage subproject is categorized as "red" and location clearance certificate (LCC) and environmental clearance certificate (ECC) must be obtained from the DoE.

---

[1] The Government of Bangladesh with the assistance of ADB has introduced a system whereby funds/loans for development are disbursed in a phased manner based on the successful accomplishment by the recipient *pourashavas* of a set of performance-criteria in the area of urban governance. UGIIP I and II reflect this approach which aims to incentivize participating *pourashavas* to become well-managed and maintained towns in a sustainable way through systems of governance ensuring citizen's participation and inclusion of women, poor and the minority groups in *pourashava* activities. UGIIP I targeted for 27 and UGIIP II for 47*pourashavas*. The subprojects were (i) water supply (ii) sanitation, (iii) solid waste management, (iv) urban drainage, (v) urban transport & communication and (vi) public use facilities.

8. **Subproject scope.** Investments under this subproject include construction of 3.05 kilometers (km) of drainage network within the core area of the *pourashava*.

9. **Implementation arrangements.** Local Government Engineering Department (LGED) and Department of Public Health Engineering (DPHE) are the executing agencies (EA). LGED is responsible for providing support and guidance to *pourashavas* concerning performance criteria and *pourashava* development planning. DPHE will provide support in water supply and sanitation schemes. Implementation activities will be overseen by a Project Management Office (PMO). The participating *pourashavas* are the implementing agencies (IA), with a project implementation unit (PIU) within the *pourashava* structure. Consultant teams[2] are responsible for (i) detailed engineering design, contract documents preparation and safeguards facilitation; (ii) project management and administration support; (iii) assistance in supervising construction; (iii) strengthening of local governance, conducting required studies/surveys and (iv) awareness raising on behavioral change in water, sanitation and solid waste management activities.

10. **Description of the environment**. Subproject components are located in Rajbari urban area or in its immediate surroundings which were developed into urban land uses. The subproject sites are located in existing right of ways (ROWs) and government-owned land. There are no protected areas, wetlands, mangroves, or estuaries in or near the subproject location. There are no forest areas within or near Rajbari.

11. **Environmental management.** An environmental management plan (EMP) is included as part of this IEE, which includes (i) mitigation measures for environmental impacts during implementation; (ii) an environmental monitoring program, and the responsible entities for mitigating, monitoring, and reporting; (iii) public consultation and information disclosure; and (iv) a grievance redress mechanism. A number of impacts and their significance were reduced through mitigation measures in the preliminary design stage. The EMP will form part of the civil work bidding and contract documents.

12. Locations and siting of the proposed infrastructures were considered to further reduce impacts. The concepts considered in design of the Rajbari drainage subproject are: (i) locating facilities on government-owned land to avoid the need for land acquisition and relocation of people; (ii) taking all possible measures in design and selection of alignment to avoid resettlement impacts; (iii) avoiding where possible locations that will result in destruction/disturbance to historical and cultural places/values; (iv) avoiding tree-cutting where possible; (v) ensuring all planning and design interventions and decisions are made in consultation with local communities and reflecting inputs from public consultation and disclosure for site selection.

13. During the construction phase, impacts mainly arise from (i) disturbance of residents, businesses, and traffic; (ii) need to manage excess construction materials and spoils; and (iii) community and workers health and safety. These are common impacts of construction in urban areas, and there are well developed methods for their mitigation. Measures such as conducting work in lean season and minimizing inconvenience by best construction methods will be employed. Traffic management will be necessary during excavation works on busy roads. In the operational phase, all facilities and infrastructure will operate with routine maintenance, which should not affect the environment. Facilities will need to be repaired from time to time, but

[2] Consultant teams are composed of Management Design and Supervision Consultants (MDSC) and Governance Improvement and Capacity Development Consultants (GICDC).

environmental impacts will be much less than those of the construction period as the work will be infrequent, affecting small areas only.

14. Mitigation measures have been developed to reduce all negative impacts to acceptable levels and will be assured through a program of environmental monitoring. The monitoring program will include observations on- and off-site, document checks, and interviews with workers and beneficiaries. The PMO will submit semi-annual monitoring reports to ADB which will include a detailed review of EMP implementation, including corrective actions taken.

15. **Consultation, disclosure and grievance redress.** The stakeholders were involved in developing the IEE through discussions on-site and public consultation, after which views expressed were incorporated into the IEE and in the planning and development of the subproject. The IEE will be made available at public locations in the *pourashava* and will be disclosed to a wider audience via the ADB and LGED project websites. The consultation process will be continued and expanded during project implementation to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation. A grievance redress mechanism is described within the IEE to ensure any public grievances are addressed quickly.

16. **Monitoring and reporting.** The PMO, PIU (Rajbari *pourashava*), and Management Design and Supervision Consultants (MDSC) will be responsible for safeguard monitoring. The MDSC will submit monthly monitoring reports to PMO, and the PMO will send semi-annual monitoring reports to ADB. ADB will post the semi-annual environmental monitoring reports on its website as part of its disclosure requirements.

17. **Conclusions and recommendations.** The citizens of Rajbari will be the major beneficiaries of this subproject. The proposed subproject is unlikely to cause significant adverse impacts and net environmental benefits to citizens of Rajbari will be positive. The potential impacts that are associated with design, construction and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures.

18. Based on the findings of the IEE, there are no significant impacts and the classification of the subproject as Category “B” is confirmed. No further special study or detailed environmental impact assessment (EIA) needs to be undertaken to comply with ADB SPS, 2009.

I. INTRODUCTION

1. After the successful implementation of Urban Governance and Infrastructure Improvement Projects (UGIIP I and II)[3] in the selected *pourashavas*, Local Government Engineering Department (LGED) with the financial assistance of Asian Development Bank (ADB) have planned to implement a similar project (UGIIP-3) in selected thirty *pourashavas* over a period of 6 years (2014 to 2020).

2. The impact will be improved living environment in project towns. The outcome will be improved municipal service delivery and urban governance in project towns. Project towns are pre-selected 30 towns to be supported in an integrated manner under the project. UGIIP-3 will improve existing and provide new municipal infrastructures including (i) roads; (ii) drainages; (iii) water supply system; (iv) solid waste management facilities; (v) slaughterhouses; (vi) markets, community center/auditorium, bus and truck terminals and river *ghats*; (vii) public toilets; and (viii) others such as provision for street lighting and improvement of slums.

3. A sector-lending approach will be used for the ensuing loan project as it has been well established and successfully practiced in the UGIIP I and II.

4. LGED is the executing agency of the project while DPHE (Department of Public Health Engineering) will provide advisory support in relation to the implementation of water supply schemes/subprojects in a *pourashavas*.

5. Rajbari drainage subproject is one of the subprojects proposed under UGIIP-3. ADB requires the consideration of environmental issues in all aspects of the Bank's operations, and the requirements for environmental assessment are described in ADB's Safeguard Policy Statement (SPS, 2009).

6. **Categorization.** An environmental assessment using ADB's Rapid Environmental Assessment (REA) checklist for drainage and flood control (**Appendix 1**) was conducted and results of the assessment show that the subproject is unlikely to cause significant adverse impacts. Rajbari drainage subproject is classified as environmental category B as per ADB SPS. This initial environmental examination (IEE) has been prepared in accordance with ADB SPS's requirements for environment category B projects and provides mitigation and monitoring measures to ensure no significant impacts as a result of the subproject.

II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

A. ADB Policy

7. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for environmental assessment are described in ADB SPS, 2009. This states that ADB requires environmental assessment of all ADB investments.

[3] The Government of Bangladesh with the assistance of ADB has introduced a system whereby funds/loans for development are disbursed in a phased manner based on the successful accomplishment by the recipient *pourashavas* of a set of performance-criteria in the area of urban governance. UGIIP I and II reflect this approach which aims to incentivize participating *pourashavas* to become well-managed and maintained towns in a sustainable way through systems of governance ensuring citizen's participation and inclusion of women, poor and the minority groups in *pourashava* activities. UGIIP I targeted for 33 and UGIIP II for 35 *pourashavas*. The subprojects were (i) water supply (ii) sanitation, (iii) solid waste management, (iv) urban drainage, (v) urban transport & communication and (vi) public use facilities.

8. **Screening and categorization.** The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project; the sensitivity, scale, nature, and magnitude of its potential impacts; and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impacts, and are assigned to one of the following four categories:

(i) **Category A.** Projects could have significant adverse environmental impacts. An EIA is required to address significant impacts.
(ii) **Category B.** Projects could have some adverse environmental impacts, but of lesser degree or significance than those in category A. An IEE is required to determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.
(iii) **Category C.** Projects are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are reviewed.
(iv) **Category FI.** Projects involve a credit line through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system, unless all projects will result in insignificant impacts.

9. This draft IEE for the Rajbari drainage subproject is based on the feasibility study and preliminary engineering designs prepared during project preparation. This IEE will be finalized during detailed design stage to reflect any changes and latest subproject designs.

10. **Environmental management plan.** An EMP, which addresses the potential impacts and risks identified by the environmental assessment, shall be prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the project's impact and risks.

11. **Public disclosure.** ADB will post the below safeguard documents on its website as well as disclose relevant information in accessible manner in local communities:

(i) for environmental category A projects, draft EIA report at least 120 days before Board consideration;
(ii) final or updated EIA and/or IEE upon receipt; and
(iii) environmental monitoring reports submitted by the Project Management Office (PMO) during project implementation upon receipt.

B. National Laws

12. Implementation of all subprojects will be governed by the environmental acts, rules, policies, and regulations of the Government of Bangladesh. These regulations impose restrictions on the activities to minimize/mitigate likely impacts on the environment. Many of these are cross-sectoral and several of them are directly related to environmental issues. The most important of these are the Environment Conservation Act, 1995 (ECA, 1995), and the Environment Conservation Rules (ECR, 1997).

13. Table 1 presents specific requirements for the Rajbari drainage subproject. **Appendix 2** provides the environmental standards for air, surface water, groundwater, drinking water, emissions, noise and vehicular exhaust.

Table 1: Applicable Government of Bangladesh Environmental Legislations

	Legislation	Requirements for the Project	Relevance
1.	Environmental Conservation Act of 1995 and amendments in 2000, 2002 and 2010 [4]	• Restriction on operation and process, which can be continued or cannot be initiated in the ecologically critical areas • Regulation on vehicles emitting smoke harmful to the environment • Remedial measures for injuries to ecosystems • Standards for quality of air, water, noise and soil for different areas for various purposes and limits for discharging and emitting waste • Environmental guidelines	The provisions of the act apply to the entire subproject in the construction and operation and maintenance (O&M) phases.
2.	Environmental Conservation Rules of 1997 and amendments in 2002 and 2003	• Environmental clearances • Compliance to environmental quality standards	The subproject is categorized as Orange-B and requires locational clearance certificate (LCC) and environmental clearance certificate (ECC). All requisite clearances from DoE shall be obtained prior to commencement of civil works.
3.	Forest Act of 1927 and amendments (2000)	• Clearance for any felling, extraction, and transport of forest produce	Considered in subproject preparation and implementation.
4.	Bangladesh Climate Change Strategy and Action Plan of 2009	• Ensure existing assets is put in place to deal with the likely impacts of climate change. • Enhance the capacity government ministries, civil society and private sector to meet the challenge of climate change	Considered in subproject preparation and implementation.
5.	Bangladesh Labor Law of 2006	• Compliance to the provisions on employment standards, occupational safety and health, welfare and social protection, labor relations and social dialogue, and enforcement • Prohibition of employment of children and adolescent	Considered in the EMP.

C. Government of Bangladesh Environmental Assessment Procedures

14. Under ECA, 1995 and ECR, 1997 industrial units and projects are classified into four categories according to "their site and impact on the environment" and investment size, and each category (Green, Orange-A, Orange-B and Red) requires a different level of environmental assessment as a prerequisite for the Department of Environment (DoE) in granting the

[4] *ECA Amendment 2000* focuses on ascertaining responsibility for compensation in cases of damage to ecosystems, increased provision of punitive measures both for fines and imprisonment and the authority to take cognizance of offences. *ECA Amendment 2002* elaborates restrictions on polluting automobiles; restrictions on the sale, production of environmentally harmful items like polythene bags; assistance from law enforcement agencies for environmental actions; break up of punitive measures; and authority to try environmental cases. In *ECA Amendment 2010,* no individual or institution (government or semi-government/non-government/self-governing can cut any hill or hillock; fill-up or changed any remarked water body however in case of national interest; the mentioned activities can be done after getting clearance from respective the departments.

locational clearance certificate (LCC) and environmental clearance certificate (ECC)that allow the project to proceed.

15. As per Schedule 1 of ECA, 1995Rajbari drainage subproject is likely to be classified as red category (Table 2). Thus LCC and ECC is required from the DoE prior to commencement of the subproject.

Table 2: Likely Government of Bangladesh Classification of Rajbari Drainage Subproject

	Subproject	Component	Equivalent in Schedule I of ECR 1997	DoE Classification
1.	Drainage and flood control	Primary network (includes domestic connections or primary drains)	Engineering works (up to 10 hundred thousand Taka capital)	Red As per preliminary quantity and cost estimate, Rajbari drainage structures cost 49.6 million BDT
		Secondary network (includes secondary drains)		
		Tertiary network (includes main drains and drainage outfalls)		

16. Rule 7 of the ECR, 1997 indicates that the application for ECC must be made to the relevant DoE Divisional Officer, and the application for red category projects will include the following:

(i) completed application for ECC, and the appropriate fee;
(ii) report on the feasibility of the project;
(iii) report on the IEE for the project, and terms of reference (TOR) for the EIA; or EIA report prepared on the basis of TOR previously approved by DoE;
(iv) report on the environmental management plan (EMP);
(v) no objection certificate from the local authority;
(vi) emergency plan relating to adverse environmental impact and plan for mitigation of the effect of pollution; and
(vii) Outline of the relocation and rehabilitation plan (where applicable).

17. DoE has 60 days to respond to receipt of the ECC application for a red category project.

18. This draft IEE will serve the basis for the ECC application and will be supplemented to fulfill any additional government requirements.

III. DESCRIPTION OF THE PROJECT

A. The Study Area

19. Rajbari is a district of Dhaka division in near the centre of Bangladesh and lies between 25º46´ and 26º33´ north latitudes and between 89º01´ and 89º36´ east longitudes. The area of the Rajbari Pourashava is 11.66 sq.km and its total population as of 2011 is 56,313.

20. Subproject components are located in Rajbari urban area or in its immediate surroundings which were converted into urban use for many years ago, and there is no natural habitat left at these sites. The subproject sites are located in existing right of way (ROWs) and government-owned land. There are no protected areas, wetlands, mangroves, or estuaries in or near the subproject location. There are no forest areas within or near Rajbari. The location map is shown as Figure 1.

B. Existing Condition and Need for the Project

21. The urban center of the town is built on high lands in the north-south direction of the eastern part. Large parts of the Paurashava are regularly flooded due to a number of low laying areas, which has effectively impeded development. In the vicinity of Rajbari Pourashava there is no river. The river Padma is flowing through the western periphery of the Rajbari Pourashava. Beside this, there are also four major khals namely the Kazi Kanda Khal, Chitra Khal, Binodpur Khal and Bhabanipur Khal which act as primary drainage system. The Bhabanipur Khal originating from a place near Bangladesh Oxygen Bridge in front of a graveyard falls into Chitra Khal near Chitra Cinema Hall. The Chitra khal originating from Baradanga, falls into Umury Beel. The Kazi Kanda khal starting from the point near Barapul Bridge, falls into Chetal Beel. The Binodpur khal originating from Kumar Patti near Kazir School, falls into Chotlar Beel. All these khals serve as an arterial drainage system for Rajbari Pourashava. Besides the above four main drainage khals, there are some natural drainage passages which independently drain out some areas. With growing urbanization and unplanned expansion of the Pourashava drainage facilities have not been provided as per requirement of growing population. As a result efficient and quick drainage of runoff into those natural khals is not taking place.

22. A total of 8.42 km pucca (RCC & masonry) and 13.18 km katcha drain exists in the Rajbari Pourashava including the above mentioned primary khals. The condition of Kutcha and Pucca drains, Khals is not satisfactory. The major Khals are falling to the 'beel' which have been silted up reducing the carrying capacity of the drainage khals considerably. Also the drains are blocked because of indiscriminate disposal of solid wastes. Moreover, there had been erected encroachments like construction of shops, buildings, roads boundary walls etc. on the Khals.

23. There are eight scattered low lying areas namely BSIV area, Daskhin Bhabanipur area, Kazi kanda area, Station road area, Binodepur area, Laxmikhola area, Mandal para area and Dhunchi area. All these areas encounter water logging after heavy rainfall causing much inconvenience to the people with the deterioration of the environment

24. A Drainage and Environmental Master Plan was prepared under STIDP II project for the Pourashava in 1999. In that plan a total of 26.67 km drain was proposed to be constructed by the year 2007 which is not implemented. The Master Plan included recommendations for both structural and non-structural measures for addressing drainage problems.

C. Proposed Components

25. The drainage alignments were visited and examined extensively by the PPTA team. The rainfall, flooding information were collected including history of stagnation, over-flow causing inundation of adjoining areas. The existing conditions were assessed and used as basis for widening or deepening requirements, re-sectioning needs, longitudinal gradients and location of outfall. The list of proposed drainage network (Table 3) was discussed with Rajbari pourashava Town Level Committee Council (TLCC) and municipal council, with a view to prepare preliminary designs and cost estimates.

19. Figures 3 to 5 show the typical sections of different types of roads that may be used in the subproject.

Table 3: Proposed Drainage Improvements in Rajbari

Sl. Nr.	ID Nr.	Scheme Name	Length (km)
1	P-01	Construction of RCC open drain at Binodpur Canal Starting from Kazir School to Lokosheed Via mobarak Master house .(Ch-0.00-2250.00m)	2.25
2	P-03	Estimate for Construction of RCC Drain Starting from Ansar Camp to Bank Para Chatra Bill, under Rajbari Pourashava, Rajbari .(Ch:-0.00 to 800.00m)	0.800
3	S-58	Construction of RCC Drain Starting from 2No Railgate to Near Cow Market Culvert Via All In All Tailors under Rajbari Pourashava, Rajbari .(Ch:-0.00 to 535.00m)	0.535
4	T-44	Estimate for Construction of RCC Drain Starting from Bazar Pathshala School Road Drain under Rajbari Pourashava ,Rajbari.(Ch:-0.00 to 300.00m)	0.300
5	T-51	Estimate for Re- Construction of RCC Drain Starting from Old Kapor Bazar To Jute Market under Rajbari Pourashava ,Rajbari.(Ch:-0.00 to 113.00m)	0.113
6	T-52	Estimate for Construction of RCC Drain Starting from Old Kapor Bazar To Jute Market under Rajbari Pourashava ,Rajbari.(Ch:-0.00 to 221.00m)	0.221
7	T-53	Estimate for Construction of RCC Drain Jute Market Road under Rajbari Pourashava, Rajbari.(Ch:-0.00 to 188.00m)	0.188
8	T-54	Estimate for Construction of RCC Drain Jhalay Potty Road, under Rajbari Pourashava, Rajbari.(Ch:-0.00 to 114.00m)	0.114
9	T-55	Estimate for Construction of RCC Drain Ghosh Potty Road, under Rajbari Pourashava, Rajbari.(Ch:-0.00 to 166.00m)	0.116
10	T-56	Estimate for Construction of RCC Drain Hazi Market To Binodpur Main Road Via Ghash Potty Road, under Rajbari Pourashava, Rajbari.(Ch:-0.00 to 433.00m)	0.433
11	T-57	Estimate for Construction of RCC Drain Pan Bazar East Side Road under Rajbari Pourashava, Rajbari.(Ch:-0.00 to 106.00m)	0.106
12	T-58	Estimate for Construction of RCC Drain Pan Bazar West Side Road under Rajbari Pourashava, Rajbari.(Ch:-0.00 to 106.00m)	0.106
13	T-59	Estimate for Construction of RCC Drain Rice Market to Fish Market Road , under Rajbari Pourashava ,Rajbari.(Ch:-0.00 to 111.00m)	0.111
14	T-60	Estimate for Construction of RCC Drain Fruit Market Road , under Rajbari Pourashava, Rajbari.(Ch:-0.00 to 138.00m)	0.138
15	T-61	Estimate for Construction of RCC Drain Starting from Jute Market to Rice Market Road(South Side of Sarno Kamal Market) , under Rajbari Pourashava ,Rajbari.(Ch:-0.00 to 127.00m)	0.127
16	T-62	Estimate for Construction of RCC Drain Starting from Sarno kamal Road , under Rajbari Pourashava, Rajbari.(Ch:-0.00 to 119.00m)	0.119
17	T-63	Estimate for Construction of RCC Drain At Gur Bazar Road , under Rajbari Pourashava ,Rajbari.(Ch:-0.00 to 116.00m)	0.116
18	T-64	Estimate for Construction of RCC Drain starting from Rice market To Gur Bazar Road , under Rajbari Pourashava ,Rajbari.(Ch:-0.00 to 104.00m)	0.104
19	T-65	Estimate for Construction of RCC Drain At Maroary Potty Road , under Rajbari Pourashava,Rajbari.(Ch:-0.00 to 150.00m)	0.15
20	T-66	Estimate for Construction of RCC Drain Starting from Fish market to Binodpur Main Road under Rajbari Pourashava, Rajbari.(Ch:-0.00 to 78.00m)	0.078
21	T-67	Estimate for Construction of RCC Drain at Rail Station Road under Rajbari Pourashava, Rajbari.(Ch:-0.00 to 226.00m)	0.226
22	T-68	Estimate for Construction of RCC Drain at Workers Party Road under Rajbari Pourashava, Rajbari.(Ch:-0.00 to 89.00m)	0.089
23	T-69	Estimate for Construction of RCC Drain at Khalifa Potty Road under Rajbari Pourashava, Rajbari.(Ch:-0.00 to 148.00m)	0.148
24	T-70	Estimate for Construction of RCC Drain Starting from Milk Market to Chiken Market under Rajbari Pourashava, Rajbari.(Ch:-0.00 to 300.00m)	0.300
25	T-71	Estimate for Construction of RCC Drain Starting from Fish Market to Binodpur Main Road via Chira mill under Rajbari Pourashava, Rajbari.(Ch:-0.00 to 67.00m)	0.067
26	T-73	Estimate for Construction of RCC Drain Starting from 1No. Beradanga Road To Principal Kiumuddin Sir House Road , under Rajbari Pourashava, Rajbari.(Ch:-0.00 to 218.00m)	0.218
27	P1	Re-excavation and construction with RCC of Binodpur khal (Kazi school to Loko bridge via Mubarak master house)	2.25
Total			**9.523**

26. This IEE covers construction of 2 drains with total length of 3.05km (Table 4) to be rehabilitated under Phase 1 (see implementation schedule). This IEE will be updated with the final road designs to be prepared during the detailed design phase.[5]

Table 4: Proposed Drains under Phase 1 Implementation - Rajbari

Sl. No.	ID No	Scheme Name	Length (km)	Present nature and condition
1	P-01	Construction of RCC open drain at Binodpur Canal Starting from Kazir School to Lokosheed Via mobarak Master house .(Ch-0.00-2250.00m)	2.25	Open Canal/primary drain
2	P-03	Estimate for Construction of RCC Drain Starting from Ansar Camp to Bank Para Chatra Bill under Rajbari Pourashava, Rajbari .(Ch:-0.00 to 800.00m)	0.800	Earthen/secondary drain
		Total	**3.05**	

D. Implementation Schedule

27. Implementation of UGIIP-3is split up into 3 phases: (i) 1st phase = 18 months or 1.5 years; (ii) 2nd phase = 30 months or 2.5 years; and (iii) 3rd phase = 24 months or 2 years

28. Construction of two drains (total 3.05 km) will be implemented under Phase 1, while the remaining drains will be implemented in the succeeding phases. Preliminary design of Phase 1 drains has been done by the PPTA and will finalized during detailed design stage. It is estimated that construction period for Phase 1 implementation will cover 18 months.

29. The final detailed implementation schedule will be provided in the updated IEE once the detailed design phase is completed.

[5] A new IEE will need to be prepared for each phase, which would require a simple updating of this IEE, as follows: Rajbari Drainage (Phase II) IEE and Rajbari Drainage (Phase III) IEE

Figure 1: Location Map

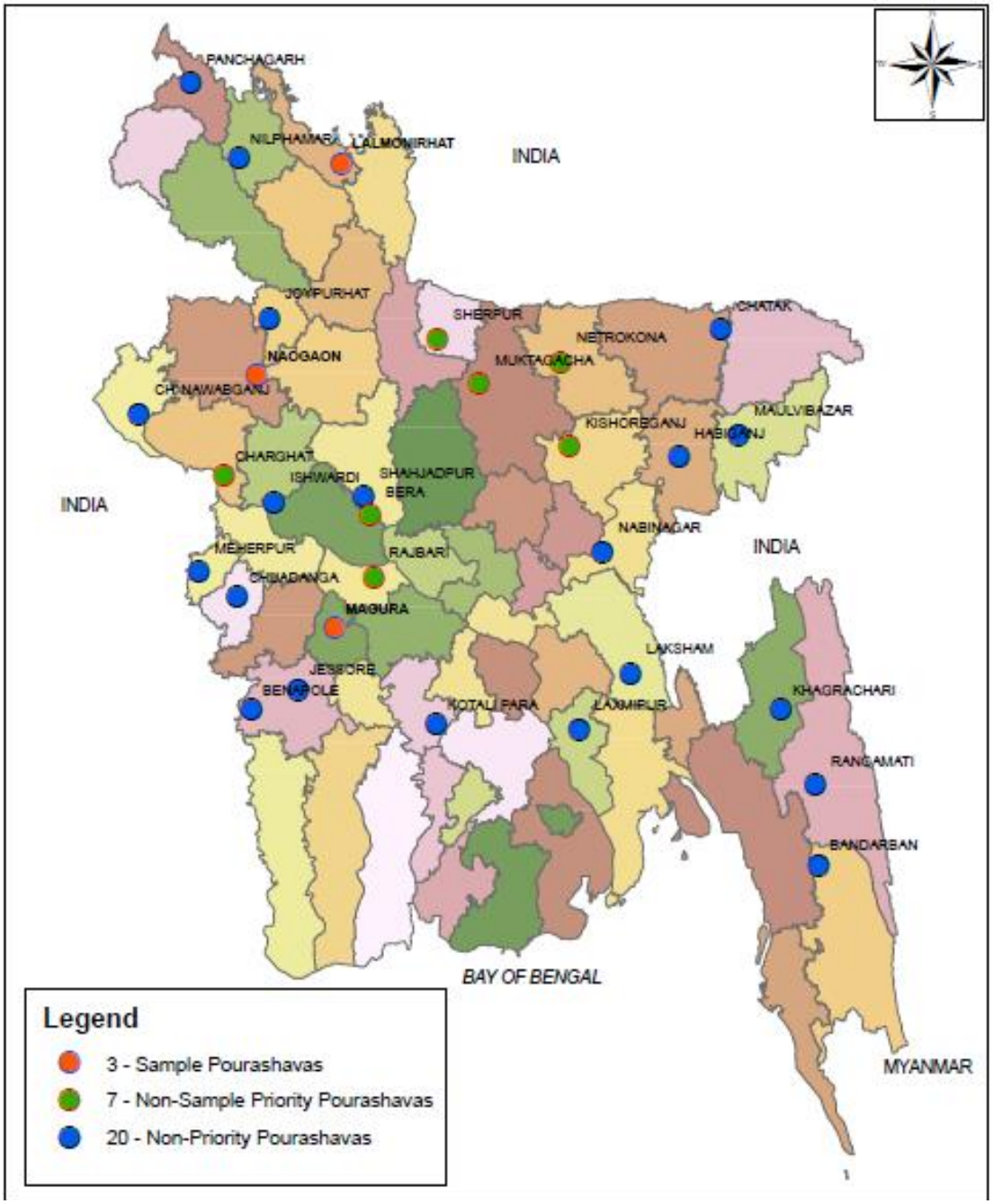


Figure 2: Proposed Drainage Works in Rajbari Pourashava

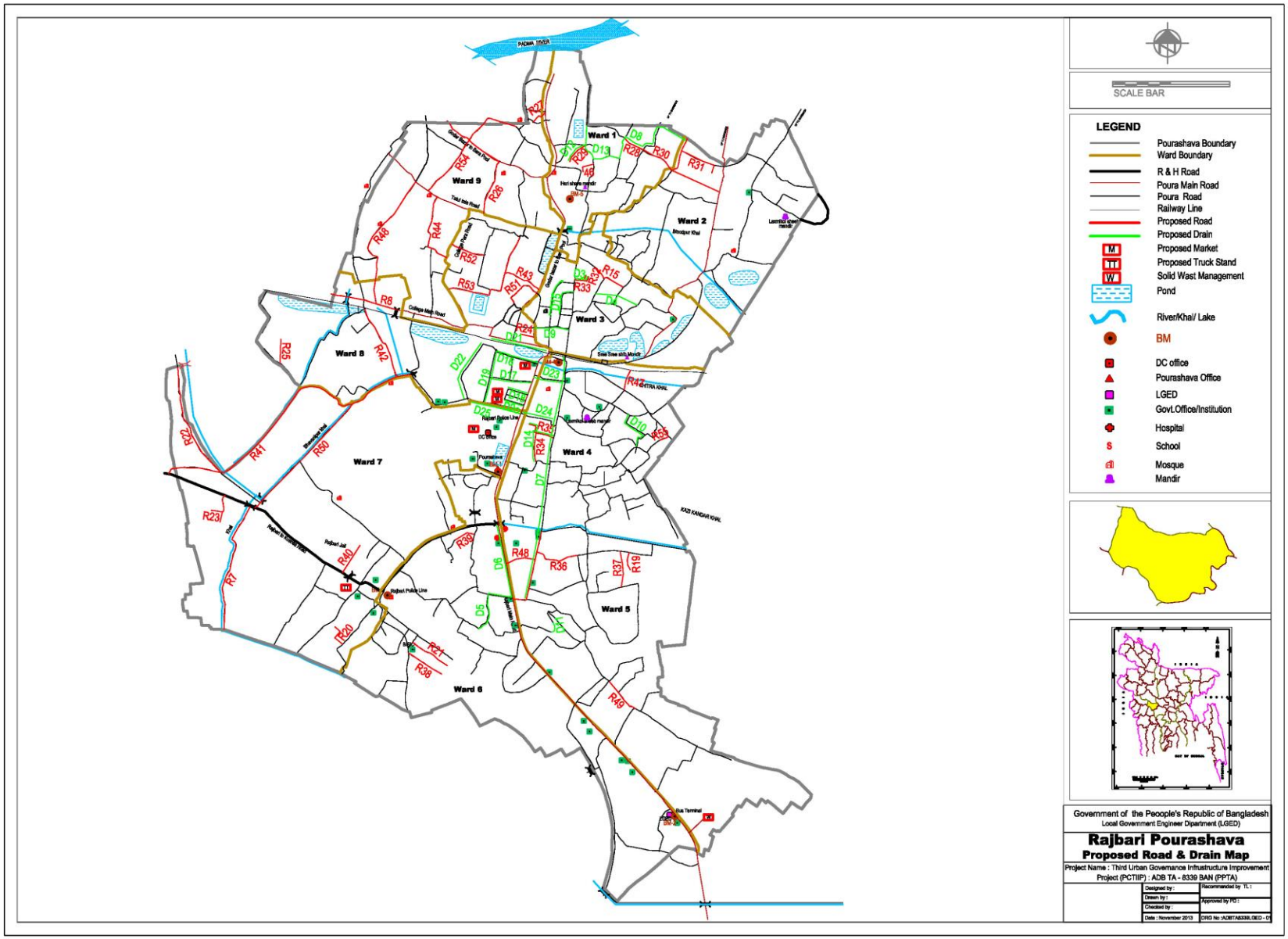


Figure 3: Typical Reinforced Cement Concrete Box Culvert Drain

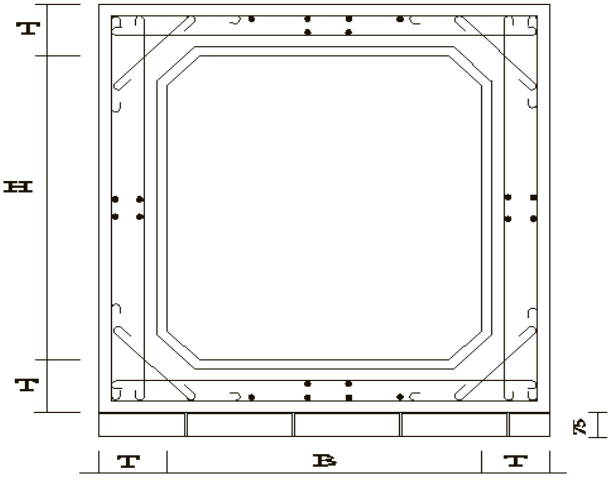
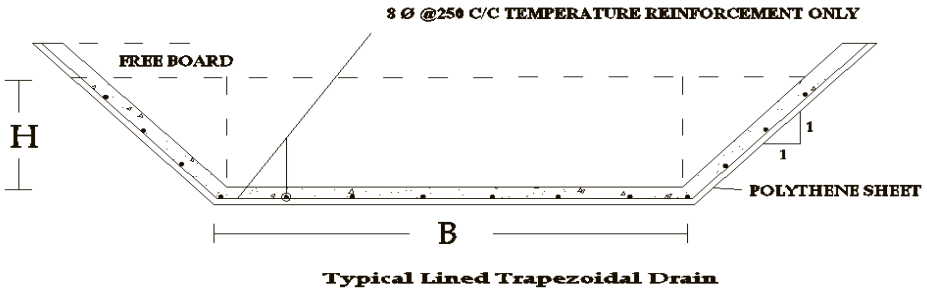


Figure 4: Typical RCC Trapezoidal Line Drain



Typical Lined Trapezoidal Drain

IV. DESCRIPTION OF THE ENVIRONMENT

A. Methodology Used for the Baseline Study

30. **Data collection and stakeholder consultations.** Data for this study has been primarily collected through comprehensive literature survey, discussion with stakeholder agencies, and field visits to the proposed subproject sites. The literature survey broadly covered the following:

(i) subproject details, reports, maps, and other documents available with the ADB and PPTA consultants, LGED, and Rajbari *pourashava*;
(ii) relevant acts and extraordinary gazettes, and guidelines issued by Government of Bangladesh agencies; and
(iv) literature on land use, soil, geology, hydrology, climate, socioeconomic profiles, and environmental planning documents collected from Government of Bangladesh agencies and websites.

31. Several visits to the subproject sites were made during the PPTA stages to assess the existing environment (physical, biological, and socioeconomic) and gather information with regard to the proposed sites and scale of the proposed subproject. A separate socioeconomic study was conducted to determine the demographic information, archeological and religious places, densely populated pockets, and settlements.

32. **Data analysis and interpretation.** The data collected was analyzed and interpretations made to assess the physical, biological, and socioeconomic features of the project area. The relevant information is presented in the succeeding paragraphs.

33. **Updating during detailed design phase.** The IEE including specific description of the environment and corridor of impact will be updated as necessary based on the final roads design and alignments.

B. Physical Characteristics

34. Topography. Rajbari Pourashava area is more or less plain. In the vicinity of Rajbari Pourashava, there is no river. The urban center of the town is built on high lands in the center of the Pourashava in north-south direction. The river Padma is flowing through the western periphery at a considerable distance from Rajbari Pourashava. BWDB has constructed embankment along the western periphery and as such the Pourashava is not likely to be affected annually by external flood from river. The maximum and minimum land elevation of Pourashava is found to be 10.52 and 9.64 respectively and the average land elevation is estimated to be 10.08. There exists considerable number of filthy pools, ditches and ponds within the Pourashava which serve as retention basin and help in reducing the flood intensity and also mitigate the flood damages during and after heavy rainfall in the monsoon period.

35. The town center of the *Pourashava* is comparatively elevated and not subject to annual flooding. Besides, the *Pourashava* is protected in the northern side by an embankment and dyke built along the padma river. The *Pourashava* is not subject to annual flooding due to this embankment.

36. **Climatic conditions.** The climate of the *pourashava* area is moderate with the maximum and minimum mean monthly temperature being 28.9^{o}C and 17.8^{o}C, respectively observed in June and January. Mean annual rainfall is 1855 mm, with most of it occurring during five months of monsoon, between May to September, which is around 81.83% of the aggregate precipitation. In the winter months of December-January, at times, temperature comes down substantially that at times adds to the woe of the dwellers.

37. **Surface water and other bodies of water.** There are large number of ponds, ditches, low lying agricultural lands as low pockets in Rajbari which act as retention basin to delay the maximum floods in the monsoon. However the PPTA study identified there are no existing natural or man-made bodies of water adjacent or within the corridors of impact of the subproject. Any water bodies to be identified during detailed design phase will be assessed and reported in the updated IEE.

38. **Air quality.** As there are no major industries in Rajbari the main sources of air pollution are vehicles and non-point sources such as open burning. There are currently no air quality monitoring stations are in operation within the *pourashava* limit. The baseline air quality will be measured by the subproject contractors prior to commencement of work. The results will be provided in the updated IEE and all other measurements during implementation will be reported as part of EMP implementation.

39. **Acoustic environment.** Subproject components are in the built-up part of Rajbari, with residential, commercial, and institutional establishments. The volume of traffic that passes through these sections is not significant and traffic jams are not frequent. However vehicular movement can be considered as major cause of noise pollution. The baseline noise level will be

measured by the subproject contractors prior to commencement of work. The results will be provided in the updated IEE and all other measurements during implementation will be reported as part of EMP implementation.

40. **Water logged areas.** There are eight scattered low lying areas namely BSIV area, Daskhin Bhabanipur area, Kazi kanda area, Station road area, Binodepur area, Laxmikhola area, Mandal para area and Dhunchi area. All these areas encounter water logging after heavy rainfall causing much inconvenience to the people with the deterioration of the environment. The reasons of stagnation in the town are technical, social and institutional. Inundation in the town is caused due to inadequate drainage from the unplanned and uncoordinated development of the town.

41. The *Pourashava* is protected in the northern side by an embankment and dyke built along the padma river. The *Pourashava* is not subject to annual flooding due to this embankment.

C. Biological Characteristics

42. **Flora and fauna.** Subproject components are located in Rajbari urban area or in its immediate surroundings which were converted into urban use for years ago, and there is no natural habitat left at these sites. Animals and plants in the subproject area are those commonly found in urban and built-up areas. No endangered/protected species of either flora or fauna are found in the *pourashava* or its immediate surroundings.

43. **Protected areas.** There are no protected forests, wetlands, mangroves, or estuaries in or near the subproject area.

D. Socioeconomic Characteristics

44. **Area and population**. The *pourashava* with an area of 11.66km^2 lies within the center of Rajbari *sadar upazilla*. Information about the total number of households, with average size, and population of Rajbari *pourashava* is presented in Table 5.

Table 5: Population of Rajbari Pourashava

Administrative Unit	Area (sq. km)	Households (nos.)	Total Population	Average Household Size	Density (per sq.km)
Rajbari Pourashava	**11.66**	**12,657**	**56,313**	**4.2**	**4,830**
Ward No - 01	0.93	1013	4605	4.5	4,952
Ward No - 02	1.31	1078	4665	4.3	3,561
Ward No - 03	0.91	1089	5172	4.6	5,684
Ward No - 04	0.83	1217	5286	4.2	6,369
Ward No - 05	1.89	1874	8158	4.1	4,316
Ward No - 06	1.82	1602	6677	4.1	3,669
Ward No - 07	2.15	1747	8363	4.5	3,890
Ward No - 08	1.14	1669	7670	4.3	6,728
Ward No - 09	0.68	1368	5717	4.1	8,407

Source: BBS Community Report, Zilla: Rajbari, 2011

45. **Land use.** Rajbari has a mixed land use and predominantly consists of agricultural lands and residential lands, and the rest include commercial, industrial, administrative, educational,

places of worship, health, recreational, restricted, transportation, miscellaneous, mixed uses, graveyard, open spaces, and water bodies. While the heart of the *pourashava* is of high commercial, residential and administrative areas, the fringe areas include mainly low-lying agricultural lands with scattered villages for human settlement. The predominant one is residential land use followed by agriculture area and administrative area which are 65%,14.5% and 8.75% respectively. The contribution of agricultural land area in the Pourashava is comparatively less than other Pourashavas of the project. In others category it is 5.44% which is mainly the railway establishments.

46. **Literacy.** Rajbari Sadar has an average literacy rate of 66.4% (7+ years), and the national average of 32.4% literate. (BBS, 2011)

47. Water supply and water quality. The *pourashava*'s water supply system comprises of 7 production tube wells, 1276 privately owned tube wells, 1584 water connections, 56.84 km of transmission and distribution mains. The system operates 08 to 10 hours a day. The supplied water is free of iron and arsenic and hence does not require any treatment. The current demand is 80 liters capita per day and only 60% of the population is served.

48. **Roads, existing provisions for pedestrians, and transport-related facilities.** Rajbari roads (total of 90.86 km) generally fall into two categories: *kutcha* (earthen) construction and *pukka* (formed) roads. Formed roads are mainly BT asphalt roads with CC roads in a few places for main roads, while minor roads may also be brick-on-edge soling, known locally as HBB. Nearly all roads are built above the existing ground level, not only to avoid inundation during storms, but as the silty loam and alluvial soils typical of the area compact easily, roads need a supporting base layer that is often built up to around one meter above ground level**.** There are no provisions for pedestrians (e.g. footpaths) along the roads. There are no public or private bus services available. There is no designated authority for the management of traffic.

49. A bus terminal exists in the Pourashava but not properly used. The huge terminal building now used by unauthorized occupants. The road around the terminal to be use in a planned way with removal of the shops on the road and boundary wall may be constructed**.** The terminal area and the building may be divided between the bus and truck terminals which will save the construction of a new truck terminal.

50. **Drainage.** At present, the drainage system of Rajbari includes 8.42 km of *pucca* drains and 13.81 km katcha drains. PPTA study shows that there is less than 1 km of *pucca* drain per sq km of the pourashava area which indicates a somewhat poor spectacle of the drainage system in Rajbari. Urban dwellers in most areas reported that the present drainage system is inadequate is inadequate. The major Khals are falling to the 'beel' which have been silted up reducing the carrying capacity of the drainage khals considerably. Also the drains are blocked because of indiscriminate disposal of solid wastes. Moreover, there had been erected encroachments like construction of shops, buildings, roads boundary walls etc. on the Khals.

51. **Sanitation.** The existing sanitary condition in Rajbari is relatively poor. As per Bangladesh Bureau of Statistics data for 2011, 57.9% of the pourashava population have water sealed latrines, 37.9% have latrines that are not water-sealed, 2.9% of the population have non-sanitary facilities while the remaining 1.3% have no toilets. Rajbari has no sewerage system and disposal/treatment facilities.

52. There are 10 nos. public toilets in Rajbari but these are in worse conditions as the pits, septic tanks and superstructures are mostly damaged. There is no arrangement for electricity

and water supply. There is no separate provisions for women.

53. Sanitation facilities in schools (primary and secondary) are found not in bad conditions. There is no huge demand of toilets in schools contrary to the findings of the PPTA study which identified school toilets to be constructed in schools visited.

54. **Solid waste management.** Solid waste management in Rajbari consists of collection, transportation and dumping of wastes. There are 15 fixed dustbins located in different parts of the *pourashava* along with 20 to 30 temporary secondary collection points. There are 2 open garbage trucks in the Pourashava. Wastes are dumped on to 2.56 acre land owned by the PS, 2km away from the main town centre near to Rajbari-Faridpur Highway.

55. Rajbari generates about 17 metric tons per day computed based on 0.3 kilograms (kg) per capita per day. Segregation at source is not practiced resulting to mixed wastes from households, commercial establishments, hospitals, institutions and others. There is no regular public awareness and public relation activities in the pourashava. Community involvement is absent. Informal sector is prominent in recyclable collection and recycling.

56. **Other existing amenities for community welfare.** The pourashava has 3 kitchen markets. PPTA study estimated 3,000 people use to meet their daily needs. The kitchen markets lack in adequate number of waste bins and do not have arrangement for waste collection. Generally, there is no arrangement for drainage within the markets. The PPTA team noted Rajbari has one well-designed and built kitchen market with 10 sheds along with a slaughterhouse however the *pourashava* sparsely use the facility. The *pourashava* could not provide plausible answer to their not being used.

57. There are 2 graveyard, 1 burning crematorium, 1 government hospital, 18 government primary schools, 9 high schools, 6 Colleges, and 1 polytechnic Institute. Apart from these, there are madrasas (community based religious institutes) established with private initiatives and operated and managed privately.

E. Historical, Cultural and Archaeological Characteristics

58. Rajbari had been named thus after the name of the residence of Raja Surja Kumar which was locally known as Rajbari and at present been used as the district administrative headquarter. The town of Rajbari had been developed as a railway town with the extension and development of rail communication and its establishments.

59. **Archaeological Heritage and Relics**: Luxmi Kol Royal Palace, Baliakandi Royal Palace, Children Park, Graveyard of writer Mir Mosharrof Hossain, Memorial Center, Acrobatic Center, Rajbari Swiming Pole, Dauladia River Port, Rajbari Circuit House, Rajbari Uddyan Base, Jora Bangla Temple, Sawdagor Mound, Shrine of Shah Palowan, Tomb of Saint Kamal Shah, Dauladia Ferry Ghat etc.

60. **Historical Events**: During the War of Liberation the Rajbari Pourashava was under Sector 8. Rajbari was liberated on 10 December 1971.

61. **Marks of War of Liberation**: Mass grave 4, memorial 4, mass killing site 6.

62. It has been noted during the PPTA study road alignments and corridors of impact are not within nor adjacent to these sites.

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Methodology

63. Issues for consideration have been raised by the following means: (i) input from interested and affected parties; (ii) desktop research of information relevant to the proposed subproject; (iii) site visits; and (iv) evaluation of proposed design scope as per PPTA study and potential impacts.

64. The corridors of impact considered include: (i) existing alignment and width of drains to be constructed; and (ii) existing ROWs. No additional land is required beyond the ROWs. Categorization of the subproject and formulation of mitigation measures have been guided by ADB's REA Checklist for Roads (Appendix 1) and ADB SPS, 2009.

B. Screening out Areas of No Significant Impact

65. From the preliminary design and results of the rapid environmental assessment, it is clear that implementation of Rajbari drainage subproject will not have major negative impacts because activities will be localized/site-specific and short in duration. Moreover, the corridors of impact of the subproject will be on existing public ROWs, and construction will be conducted within a relatively small area. Because of these there are several aspects of the environment that are not expected to be affected by the subproject (Table 6) and thus can be screened out of the assessment at this stage but will be assessed again during detailed design stage and before implementation.

Table 6: Fields in Which the Subproject Is Not expected to have Significant Impacts

Field	Rationale
A. Physical Characteristics	
Topography, landforms, geology and soils	Required amount of materials will not cause alteration of topography, landforms, geology and soils. Erosion hazard is insignificant as trenching and excavation works will be conducted only during construction stage (short-term) and specific to sites along public ROWs.
Climatic conditions	Short-term production of dust is the only effect on atmosphere. However, impact is short-term, site-specific and within a relatively small area. There are well developed methods for mitigation.
B. Biological Characteristics	
Biodiversity	Activities being located in the built-up area of Rajbari *pourashava* will not cause direct impact on biodiversity values as identified flora and fauna are those commonly found in built up areas. The construction activities do not anticipate any cutting of trees.
C. Socioeconomic Characteristics	
Land use	No alteration on land use.
Type of community spread	No alteration on type of community spread.
Socio-economic status	There is no requirement for land acquisition. Affected persons and structures will be addressed separately in the resettlement plan developed as per Government of Bangladesh laws and ADB SPS, 2009. Manpower will be required during the construction stage, this can result to generation of contractual employment and increase in local revenue.
D. Historical, Cultural, and Archaeological Characteristics	
Physical and cultural heritage	The subproject components are not located in or near and excavation works will not be conducted in the vicinities of identified historical sites.

C. Anticipated Impacts and Mitigation Measures – Planning and Design Phase

66. **Subproject selection criteria.** The project environmental assessment and review framework specifies environmental criteria to avoid or minimize adverse impacts during the identification and finalization of drainage subprojects. Table 7 summarizes site and design considerations as per preliminary design.

Table 7: Site and Design Considerations to Meet EARF Environmental Criteria

	Components	Environmental Selection Guidelines	Remarks
1.	Overall selection guideline	i. Comply with all requirements of relevant national and local laws, rules, and guidelines.	- Requisite LCC and ECC to be obtained prior to commencement of works
		ii. Avoid/minimize where possible locations in protected areas, including notified reserved forests or biodiversity conservation hotspots (wetlands, national reserves, forest reserves, and sanctuaries).	- Not present in Rajbari *pourashava*
		iii. Avoid possible locations that will result in destruction/disturbance to historical and cultural places/values.	- Use of "chance find" procedures in the EMP that include a pre-approved management and conservation approach for materials that may be discovered during project implementation.
		iv. Avoid tree-cutting where possible. Retain mature roadside trees which are important/valuable or historically significant. If any trees have to be removed, plant two new trees for every one that is lost.	- Permit for tree-cutting to be obtained by contractor/s prior to commencement of work - Compensatory plantation for trees lost at a rate of 2 trees for every tree cut, in addition to tree plantation as specified in the design, will be implemented by the contractor, who will also maintain the saplings for the duration of his contract.
		v. Ensure all planning and design interventions and decisions are made in consultation with local communities and include women. Reflect inputs from public consultation and disclosure for site selection.	- All consultations during project preparation are documented and concerns expressed by public addressed in the IEE.
		vi. Synchronize all road improvement and pipe laying works (to extent possible) to minimize disturbance and optimize use of resources (e.g., water pipes laid prior to road improvements).	-Not relevant
2.	Drainage improvement	i. Outfalls should be to suitable drainage areas (*nallas*, canals, etc.) and avoid flooding to adjacent private lands.	- Outfalls identified in the preliminary design (Choto Jamuna, Tulshiganga, existing drainage canals)
		ii. Include measures to ensure the safe disposal of canal dredge (e.g., to dumpsite or landfill) without causing an environmental hazard.	- Addressed in the EMP.

67. **Land acquisition and resettlement.** The proposed drainages will be located in public ROWs. Involuntary resettlement impacts on encroachers along ROWs will be addressed by the resettlement plan prepared for the subproject as per ADB SPS, 2009 and applicable Bangladesh laws. Cutting of trees will not be required as per preliminary design. This will be reassessed during detailed design stage and if cutting of trees will be required, compensatory

plantation for trees lost at a rate of 2 trees for every tree cut will be implemented by the contractor, who will also maintain the saplings for the duration of his contract.

68. Planning principles and design considerations have been reviewed and incorporated into the site planning process whenever possible. Locations and sitting of the proposed infrastructures were considered to further reduce impacts. The subproject will be in properties held by the *pourashava* and access to the subproject sites is through public ROW and existing roads hence, land acquisition and encroachment on private property will not occur.

69. The concepts considered in design of the Rajbari drainage subproject are: (i) locating components on government-owned land to avoid the need for land acquisition and relocation of people; (ii) using vacant right of way (ROW), and taking all possible measures in design and selection of site or alignment to avoid resettlement impacts; (iii) avoiding where possible locations that will result in destruction/disturbance to historical and cultural places/values; (iv) avoiding tree-cutting where possible; (v) ensuring all planning and design interventions and decisions are made in consultation with local communities and reflecting inputs from public consultation and disclosure for site selection.

70. Preliminary designs integrate a number of measures, both structural and non-structural, to mainstream climate resilience into the Rajbari drainage subproject, including: (i) proper compaction; (ii) prefer RCC lining where there are threats of inundation; and (iii) provision of cross-drains as required.. As a result, some measures have already been included in the subproject designs (Table 8). This means that the impacts and their significance have already been reduced.

Table 8: Possible Actions to Mitigate against Projected Effects of Climate Change and Improve Climate Resilience on Drainage Infrastructure

	Climate Change Effect	Mitigation Measures
1.	Increased rainfall quantity and runoff	• Increase infrastructure capacity, e.g. channels, bridges, culverts, regulating structures, outfall vents, etc. (levels to take account of sea level rise) • Create capacity to detain runoff as necessary, e.g. ponds, open spaces, channels, *khals*, etc. • Isolate/protect vulnerable catchments and sub-catchments, to reduce flooding from adjacent catchments, especially if large in area and volume and impacts are less serious, e.g. agricultural land • Actively managing runoff and discharges, according to needs, adverse impacts, etc. • Improve O&M, organizational capacity, resource allocation, etc. • Work with relevant stakeholders to manage water use and flood discharges more effectively • Improve collection and disposal of solid waste • Control encroachments • Improve public behavior through active and prolonged information, education and communication campaigns to reduce uncontrolled solid waste disposal, encroachments, damage to infrastructure, unregulated development in key areas, etc., supported by enforcement.

Source: PPTA Consultants

D. Anticipated Impacts and Mitigation Measures – Construction Phase

71. In the case of this subproject (i) most of the individual elements are relatively small and involve straightforward construction, so impacts will be mainly localized and not greatly significant; (ii) most of the predicted impacts are associated with the construction process, and

are produced because that process is invasive, involving excavation and earth movements; and (iii) being located in the built-up area of the *pourashava*, will not cause direct impact on biodiversity values.

72. **Construction method.** Trenches will be dug by backhoe digger, supplemented by manual digging where necessary. Excavated soil will be placed nearby, and the materials (brought to site on trucks and stored on unused land nearby) will be placed in the trench by crane or using a small rig. The infrastructures will be constructed manually according to design specifications. Any excavated road will be reinstated. Any dredged materials will be disposed to pre-approved disposal sites.

73. There is sufficient space for a staging area, construction equipment, and stockpiling of materials. However, the contractor will need to remove all construction and demolition wastes on a daily basis.

74. Although construction of these project components involves quite simple techniques of civil work, the invasive nature of excavation and the project sites in built-up areas of Rajbari where there are a variety of human activities, will result to impacts to the environment and sensitive receptors such as residents, businesses, and the community in general. These anticipated impacts are short-term, site-specific and within a relatively small area. There are no impacts that are significant or complex in nature, or that need an in-depth study to assess the impact. Thus, Rajbari drainage subproject is unlikely to cause significant adverse impacts. The potential adverse impacts that are associated with construction activities can be mitigated to acceptable levels with the following mitigation measures (Table 9).

Table 9: Anticipated Impacts and Mitigation Measures – Construction Phase

Field	Impacts	Mitigation Measures
A. Physical Characteristics		
Topography, landforms, geology and soils	Significant amount of gravel, sand, asphalt and cement will be required for this subproject. Extraction of construction materials may cause localized changes in topography and landforms. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Utilize readily available sources of materials. If contractor procures materials from existing burrow pits and quarries, ensure these conform to all relevant regulatory requirements. • Borrow areas and quarries (If these are being opened up exclusively for the subproject) must comply with environmental requirements, as applicable. No activity will be allowed until formal agreement is signed between PIU, landowner and contractor.
Water quality	Trenching and excavation, run-off from stockpiled materials, and chemical contamination from fuels and lubricants may result to silt-laden runoff during rainfall which may cause siltation and reduction in the quality of adjacent bodies of water. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Prepare and implement a spoil management plan (**Appendix 3**). • Prioritize re-use of excess spoils and materials in construction activities. If spoils will be disposed, consult with Rajbari local authority on designated disposal areas. • All earthworks must be conducted during dry season to maximum extent possible to avoid the difficult working conditions that prevail during monsoon season such as problems from runoff. • Location for stockyards for construction materials shall be identified at least 300m away from watercourses. Place storage areas for fuels and lubricants away from any drainage leading to water bodies. • Take all precautions to minimize the wastage of water in the construction activities. • Take all precautions to prevent entering of wastewater

Field	Impacts	Mitigation Measures
		into streams, watercourses, or irrigation system. Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies. • Ensure diverting storm water flow during construction shall not lead to inundation and other nuisances in low lying areas. • While working across or close to any water body, the flow of water must not be obstructed. Ensure no construction materials like earth, stone, or appendage are disposed of in a manner that may block the flow of water of any watercourse and cross drainage channels. • Monitor water quality according to the environmental management plan.
Air quality	Conducting works at dry season and moving large quantity of materials may create dusts and increase in concentration of vehicle-related pollutants (such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons) which will affect people who live and work near the sites. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Damp down exposed soil and any sand stockpiled on site by spraying with water when necessary during dry weather; • Use tarpaulins to cover soils, sand and other loose material when transported by trucks. • Unpaved surfaces used for haulage of materials within settlements shall be maintained dust-free. • Arrangements to control dust through provision of windscreens, water sprinklers, and dust extraction systems shall be provided at all hot-mix plants, batching plants and crushers (if these establishments are being set up exclusively for the subproject). • Monitor air quality.
Acoustic environment	Construction activities will be on settlements, along and near schools, and areas with small-scale businesses. Temporary increase in noise level and vibrations may be caused by excavation equipment, and the transportation of equipment, materials, and people. However, the proposed subproject will follow existing ROW alignment and impact is short-term, site-specific and within a relatively small area. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Involve the community in planning the work program so that any particularly noisy or otherwise invasive activities can be scheduled to avoid sensitive times. • Plan activities in consultation with Rajbari local authority so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance. • Use of high noise generating equipment shall be stopped during night time. • Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach; • Utilize modern vehicles and machinery with the requisite adaptations to limit noise and exhaust emissions, and ensure that these are maintained to manufacturers' specifications at all times. • All vehicles and equipment used in construction shall be fitted with exhaust silencers. Use silent-type generators (if required). • Monitor noise levels. Maintain maximum sound levels not exceeding 80 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s. • If it is not practicable to reduce noise levels to or below noise exposure limits, the contractor must post warning signs in the noise hazard areas. Workers in a posted noise hazard area must wear hearing protection. • Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity. Complete work in these areas quickly.
Aesthetics	The construction activities do not anticipate any cutting of trees but will produce excess excavated earth (spoils), excess	• Prepare the Debris Disposal Plan • Remove all construction and demolition wastes on a daily basis. • Coordinate with Rajbari local authority for beneficial uses

Field	Impacts	Mitigation Measures
	construction materials, and solid waste such as removed concrete, wood, packaging materials, empty containers, spoils, oils, lubricants, and other similar items. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	of excess excavated soils or immediately dispose to designated areas Avoid stockpiling of any excess spoils • Suitably dispose of collected materials from drainages, unutilized materials and debris either through filling up of pits/wasteland or at pre-designated disposal locations. • All vehicles delivering fine materials to the site and carrying waste debris for disposal shall be covered to avoid spillage of materials. All existing roads used by vehicles of the contractor, shall be kept clear of all dust/mud or other extraneous materials dropped by such vehicles. • Lighting on construction sites shall be pointed downwards and away from oncoming traffic and nearby houses. • In areas where the visual environment is particularly important or privacy concerns for surrounding buildings exist, the site may require screening. This could be in the form of shade cloth, temporary walls, or other suitable materials prior to the beginning of construction. • The site must be kept clean to minimize the visual impact of the site. Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
B. Biological Characteristics		
Biodiversity	Activities being located in the built-up area of Rajbari p*ourashava*. There are no protected areas in or around subproject sites, and no known areas of ecological interest. There are no trees along ROWs that need to be removed.	• Check if tree-cutting will be required during detailed design stage. No trees, shrubs, or groundcover may be removed or vegetation stripped without the prior permission of project management office (PMO). • If during detailed design cutting of tress will be required, compensatory plantation for trees lost at a rate of 2 trees for every tree cut, in addition to tree plantation as specified in the design, will be implemented by the contractor, who will also maintain the saplings for the duration of his contract. • All efforts shall be made to preserve trees by evaluation of minor design adjustments/ alternatives (as applicable) to save trees. • Special attention shall be given for protecting giant trees and locally-important trees (with religious importance) during implementation. • Prevent workers or any other person from removing and damaging any flora (plant/vegetation) and fauna (animal) including fishing in any water body in the subproject vicinity. • Prohibit employees from poaching wildlife and cutting of trees for firewood.
C. Socioeconomic Characteristics		
Existing provisions for pedestrians and other forms of transport	Road closure is anticipated. Hauling of construction materials and operation of equipment on-site can cause traffic problems. However, the proposed subproject will follow existing ROW alignment. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Prepare and implement a Traffic Management Plan (see **Appendix 4**for sample) • Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites. • Maintain safe passage for vehicles and pedestrians throughout the construction period. • Schedule truck deliveries of construction materials during periods of low traffic volume. • Erect and maintain barricades, including signs, markings, flags and flagmen informing diversions and alternative routes when required. • Notify affected sensitive receptors by providing sign boards informing nature and duration of construction

Field	Impacts	Mitigation Measures
		activities and contact numbers for concerns/complaints. • Leave spaces for access between mounds of soil. • Provide walkways and metal sheets where required to maintain access across for people and vehicles. • Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools. • Consult businesses and institutions regarding operating hours and factoring this in work schedules. Ensure there is provision of alternate access to businesses and institutions during construction activities, so that there is no closure of these shops or any loss of clientage. • Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.
Socio-economic status	Subproject components will be located in government land and existing ROWs thus there is no requirement for land acquisition or any resettlements. Manpower will be required during the 24-month construction stage. This can result in generation of contractual employment and increase in local revenue. Thus potential impact is positive and long-term.	• Employ at least 50% of labor force from communities in the vicinity of the site. This will have the added benefit of avoiding social problems that sometimes occur when workers are imported into host communities, and avoiding environmental and social problems from workers housed in poorly serviced camp accommodation. • Secure construction materials from local market.
Other existing amenities for community welfare	Although construction of subproject components involves quite simple techniques of civil work, the invasive nature of excavation and the subproject sites being in built-up areas of Rajbari *pourashava* where there are a variety of human activities, will result in impacts to the sensitive receptors such as residents, businesses, and the community in general. Excavation may also damage existing infrastructure (such as water distribution pipes, electricity pylons, etc) located alongside the roads. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Obtain details from *pourashava* nature and location of all existing infrastructure, and plan excavation carefully to avoid any such sites to maximum extent possible; • Integrate construction of the various infrastructure subprojects to be conducted in Rajbari (roads, water supply, etc.) so that different infrastructure is located on opposite sides of the road where feasible and roads and inhabitants are not subjected to repeated disturbance by construction in the same area at different times for different purposes. • Consult with local community to inform them of the nature, duration and likely effects of the construction work, and to identify any local concerns so that these can be addressed. • Existing infrastructure (such as water distribution pipes, electricity pylons, etc.) shall be relocated before construction starts at the subproject sites. • Prior permission shall be obtained from respective local authority for use of water for construction. Use of water for construction works shall not disturb local water users. • If construction work is expected to disrupt users of community water bodies, notice to the affected community shall be served 7 days in advance and again 1 day prior to start of construction. • Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.
Community health and safety	Construction works will impede the access of residents and businesses in limited cases. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures. Poor safety signage	• Provide safety signage at all sites visible to public • Provide safety barriers near any trenches, and cover trenches with planks during non-work hours. • Contractor's activities and movement of staff will be restricted to designated construction areas. • Locations of hot-mix plants, batching plants and crushers (if these establishments are being set up exclusively for the subproject) shall be located at least 100 m away from

Field	Impacts	Mitigation Measures
	and lack of barriers at work site and trenches will create hazard to pedestrians and children.	the nearest dwelling preferably in the downwind direction. • Consult with Rajbari local authority on the designated areas for stockpiling of, soils, gravel, and other construction materials. • If the contractor chooses to locate the work camp/storage area on private land, he must get prior permission from the environment management specialist and landowner. • Use small mechanical excavators to attain faster trenching progress. For rock and concrete breaking, use non-explosive blasting chemicals, silent rock cracking chemicals, and concrete breaking chemicals.[6] • Under no circumstances may open areas or the surrounding bushes be used as a toilet facility. • Recycling and the provision of separate waste receptacles for different types of waste shall be encouraged. • A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: (i) no alcohol/drugs on site; (ii) prevent excessive noise; (iii) construction staff are to make use of the facilities provided for them, as opposed to ad hoc alternatives (e.g. fires for cooking, the use of surrounding bushes as a toilet facility); (iv) no fires permitted on site except if needed for the construction works; (v) trespassing on private/commercial properties adjoining the site is forbidden; (vi) other than pre-approved security staff, no workers shall be permitted to live on the construction site; and (vii) no worker may be forced to do work that is potentially dangerous or that he/she is not trained to do. • Interested and affected parties need to be made aware of the existence of the complaints book and the methods of communication available to them. The contractor must address queries and complaints by: (i) documenting details of such communications; (ii) submitting these for inclusion in complaints register; (iii) bringing issues to the national/regional environmental specialist's attention immediately; and (iv) taking remedial action as per national/regional environment specialist's instruction. • The contractor shall immediately take the necessary remedial action on any complaint/grievance received by him and forward the details of the grievance along with the action taken to the national/regional environmental specialist within 48 hours of receipt of such complaint/grievance.
Workers health and safety	There is invariably a safety risk when construction works such as excavation and earthmoving are conducted in urban areas. Workers need to be mindful of the occupational hazards which can arise from working in height and excavation works. Potential impacts are negative and long-term but reversible by mitigation measures.	• Comply with requirements of Government of Bangladesh Labor Law of 2006 and all applicable laws and standards on workers health and safety (H&S). • Ensure that all site personnel have a basic level of environmental awareness training. If necessary, the national/regional environmental specialist and/or a translator shall be called to the sites to further explain aspects of environmental or social behavior that are unclear. • Produce and implement a site H&S plan which include measures as: (i) excluding the public from worksites; (ii)

[6] These products come in powder forms, and once mixed with water (being the catalyst) simply expand, and crack the rock from hole to hole. This product is environmentally friendly and can be washed away after it has been used.

Field	Impacts	Mitigation Measures
		ensuring all workers are provided with and required to use personal protective equipment (reflectorized vests, footwear, gloves, goggles and masks) at all times; (iii) providing H&S training[7] for all site personnel; (iv) documenting procedures to be followed for all site activities; and (v) maintaining accident reports and records. • Arrange for readily available first aid unit including an adequate supply of sterilized dressing materials and appliances • Maintain necessary living accommodation and ancillary facilities in functional and hygienic manner in work camps. Ensure (i) uncontaminated water for drinking, cooking and washing, (ii) clean eating areas where workers are not exposed to hazardous or noxious substances; and (iii) sanitation facilities are available at all times. • Provide medical insurance coverage for workers; • Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers; • Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted; • Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas; • Ensure moving equipment is outfitted with audible back-up alarms; • Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and • Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.
D. Historical, Cultural, and Archaeological Characteristics		
Physical and cultural heritage	Construction works will be on existing roads and in built-up areas of Rajbari thus risk for chance finds is low.	• All fossils, coins, articles of value of antiquity, structures and other remains of archaeological interest discovered on the site shall be the property of the government. • Prevent workers or any other persons from removing and damaging any fossils, coins, articles of value of antiquity, structures and other remains of archaeological interest.

[7] Some of the key areas that may be covered during training as they relate to the primary causes of accidents include (i) slips, trips and falls; (ii) personal protective equipment; (iii) ergonomics, repetitive motion, and manual handling; (iv) workplace transport; and (v) legislation and responsibilities. Training can provide the foundations of competence but it does not necessarily result in a competent worker. Therefore, it is essential to assess staff competence to ensure that the training provided is relevant and effective. Supervision and monitoring arrangements shall be in place to ensure that training has been effective and the worker is competent at their job. The level of supervision and monitoring required is a management decision that shall be based on the risks associated with the job, the level of competence required, the experience of the individual and whether the worker works as part of a team or is a lone worker.

Field	Impacts	Mitigation Measures
		• Stop work immediately to allow further investigation if any finds are suspected.

E. Anticipated Impacts and Mitigation Measures – Operations and Maintenance Phase

75. In the operations and maintenance (O&M) phase, the drainages and flood control structures will operate with routine maintenance, which should not affect the environment. The infrastructures will need to be repaired from time to time, but environmental impacts will be much less than those of the construction period as the work will be infrequent, affecting small areas only. O&M will be the responsibility of Rajbari local authority, which will be given training by this project.

76. Routine repairs and unblocking of drains will be very small in scale, to conducted manually by small teams of men with simple equipment (shovels, wheelbarrows, etc.) and works will be very short in duration thus will not cause significant physical impacts. Traffic may be interrupted temporarily but this work will be very small in scale, infrequent, and short in duration, so there will be no economic or other implications. To maintain the safety of workers and road-users, such work should be coordinated with the local police department so that adequate warning signs and traffic diversions can be set up when necessary. Debris/sediments from drainages need to be collected and disposed at a designated site such as the landfill. It is important that the designated disposal site's base is of a non-permeable membrane in order to prevent leachate that can contaminate the soil and groundwater. The potential adverse impacts that are associated with O&M activities can be mitigated to acceptable levels with the following mitigation measures (Table10).

Table 10: Anticipated Impacts and Mitigation Measures – O&M Phase

Field	Impacts	Mitigation Measures
A. Physical Characteristics		
Water quality	Run-off from stockpiled debris/sediments from drainages which may cause siltation and reduction in the quality of adjacent bodies of water. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Take all precautions to prevent entering of run-off into streams, watercourses, or irrigation system. Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies. • Remove all debris/sediments immediately. • Dispose debris/sediments at a designated site such as landfill. It is important that the designated disposal site's base is of a non-permeable membrane in order to prevent leachate that can contaminate the soil and groundwater.
Air quality	Moving debris/sediments from drainages may create dusts during dry season. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Use tarpaulins to cover soils, sand and other loose material.
Acoustic environment	Temporary increase in noise level and vibrations. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Plan activities in consultation with Rajbari local authority so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance. • Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity. Complete work in these areas quickly.
B. Biological Characteristics		

Field	Impacts	Mitigation Measures
Biodiversity	Activities in the built-up area of Rajbari *pourashava*. There are no protected areas in or around subproject sites, and no known areas of ecological interest.	• No trees, shrubs, or groundcover may be removed or vegetation stripped without the prior permission. • Prevent workers or any other person from removing and damaging any flora (plant/vegetation) and fauna (animal).
C. Socioeconomic Characteristics		
Existing provisions for pedestrians and other forms of transport	Road closure is not anticipated. Traffic may be interrupted temporarily. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Maintain safe passage for vehicles and pedestrians during maintenance activities. • Erect and maintain barricades, including signs, markings, flags and flagmen informing diversions and alternative routes when required. • Notify affected sensitive receptors by providing sign boards informing nature and duration of maintenance activities and contact numbers for concerns/complaints. • Leave spaces for access between mounds of soil. • Provide walkways and metal sheets where required to maintain access across for people and vehicles. • Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools. • Consult businesses and institutions regarding operating hours and factoring this in work schedules. • Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.
Workers health and safety	Workers need to be mindful of the occupational hazards working in confined spaces such as closed drains. Potential impacts are negative and long-term but reversible by mitigation measures.	• Comply with requirements of Government of Bangladesh Labor Law of 2006 and all applicable laws and standards on workers H&S. • Ensure that all site personnel have a basic level of H&S training. • Produce and implement a O&M health and safety (H&S) plan which include measures as: (i) excluding the public from worksites; (ii) ensuring all workers are provided with and required to use personal protective equipment (reflectorized vests, footwear, gloves, goggles and masks) at all times; (iii) providing (H&S) training[8] for all site personnel; (iv) documenting procedures to be followed for all site activities; and (v) maintaining accident reports and records. • Arrange for readily available first aid unit including an adequate supply of sterilized dressing materials and appliances • Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers; • Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas; • Mark and provide sign boards. Signage shall be in

[8] Some of the key areas that may be covered during training as they relate to the primary causes of accidents include (i) slips, trips and falls; (ii) personal protective equipment; (iii) ergonomics, repetitive motion, and manual handling; (iv) workplace transport; and (v) legislation and responsibilities. Training can provide the foundations of competence but it does not necessarily result in a competent worker. Therefore, it is essential to assess staff competence to ensure that the training provided is relevant and effective. Supervision and monitoring arrangements shall be in place to ensure that training has been effective and the worker is competent at their job. The level of supervision and monitoring required is a management decision that shall be based on the risks associated with the job, the level of competence required, the experience of the individual and whether the worker works as part of a team or is a lone worker.

Field	Impacts	Mitigation Measures
		accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate. • Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.
D. Historical, Cultural, and Archaeological Characteristics		
Physical and cultural heritage	Construction works will be on existing drainages and built-up areas of Rajbari thus risk for chance finds is low.	• All fossils, coins, articles of value of antiquity, structures and other remains of archaeological interest discovered on the site shall be the property of the government. • Prevent workers or any other persons from removing and damaging any fossils, coins, articles of value of antiquity, structures and other remains of archaeological interest. • Stop work immediately to allow further investigation if any finds are suspected.

F. Cumulative Impact Assessment

77. The cumulative impact assessment examined the interaction between the subproject's residual effects (i.e., those effects that remain after mitigation measures have been applied) and those associated with other past, existing, and reasonably foreseeable future projects or activities. The interaction of residual effects associated with multiple projects and/or activities can result in cumulative impacts, both positive and negative. The project's potential cumulative effects were considered with respect to valued components in environmental and socioeconomic categories, in four areas:

(i) of any potential residual project effects that may occur incrementally over time;
(ii) consideration of other known relevant projects or activities within the specified study area boundaries, even if not directly related to the project;
(iii) potential overlapping impacts that may occur due to other developments, even if not directly related to the proposed subproject; and
(iv) future developments that are reasonably foreseeable and sufficiently certain to proceed.

78. The project has identified the valued components as air quality, acoustic environment, socioeconomic and socio-community components, and human health and safety. There are no foreseeable projects that will overlap with the subproject. The spatial boundary of the subproject is the area along the corridor of impact (alignment and width of the drainages and ROWs) and the temporal boundary can be considered as the whole Rajbari*pourashava*.

79. It is recommended that infrastructures be (i) designed to the current best practice standard and notified Government of Bangladesh codes; (ii) built that the floods do not damage them; and (iii) side drains are to be kept free from wastes and siltation. Short-term negative impacts are the same with or without climate change measures except that with climate change measures there are increased demand for construction materials and more time to complete the works. No negative cumulative impact and the potential long-term environmental impacts are positive; including mainstreaming climate risk reduction into infrastructure development ensures subprojects infrastructure are less vulnerable to floods, storm surge, landslides and impacts of other extreme weather events.

80. **Air quality.** Emissions of common air contaminants and fugitive dust may be elevated in proximity to active work sites during construction and O&M phases, these impacts will be short-term and localized to the immediate vicinity of drainages. Greenhouse gas (GHG) emissions may increase as a result of the subproject activities (i.e., vehicle and equipment operation, concrete production, disposal of excavated material, land-filling of residual wastes). Given the subproject's relatively minor contribution to common air contaminants and GHG emissions during construction, the overall significance rating of both these potential residual effects is considered to be negligible.

81. **Acoustic environment.** Noise levels during construction and O&M activities in immediate proximity of work sites are expected to increase. The duration of exposure will be relatively brief and imperceptible. The exposure represents a temporary, localized, adverse residual effect of low significance for affected receptors. While building damage due to ground vibrations is unlikely, there may be annoyance to spatially located receptors during construction and O&M activities. The overall significance rating of potential residual effects is considered to be negligible.

82. **Socioeconomic and socio-community.** Concerns on existing provisions for pedestrians and other forms of transport will occur spatially during construction and O&M activities. Traffic movement along the roads will be improved once the activities are completed. Since the subproject will be improvement of existing infrastructures, it will not conflict with existing or planned land use. However, following improvement in infrastructures and services, added residential developments, commercial, and business facilities and increased densities are expected to develop and enhance Rajbari *pourashava*. This can be considered a long-term cumulative benefit of the subproject.

83. Given the scale of the project it is likely that local people will obtain at least temporary socio-economic benefits, by gaining employment in the construction workforce, and thus raising their levels of income. These benefits can bring wider social gains if they are directed at vulnerable[9] groups.

84. Upon completion of the project, the socio-community will be the major beneficiaries of this subproject. The citizens, businesses, and communities in Rajbari will be provided with reliable and climate-resilient drainage resulting to less flooding and enhanced safety, cost savings, and economic growth. Benefits for all Rajbari citizens include: reduced flooding and related positive economic impact, and improved quality of life. These are considered a long-term cumulative benefit.

85. **Community and workers health and safety.** No adverse residual effects to human health will occur as a result of construction or O&M activities, and mitigation measures are in place to ensure public and worker safety, and will be closely monitored. While exposure to elevated noise levels, fugitive dust and common air pollutants will occur in proximity to work sites, due to their short-term and localized nature, these effects are expected to be minor and insignificant with no measurable effects on human health.

[9] Vulnerable groups as those without legal title to land and other assets; households headed by single earner females, the elderly or disabled; indigenous peoples (based on ADB OM); and households with incomes that are below the poverty line.

86. Therefore the project will benefit the general public by contributing to the long-term improvement of municipal services and community livability in Rajbari *pourashava*.

VI. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

A. Public Consultation Conducted

87. The public participation process included (i) identifying interested and affected parties (stakeholders); (ii) informing and providing the stakeholders with sufficient background and technical information regarding the proposed development; (iii) creating opportunities and mechanisms whereby they can participate and raise their viewpoints (issues, comments, and concerns) with regard to the proposed development; (iv) giving the stakeholders feedback on process findings and recommendations; and (v) ensuring compliance to process requirements with regards to the environmental and related legislation.

88. Public consultations and focus group discussions (FGDs) were conducted by PPTA team on 22 to 23 August, 2014. The objective of the meetings was to appraise the stakeholders about environmental and social impacts of the proposed subproject and safeguards to mitigate the same. A questionnaire was designed and environmental information was collected. Key respondents included project-affected persons, who may suffer temporary access disruptions during construction activities, shopkeepers/businessmen from the subproject area, and daily commuters consulted randomly. Issues discussed and feedback received along with details of date, time, location, and list of participants are given in **Appendix 5**. The environmental concerns and suggestions made by the participants were listed, and discussed, and suggestions accordingly incorporated in the EMP. These include speedy construction works to ensure low impacts to community. Participants also considered the project will provide local employment.

B. Future Consultation and Disclosure

89. This IEE and other relevant documents will be made available at public locations in the *pourashava* and posted on the websites of executing agencies and ADB. The consultation process will be continued and expanded during the project implementation to ensure stakeholders participate fully in project execution, as well as to implement comprehensive information, education, and communication plan.

90. The public consultation and disclosure program with all interested and affected partied will remain a continuous process throughout the project implementation, and shall include the following:

(i) **Consultations during construction phase:** (a) public meetings with affected communities to discuss and plan work programs and allow issues to be raised and addressed once construction has started; and (b) smaller-scale meetings to discuss and plan construction work with individual communities to reduce disturbance and other impacts, and to provide a mechanism through which stakeholders can participate in project monitoring and evaluation.

(ii) **Project disclosure:** (a) public information campaigns (via newspaper, flyers, and media) to explain the project to the wider city population and prepare them for disruptions they may experience once construction is underway; (b) public disclosure meetings at key project stages to inform the public of progress and future plans, and to provide copies of summary documents in local language; (c)

formal disclosure of completed project reports by making copies available at convenient locations in the study areas, and informing the public of their availability; and (d) providing a mechanism through which comments can be made.

91. For the benefit of the community, relevant information from the IEE will be translated in the local language and made available at (i) offices of executing and implementing agencies, (ii) area offices, (iii) consultant teams' offices; and (iv) contractor's campsites. It will be ensured that the hard copies of IEE are kept at places which are conveniently accessible to people, as a means to disclose the document and at the same time creating wider public awareness. An electronic version of the IEE will be placed in the official website of executing and implementing agencies and the ADB website after approval of the IEE by ADB.

VII. GRIEVANCE REDRESS MECHANISM

92. A project-specific grievance redress mechanism (GRM) will be established to receive, evaluate, and facilitate the resolution of AP's concerns, complaints, and grievances about the social and environmental performance at the level of the project. The GRM will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the project.

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

94. *Pourashava*-wide public awareness campaigns will ensure that awareness on grievance redress procedures is generated through the campaign. The project implementation unit (PIU) and governance improvement and capacity development consultants (GICDC) will conduct *pourashava*-wide awareness campaigns to ensure that poor and vulnerable households are made aware of grievance redress procedures and entitlements, and will work with the PMO and management, design and supervision consultants (MDSC) to help ensure that their grievances are addressed.

95. Affected persons (APs) will have the flexibility of conveying grievances/suggestions by dropping grievance redress/suggestion forms in complaints/suggestion boxes that have already been installed by project pourashavas or through telephone hotlines at accessible locations, by e-mail, by post, or by writing in a complaints register in pourashava offices. Appendix 7 has the sample grievance registration form. Careful documentation of the name of the complainant, date of receipt of the complaint, address/contact details of the person, location of the problem area, and how the problem was resolved will be undertaken. The project management office (PMO) safeguard officer will have the overall responsibility for timely grievance redressal on environmental and social safeguards issues and for registration of grievances, related disclosure, and communication with the aggrieved party through the PIU designated safeguard focal person.

96. **Grievance redress process**. In case of grievances that are immediate and urgent in the perception of the complainant, the contractor and MDSC on-site personnel will provide the most

easily accessible or first level of contact for quick resolution of grievances. Contact phone numbers and names of the concerned PIU safeguard focal person and contractors, will be posted at all construction sites at visible locations.

i. **1st Level Grievance.** The phone number of the PIU office should be made available at the construction site signboards. The contractors and PIU safeguard focal person can immediately resolve on-site in consultation with each other, and will be required to do so within 7 days of receipt of a complaint/grievance.

ii. **2nd Level Grievance.** All grievances that cannot be redressed within 7 days at field/ward level will be reviewed by the grievance redress cell (GRC) headed by Panel Mayor of the pourashava with support from PIU designated safeguard focal person and MDSC regional environment and resettlement specialists. GRC will attempt to resolve them within 15 days.[10] The PIU designated safeguard focal person will be responsible to see through the process of redressal of each grievance.

iii. **3rd Level Grievance.**The PIU designated safeguard focal person will refer any unresolved or major issues to the PMO safeguard officer and MDSC national environmental and resettlement specialists. The PMO in consultation with these officers/specialists will resolve them within 30 days.

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

98. In the event that the established GRM is not in a position to resolve the issue, the affected person also can use the ADB Accountability Mechanism (AM) through directly contacting (in writing) the Complaint Receiving Officer (CRO) at ADB headquarters or the ADB Bangladesh Resident Mission (BRM). The complaint can be submitted in any of the official languages of ADB's DMCs. The ADB Accountability Mechanism information will be included in the PID to be distributed to the affected communities, as part of the project GRM.

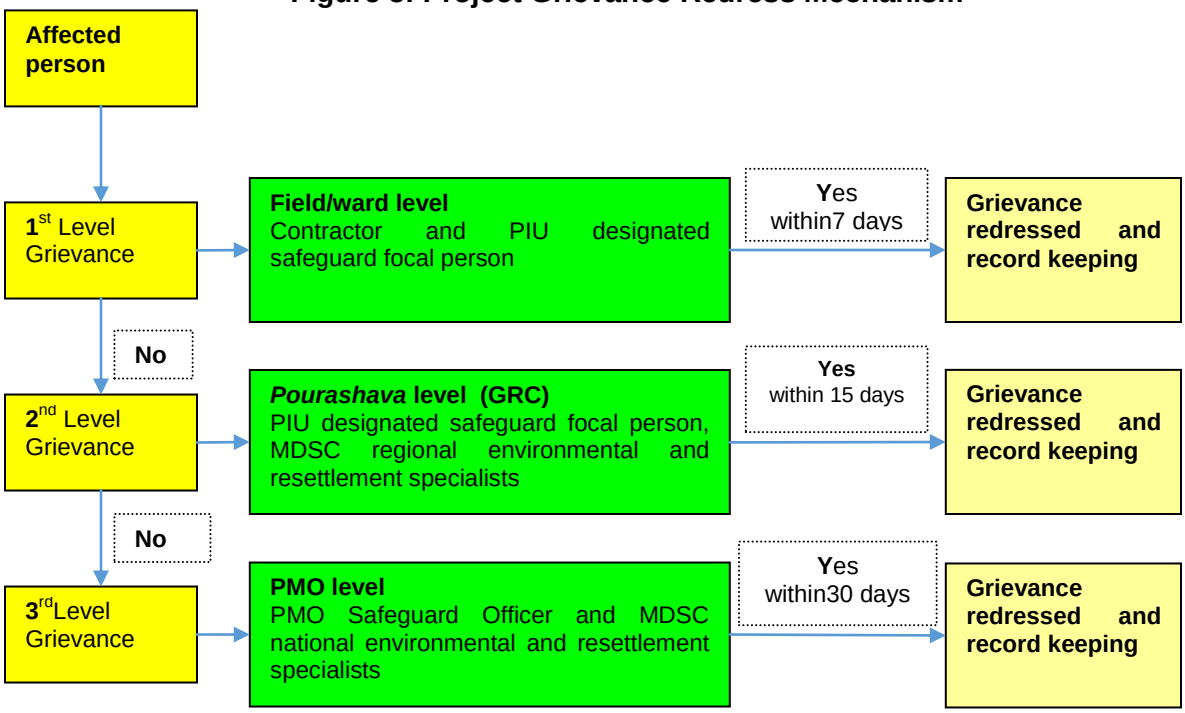
99. **Recordkeeping.** Records of all grievances received, including contact details of complainant, date the complaint was received, nature of grievance, agreed corrective actions and the date these were effected and final outcome will be kept by PIU. The number of grievances recorded and resolved and the outcomes will be displayed/disclosed in the PMO office, *pourashava* office, and on the web, as well as reported in monitoring reports submitted to ADB on a semi-annual basis.

100. **Periodic review and documentation of lessons learned.** The PMO safeguard officer will periodically review the functioning of the GRM in each *pourashava* and record information on the effectiveness of the mechanism, especially on the project's ability to prevent and address grievances.

[10] Grievance redress cell (GRC) will have been formed at Pourashava-level. For example in Lalmonirhat pourashava, the GRC comprises Panel Mayor as Chairperson, and 1 councilor, the pourashava Executive Engineer, Secretary *pourashava* and *pourashava* administrative officer, as members. All *pourashava*-level GRCs shall have at least one-woman member/chairperson and AP representative or independent NGO as committee member. In addition, for project-related grievances, representatives of APs, community-based organizations (CBOs), and eminent citizens must be invited as observers in GRC meetings.

101. Costs. All costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) will be borne by the concerned PIU at *pourashava*-level; while costs related to escalated grievances will be met by the PMO. Cost estimates for grievance redress are included in resettlement cost estimates.

Figure 5: Project Grievance Redress Mechanism



Note: GRC = Grievance Redressal Cell; GICDC = Governance Improvement and capacity Development Consultants; PIU = Project Implementation Unit; MDSC = Management. Design and Supervision Consultants; PMO = Project Management Office

VIII. ENVIRONMENTAL MANAGEMENT PLAN

102. The purpose of the environmental management plan (EMP) is to ensure that the activities are undertaken in a responsible, non-detrimental manner with the objectives of: (i) providing a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on-site; (ii) guiding and controlling the implementation of findings and recommendations of the environmental assessment conducted for the project; (iii) detailing specific actions deemed necessary to assist in mitigating the environmental impact of the project; and (iv) ensuring that safety recommendations are complied with.

103. A copy of the EMP must be kept on work sites at all times. This EMP will be included in the bid documents and will be further reviewed and updated during implementation. The EMP will be made binding on all contractors operating on the site and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

104. For civil works, the contractor will be required to (i) establish an operational system for managing environmental impacts (ii) carry out all of the monitoring and mitigation measures set

forth in the EMP; and (iii) implement any corrective or preventative actions set out in safeguards monitoring reports that the employer will prepare from time to time to monitor implementation of this IEE and EMP. The contractor shall allocate a budget for compliance with these EMP measures, requirements and actions.

A. Institutional Arrangement

105. **Executing and implementing agencies.** The Local Government Engineering Department (LGED) and the Department of Public Health Engineering (DPHE), both under the Local Government Division (LGD) of the Ministry of Local Government, Rural Development and Cooperatives (MLGRD&C) and having extensive experience in managing urban and water supply projects financed by ADB, will be the executing agencies of the project. The participating *pourashavas* will be the implementing agencies.

B. Safeguard Implementation Arrangement

106. **Project management office.** A PMO will be established for the overall management of the project. The PMO will be headed by Project Director (PD) supported by officials including three project managers in charge of (i) municipal infrastructure (excluding water supply and sanitation), (ii) water supply and sanitation, and (iii) governance improvement and capacity development, respectively. the PMO will receive support from national environmental specialist and national resettlement specialist on the MDSC team. Key tasks and responsibilities of the PMO Safeguard (Environment) Officer are as follows:

(i) confirm existing IEEs/EMPs are updated based on detailed designs, and that new IEEs/EMPs are prepared in accordance with the EARF and subproject selection criteria related to safeguards;
(ii) confirm whether IEEs/EMPs are included in bidding documents and civil works contracts;
(iii) provide oversight on environmental management aspects of subprojects and ensure EMPs are implemented by project implementation unit (PIU) and contractors;
(iv) establish a system to monitor environmental safeguards of the project, including monitoring the indicators set out in the monitoring plan of the EMP;
(v) facilitate and confirm overall compliance with all government rules and regulations regarding site and environmental clearances, as well as any other environmental requirements (e.g., location clearance certificates, environmental clearance certificates, etc.), as relevant;
(vi) supervise and provide guidance to the PIUs to properly carry out the environmental monitoring and assessments as per the EARF;
(vii) review, monitor, and evaluate the effectiveness with which the EMPs are implemented, and recommend necessary corrective actions to be taken as necessary;
(viii) consolidate monthly environmental monitoring reports from PIUs and submit semi-annual monitoring reports to ADB;
(ix) ensure timely disclosure of final IEEs/EMPs in locations and form accessible to the public; and
(x) address any grievances brought about through the grievance redress mechanism in a timely manner.

107. **Project implementation unit**. The participating *pourashavas* will establish a PIU within the *pourashava* structure. The PIUs will (i) be responsible for land acquisition; (ii) take necessary action for obtaining rights of way; (iii) plan, implement and monitor public relations activities, gender mainstreaming initiatives and community participation activities at *pourashava* level; (iv) disseminate information related to the project to the public and media; (v) ensure compliance with loan covenants concerning safeguards measures; and (vi) facilitate implementation of safeguards plans. The PIUs will each designate a Safeguard Officer[11] and will receive assistance from the assigned MDSC regional environmental specialist to:

(i) update IEEs/EMPs during detailed design stage and prepare new IEEs/EMPs in accordance with the EARF;
(ii) conduct environmental compliance audit of existing facilities as per Item F, Appendix 6 of ADB SPS, 2009;
(iii) include IEEs/EMPs in bidding documents and civil works contracts;
(iv) comply with all government rules and regulations;
(v) take necessary action for obtaining rights of way;
(vi) oversee implementation of EMPs including environmental monitoring by contractors;
(vii) take corrective actions when necessary to ensure no environmental impacts;
(viii) submit monthly environmental monitoring reports to PMO,
(ix) conduct continuous public consultation and awareness;
(x) address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs; and
(xi) organize an induction course for the training of contractors preparing them on EMP implementation, environmental monitoring requirements related to mitigation measures; and taking immediate actions to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of implementation.

108. **Project Management, Design and Supervision Consultants (MDSC).** MDSC will be engaged to work closely with and advise the PMO, to be involved in project supervision including monitoring during construction phase. The MDSC will have one national environmental specialist and three regional environmental specialist as well as one national resettlement specialist and three regional resettlement specialist. The MDSC national environmental specialist will, but not limited to:

(i) work under the general supervision of the team leader and the deputy team leader;
(ii) review the environmental guidelines and requirement of the government of Bangladesh and ADB SPS, 2009, environmental subproject selection guidelines and EARF;
(iii) Guide the implementation of future subprojects;
(iv) provide technical support to the PMO and PIUs including review and update of EARF and guidelines for specific type of subprojects and assist in preparing terms of reference for environmental assessment;

[11] It is recommended that existing *pourashava* health officer or executive engineer will also work as safeguard officer in addition to his/her regular responsibilities within the *pourashava*.

(v) assist and guide the MDSC regional environmental specialists to provide support to environmental management functions including updating subproject IEEs in respect to EMP;
(vi) assist in preparing IEEs and in monitoring impact and mitigation measures associated with subprojects;
(vii) assist PIUs and MDSC regional environmental specialists working in the steps for preparing the EIA/IEE, capacity building and training, preparation of guidelines and procedure and subproject specific guidance;
(viii) provide support and guidance to PIUs in undertaking environmental monitoring
(ix) support PMU in submitting semi-annual environmental monitoring reports to ADB;
(x) facilitate in grievance redress and corrective actions;
(xi) train PIU officials regarding environmental requirement and issues; and
(xii) perform any other task assigned by the team leader, deputy team leader and the project director.

109. The MDSC regional environmental specialists will, but not limited to:

(i) work under the supervision and guidance of the team leader, deputy team leader and MDSC national environmental specialist;
(ii) assist PIUs in preparing and updating IEEs including EMPs in accordance with the EARF, and assist in monitoring impact and mitigation measures associated with subprojects including implementation of EMPs by contractors;
(iii) assist in preparation of IEEs and in the environmental review of subproject consisting of screening at *pourashava* level by PIU through a committee formed with municipal mayor as chairman and representatives from DOE, LGED and other relevant district office as members;
(iv) assist PIUs in the steps for preparing EIA/IEE, capacity building and training, preparation of guidelines and procedure and subproject specific guidance;
(v) support PIU in environmental monitoring and submit monitoring reports to PMU as inputs into the semi-annual monitoring report submitted to ADB;
(vi) undertake mitigation measures and other specific measures in the construction contract;
(vii) facilitate in grievance redress and corrective actions;
(viii) follow subproject selection guidelines and EARF to ensure compliance with the environmental guidelines and requirement of the Government of Bangladesh and ADB SPS, 2009;
(ix) support PMO and MDSC national environment specialist by providing data, information and all other requested assistance;
(x) train PIU officials regarding environmental issues
(xi) perform any other task assigned by MDSC national environment specialist, team leader, deputy team leader and the project director.

110. **Civil works contracts and contractors**. EMPs are to be included in bidding and contract documents and verified by the PIUs and PMO. The contractor will be required to designate an environmental supervisor to (i) coordinate with MDSC on updating the IEE/EMP based on detailed designs, and (ii) ensure implementation of EMP during civil works. Contractors are to carry out all environmental mitigation and monitoring measures outlined in their contract.

111. **Governance Improvement and Capacity Development Consultants (GICDC)**. The PMO and PIUs will require support on a range of activities related to governance improvement and capacity development of *pourashavas*. The GICDC will support PMO and PIUs in implementing urban government improvement action plan (UGIAP) by providing capacity development, community mobilization and other facilitation services. There will be 4 GICDC regional offices consisting of 4 regional coordinators at each regional office. There will be 2community mobilizers in each project pourashava. The regional coordinators will assist *pourashavas* and the local capacity development experts in the activities related to community participation and inclusive development. The community mobilizers will be posted at the *pourashava* and will (i) have to work maintaining close liaison with the mayor, councilors, *pourashava* staffs and communities, (ii) provide assistance and support to PIU regarding planning and implementation of citizen awareness and participation activities, urban planning, equity and inclusiveness of women and urban poor. The GICDC will also have a training specialist who will be responsible for identifying and coordinating capacity building activities at *pourashava* level.

Figure 6: Safeguards Implementation Arrangement

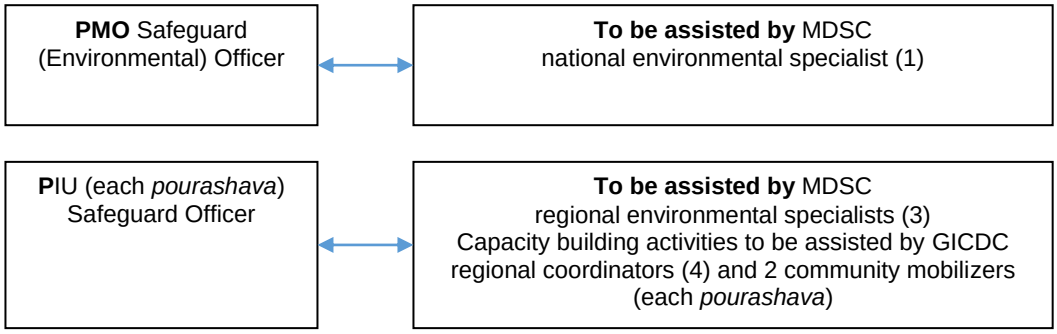


Table 11: Environmental Management and Monitoring Plan – Prior, During, and Post Construction Phase

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
1. Prior to Construction Activities						
Consents, permits, clearances, no objection certificate (NOC), etc.	Failure to obtain necessary consents, permits, NOCs, etc can result to design revisions and/or stoppage of works	• Obtain all necessary consents, permits, clearance, NOCs, etc. prior to start of civil works. • Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs, etc. • Include in detailed design drawings and documents all conditions and provisions if necessary	Project management unit (PMO), project implementing unit (PIU), Management Design Supervision Consultants (MDSC)	• Incorporated in final design and communicated to contractors.	• Prior to award of contract	• No cost required. Cost of obtaining all consents, permits, clearance, NOCs, etc. prior to start of civil works responsibility of PMO and PIU. • Mitigation measures are included as part of TOR of PMO, PIU, MDSC
Updating of IEE based on detailed design	Site-specific impacts not identified, mitigation measures not appropriate and sufficient to address impacts	• Update IEE and EMP based on detailed design • Ensure updated EMP is provided to contractors • Relevant information disclosed	PMO	• Updated IEE and EMP reviewed, approved and disclosed	• Upon completion of detailed design	• No additional cost required
Existing utilities	Disruption of services.	• Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction activities • Require construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services. • Require contractors	PMO, PIU, MDSC	• List of affected utilities and operators; • Bid document to include requirement for a contingency plan for service interruptions (example provision of water if disruption is more than 24 hours), spoil management plan (**Appendix 3**), and traffic	• During detailed design phase • Review of spoils management plan: Twice (once after first draft and once beforefinal approval)	• No cost required. • Mitigation measures are included as part of TOR of PMO, PIU, MDSC.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		to prepare spoils management plan (see **Appendix 3** for outline) and traffic management plan (see **Appendix 4** for sample)		management plan (**Appendix 4**)		
Construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.	Disruption to traffic flow and sensitive receptors	• Determine locations prior to award of construction contracts.	PMO, PIU, and MDSC	• List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas. • Written consent of landowner/s (not lessee/s) for reuse of excess spoils to agricultural land	• During detailed design phase	• No cost required. • Mitigation measures are included as part of TOR of PMO, PIU, and MDSC.
Sources of Materials	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution.	• Prepare list of approved quarry sites and sources of materials	PMO, PIU, and MDSC	• List of approved quarry sites and sources of materials; • Bid document to include requirement for verification of suitability of sources and permit for additional quarry sites if necessary.	• During detailed design phase, as necessary with discussion with detailed design engineers and PIUs	• No cost required. • Mitigation measures are included as part of TOR of PMO, PIU, and MDSC.
EMP Implementation Training	Irreversible impact to the environment, workers, and community	• Project manager and all key workers will be required to undergo EMP implementation including spoils management, Standard operating procedures (SOP) for construction works; health and safety (H&S), core labor laws, applicable environmental laws, etc	Construction Contractor	• Proof of completion (Safeguards Compliance Orientation) • Posting of proof of completion at worksites • Posting of EMP at worksites	• During detailed design phase prior to mobilization of workers to site	• Cost of EMP Implementation Orientation Training to contractor is responsibility of PMO and PIU. • Other

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
						costs responsibility of contractor.
2. During Construction Activities						
A. Physical Characteristics						
Topography, landforms, geology and soils	Significant amount of gravel, sand, and cement will be required for this subproject. Extraction of construction materials may cause localized changes in topography and landforms. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Utilize readily available sources of materials. If contractor procures materials from existing burrow pits and quarries, ensure these conform to all relevant regulatory requirements. • Borrow areas and quarries (If these are being opened up exclusively for the subproject) must comply with environmental requirements, as applicable. No activity will be allowed until formal agreement is signed between PIU, landowner and contractor.	Construction Contractor	• Records of sources of materials	• Monthly by PIU	• Cost for implementation of mitigation measures responsibility of contractor.
Water quality	Trenching and excavation, run-off from stockpiled materials, and chemical contamination from fuels and lubricants may result to silt-laden runoff during rainfall which may cause siltation and reduction in the quality of	• Prioritize re-use of excess spoils and materials in construction activities. If spoils will be disposed, consult with Rajbari local authority on designated disposal areas. • All earthworks must to be conducted during dry season to maximum extent possible to avoid the difficult working conditions that prevail during monsoon season such as problems from runoff. • Location for stockyards for construction materials shall be identified at	Construction Contractor	• Areas for stockpiles, storage of fuels and lubricants and waste materials; • Number of silt traps installed along trenches leading to water bodies; • Records of surface water quality inspection; • Effectiveness of water management measures;	• Visual inspection by PIU and supervision consultants on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of subproject components	• Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	adjacent bodies of water. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	least 300m away from watercourses. Place storage areas for fuels and lubricants away from any drainage leading to water bodies. • Take all precautions to minimize the wastage of water in the construction activities. • Take all precautions to prevent entering of wastewater into streams, watercourses, or irrigation system. Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies. • Ensure diverting storm water flow during construction shall not lead to inundation and other nuisances in low lying areas. • While working across or close to any water body, the flow of water must not be obstructed. Ensure no construction materials like earth, stone, or appendage are disposed of in a manner that may block the flow of water of any watercourse and cross drainage channels. • Monitor water quality according to the environmental management plan.		• No visible degradation to nearby drainages, *khals* or water bodies due to construction activities		
Air quality	Conducting works at dry season and moving large quantity of materials may create dusts and	• Damp down exposed soil and any sand stockpiled on site by spraying with water when necessary during dry weather; • Use tarpaulins to cover soils, sand and other	Construction Contractor	• Location of stockpiles; • Number of complaints from sensitive receptors; • Heavy	• Visual inspection by PIU and supervision consultants on monthly basis • Frequency	• Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	increase in concentration of vehicle-related pollutants (such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons) which will affect people who live and work near the sites. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	loose material when transported by trucks. • Unpaved surfaces used for haulage of materials within settlements shall be maintained dust-free. • Arrangements to control dust through provision of windscreens, water sprinklers, and dust extraction systems shall be provided at all hot-mix plants, batching plants and crushers (if these establishments are being set up exclusively for the subproject). • Monitor air quality.		equipment and machinery with air pollution control devices; • Certification that vehicles are compliant with air quality standards.	and sampling sites to be finalized during detailed design stage and final location of subproject components	
Acoustic environment	Construction activities will be on settlements, along and near schools, and areas with small-scale businesses. Temporary increase in noise level and vibrations may be caused by excavation equipment, and the transportation of equipment, materials, and	• Involve the community in planning the work program so that any particularly noisy or otherwise invasive activities can be scheduled to avoid sensitive times. • Plan activities in consultation with Rajbari local authority so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance. • Use of high noise generating equipment shall be stopped during night time. • Horns should not be	Construction Contractor	• Number of complaints from sensitive receptors; • Use of silencers in noise-producing equipment and sound barriers; • Equivalent day and night time noise levels	• Visual inspection by PIU and supervision consultants on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of subproject components	• Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	people. However, the proposed subproject will follow existing ROW alignment and impact is short-term, site-specific and within a relatively small area. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	used unless it is necessary to warn other road users or animals of the vehicle's approach; • Utilize modern vehicles and machinery with the requisite adaptations to limit noise and exhaust emissions, and ensure that these are maintained to manufacturers' specifications at all times. • All vehicles and equipment used in construction shall be fitted with exhaust silencers. Use silent-type generators (if required). • Monitor noise levels. Maintain maximum sound levels not exceeding 80 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s. • If it is not practicable to reduce noise levels to or below noise exposure limits, the contractor must post warning signs in the noise hazard areas. Workers in a posted noise hazard area must wear hearing protection. • Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity. Complete work in these areas quickly.				
Aesthetics	The construction activities do not anticipate any cutting of trees	• Prepare the Debris Disposal Plan • Remove all construction and demolition	Construction Contractor	• Number of complaints from sensitive receptors; • Worksite	• Visual inspection by PIU and supervision consultants on	• Cost for implementation of mitigation

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	but will produce excess excavated earth (spoils), excess construction materials, and solid waste such as removed concrete, wood, packaging materials, empty containers, spoils, oils, lubricants, and other similar items. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	wastes on a daily basis. • Coordinate with Rajbari local authority for beneficial uses of excess excavated soils or immediately dispose to designated areas Avoid stockpiling of any excess spoils • Suitably dispose of collected materials from drainages, unutilized materials and debris either through filling up of pits/wasteland or at pre-designated disposal locations. • All vehicles delivering fine materials to the site and carrying waste debris for disposal shall be covered to avoid spillage of materials. All existing roads used by vehicles of the contractor, shall be kept clear of all dust/mud or other extraneous materials dropped by such vehicles. • Lighting on construction sites shall be pointed downwards and away from oncoming traffic and nearby houses. • In areas where the visual environment is particularly important or privacy concerns for surrounding buildings exist, the site may require screening. This could be in the form of shade cloth, temporary walls, or other suitable materials prior to the beginning of construction.		clear of hazardous wastes such as oil/fuel • Worksite clear of any wastes, collected materials from drainages, unutilized materials and debris • Transport route and worksite cleared of any dust/mud	monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		• The site must be kept clean to minimize the visual impact of the site. Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;				
B. Biological Characteristics						
Biodiversity	Activities being located in the built-up area of Rajbari *pourashava*. There are no protected areas in or around subproject sites, and no known areas of ecological interest. There are no trees at the site that need to be removed.	• Check if tree-cutting will be required during detailed design stage. No trees, shrubs, or groundcover may be removed or vegetation stripped without the prior permission of the environment management specialist. • If during detailed design cutting of tress will be required, compensatory plantation for trees lost at a rate of 2 trees for every tree cut, in addition to tree plantation as specified in the design, will be implemented by the contractor, who will also maintain the saplings for the duration of his contract. • All efforts shall be made to preserve trees by evaluation of minor design adjustments/ alternatives (as applicable) to save trees. • Special attention shall be given for protecting giant trees and locally-important trees (with religious importance) during implementation. • Prevent workers or any other person from removing and damaging any	Construction Contractor	• PMO and PIU to report in writing the number of trees cut and planted if tree-cutting will be required (to be determined during detailed design stage) • Number of complaints from sensitive receptors on disturbance of vegetation, poaching, fishing, etc.	• Visual inspection by PIU and supervision consultants on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	• Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		flora (plant/vegetation) and fauna (animal) including fishing in any water body in the subproject vicinity. • Prohibit employees from poaching wildlife and cutting of trees for firewood.				
C. Socioeconomic Characteristics						
Existing provisions for pedestrians and other forms of transport	Road closure is not anticipated. Hauling of construction materials and operation of equipment on-site can cause traffic problems. However, the proposed subproject will follow existing ROW alignment. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Prepare and implement a Traffic Management Plan (see **Appendix 4** for sample) • Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites. • Maintain safe passage for vehicles and pedestrians throughout the construction period. • Schedule truck deliveries of construction materials during periods of low traffic volume. • Erect and maintain barricades, including signs, markings, flags and flagmen informing diversions and alternative routes when required. • Notify affected sensitive receptors by providing sign boards informing nature and duration of construction activities and contact numbers for concerns/complaints. • Leave spaces for access between mounds of soil. • Provide walkways	Construction Contractor	• Traffic route during construction works including number of permanent signages, barricades and flagmen on worksite as per Traffic Management Plan (see **Appendix 4** for sample); • Number of complaints from sensitive receptors; • Number of signages placed at project location • Number of walkways, signages, and metal sheets placed at project location	• Visual inspection by PIU and supervision consultants on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	• Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		and metal sheets where required to maintain access across for people and vehicles. • Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools. • Consult businesses and institutions regarding operating hours and factoring this in work schedules. Ensure there is provision of alternate access to businesses and institutions during construction activities, so that there is no closure of these shops or any loss of clientage. • Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.				
Socio-economic status	Subproject components will be located in government land and existing ROWs thus there is no requirement for land acquisition or any resettlements. Manpower will be required during the XXX-months construction stage. This can result to	• Employ at least 50% of labor force from communities in the vicinity of the site. This will have the added benefit of avoiding social problems that sometimes occur when workers are imported into host communities, and avoiding environmental and social problems from workers housed in poorly serviced camp accommodation. • Secure construction materials from local market.	Construction Contractor	• Employment records; • Records of sources of materials • Records of compliance to Bangladesh Labor Law of 2006 and other applicable standards	• Visual inspection by PIU and supervision consultants on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	• Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	generation of contractual employment and increase in local revenue. Thus potential impact is positive and long-term.					
Other existing amenities for community welfare	Although construction of subproject components involves quite simple techniques of civil work, the invasive nature of excavation and the subproject sites being in built-up areas of Rajbari pourashava where there are a variety of human activities, will result to impacts to the sensitive receptors such as residents, businesses, and the community in general. Excavation may also damage existing infrastructure (such as water distribution pipes, electricity pylons, etc) located	• Provide safety signage at all sites visible to public • Provide safety barriers near any trenches, and cover trenches with planks during non-work hours. • Obtain details from *pourashava* nature and location of all existing infrastructure, and plan excavation carefully to avoid any such sites to maximum extent possible; • Integrate construction of the various infrastructure subprojects to be conducted in Rajbari (roads, water supply, etc.) so that different infrastructure is located on opposite sides of the road where feasible and roads and inhabitants are not subjected to repeated disturbance by construction in the same area at different times for different purposes. • Consult with local community to inform them of the nature, duration and likely effects of the construction work, and to identify any local concerns so that these can be addressed. • Existing infrastructure (such as water distribution	Construction Contractor	• Utilities Contingency Plan Number of complaints from sensitive receptors	• Visual inspection by PIU and supervision consultants on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	• Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	alongside the roads. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	pipes, electricity pylons, etc.) shall be relocated before construction starts at the subproject sites. • Prior permission shall be obtained from respective local authority for use of water for construction. Use of water for construction works shall not disturb local water users. • If construction work is expected to disrupt users of community water bodies, notice to the affected community shall be served 7 days in advance and again 1 day prior to start of construction. • Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.				
Community health and safety	Construction works will impede the access of residents and businesses in limited cases. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures. Poor safety signage and lack of barriers at work site and trenches will	• Provide safety signage at all sites visible to public • Provide safety barriers near any trenches, and cover trenches with planks during non-work hours. • Contractor's activities and movement of staff will be restricted to designated construction areas. • Locations of hot-mix plants, batching plants and crushers (if these establishments are being set up exclusively for the subproject) shall be located at least 100 m away from the nearest dwelling preferably in the downwind direction.	Construction Contractor	• Number of permanent signages, barricades and flagmen on worksite as per Traffic Management Plan (see **Appendix 4** for sample); • Number of complaints from sensitive receptors; • Number of walkways, signages, and metal sheets placed at project location • Agreement between landowner and contractors in case of using private lands as work camps,	• Visual inspection by PIU and supervision consultants on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	• Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	create hazard to pedestrians and children.	• Consult with Rajbari local authority on the designated areas for stockpiling of, soils, gravel, and other construction materials. • If the contractor chooses to locate the work camp/storage area on private land, he must get prior permission from the environment management specialist and landowner. • Use small mechanical excavators to attain faster trenching progress. For rock and concrete breaking, use non-explosive blasting chemicals, silent rock cracking chemicals, and concrete breaking chemicals.[12] • Under no circumstances may open areas or the surrounding bushes be used as a toilet facility. • Recycling and the provision of separate waste receptacles for different types of waste shall be encouraged. • A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: (i) no		storage areas, etc.		

[12] These products come in powder forms, and once mixed with water (being the catalyst) simply expand, and crack the rock from hole to hole. This product is environmentally friendly and can be washed away after it has been used.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		alcohol/drugs on site; (ii) prevent excessive noise; (iii) construction staff are to make use of the facilities provided for them, as opposed to ad hoc alternatives (e.g. fires for cooking, the use of surrounding bushes as a toilet facility); (iv) no fires permitted on site except if needed for the construction works; (v) trespassing on private/commercial properties adjoining the site is forbidden; (vi) other than pre-approved security staff, no workers shall be permitted to live on the construction site; and (vii) no worker may be forced to do work that is potentially dangerous or that he/she is not trained to do. • Interested and affected parties need to be made aware of the existence of the complaints book and the methods of communication available to them. The contractor must address queries and complaints by: (i) documenting details of such communications; (ii) submitting these for inclusion in complaints register; (iii) bringing issues to the national/regional environmental specialist's attention immediately; and (iv) taking remedial action as per national/regional environment specialist's instruction. • The contractor shall				

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		immediately take the necessary remedial action on any complaint/grievance received by him and forward the details of the grievance along with the action taken to the national/regional environmental specialist within 48 hours of receipt of such complaint/grievance.				
Workers health and safety	There is invariably a safety risk when construction works such as excavation and earthmoving are conducted in urban areas. Workers need to be mindful of the occupational hazards which can arise from working in height and excavation works. Potential impacts are negative and long-term but reversible by mitigation measures.	• Comply with requirements of Government of Bangladesh Labor Law of 2006 and all applicable laws and standards on workers H&S. • Ensure that all site personnel have a basic level of environmental awareness training. If necessary, the environmental management specialist and/or a translator shall be called to the sites to further explain aspects of environmental or social behavior that are unclear. • Produce and implement a site health and safety (H&S) plan which include measures as: (i) excluding the public from worksites; (ii) ensuring all workers are provided with and required to use personal protective equipment (reflectorized vests, footwear, gloves, goggles and masks)	Construction Contractor	• Site-specific H&S Plan • Equipped first-aid stations • Medical insurance coverage for workers • Number of accidents • Records of supply of uncontaminated water • Condition of eating areas of workers • Record of H&S orientation trainings • Use of personal protective equipment • % of moving equipment outfitted with audible back-up alarms • Permanent	• Visual inspection by PIU and supervision consultants on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	• Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		at all times; (iii) providing (H&S) training[13] for all site personnel; (iv) documenting procedures to be followed for all site activities; and (v) maintaining accident reports and records. • Arrange for readily available first aid unit including an adequate supply of sterilized dressing materials and appliances • Maintain necessary living accommodation and ancillary facilities in functional and hygienic manner in work camps. Ensure (i) uncontaminated water for drinking, cooking and washing, (ii) clean eating areas where workers are not exposed to hazardous or noxious substances; and (iii) sanitation facilities are available at all times. • Provide medical insurance coverage for workers; • Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection,		sign boards for hazardous areas • Signages for storage and disposal areas • Condition of sanitation facilities for workers		

[13] Some of the key areas that may be covered during training as they relate to the primary causes of accidents include (i) slips, trips and falls; (ii) personal protective equipment; (iii) ergonomics, repetitive motion, and manual handling; (iv) workplace transport; and (v) legislation and responsibilities. Training can provide the foundations of competence but it does not necessarily result in a competent worker. Therefore, it is essential to assess staff competence to ensure that the training provided is relevant and effective. Supervision and monitoring arrangements shall be in place to ensure that training has been effective and the worker is competent at their job. The level of supervision and monitoring required is a management decision that shall be based on the risks associated with the job, the level of competence required, the experience of the individual and whether the worker works as part of a team or is a lone worker.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		and preventing injuring to fellow workers; • Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted; • Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas; • Ensure moving equipment is outfitted with audible back-up alarms; • Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and • Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.				
D. Historical, Cultural, and Archaeological Characteristics						
Physical and	Construction	• All fossils, coins,	Construction	• Records of	• Visual	• Cost

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
cultural heritage	works will be on existing roads and in built-up areas of Rajbari thus risk for chance finds is low.	articles of value of antiquity, structures and other remains of archaeological interest discovered on the site shall be the property of the government. • Prevent workers or any other persons from removing and damaging any fossils, coins, articles of value of antiquity, structures and other remains of archaeological interest. • Stop work immediately to allow further investigation if any finds are suspected.	Contractor	chance finds	inspection by PIU and supervision consultants on monthly basis • Frequency and sampling sites to be finalized during detailed design stage and final location of) subproject components	for implementation of mitigation measures responsibility of contractor.
E. Others						
Submission of EMP implementation report	Unsatisfactory compliance to EMP	• Appointment of supervisor to ensure EMP implementation • Timely submission of monitoring reports including pictures	Construction contractor	• Availability and competency of appointed supervisor • Monthly report	• Monthly monitoring report to be submitted by PIU to PMO • PMO to submit semi-annual monitoring report to ADB	• Cost for implementation of mitigation measures responsibility of contractor.
3. Post-construction Activities						
Post-construction clean-up	Damage due to debris, spoils, excess construction materials	• Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and • All excavated roads shall be reinstated to original condition. • All disrupted utilities restored • All affected structures rehabilitated/compensated • The area that	Construction Contractor	• PMO report in writing that (i) worksite is restored to original conditions; (ii) camp has been vacated and restored to pre-project conditions; (iii) all construction related structures not relevant to O&M are removed; and (iv) worksite clean-up is satisfactory.	• Prior to turn-over of completed works to *pourashava*	• Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up. • All hardened surfaces within the construction camp area shall be ripped, all imported materials removed, and the area shall be topsoiled and regrassed using the guidelines set out in the revegetation specification that forms part of this document. • The contractor must arrange the cancellation of all temporary services. • Request PMO/CSS to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work.				

Table 12: Environmental Management and Monitoring Plan – O&M Phase

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
Post-construction clean-up	Damage due to debris, spoils, excess construction materials	• Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and • All excavated roads shall be reinstated to original condition. • All disrupted utilities restored	Construction Contractor	• PMO/MDSC report in writing that (i) worksite is restored to original conditions; (ii) camp has been vacated and restored to pre-project conditions; (iii) all construction related structures not relevant to O&M are removed; and (iv)	• Prior to turn-over of completed works to pourashava	• Cost for implementation of mitigation measures responsibility of contractor.

		• All affected structures rehabilitated/compensated • The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up. • All hardened surfaces within the construction camp area shall be ripped, all imported materials removed, and the area shall be topsoiled and regrassed using the guidelines set out in the revegetation specification that forms part of this document. • The contractor must arrange the cancellation of all temporary services. • Request PMO/CSS to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work.		worksite clean-up is satisfactory.		

Table 13: Environmental Management and Monitoring Plan – O&M Phase

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
A. Physical Characteristics						
Water quality	Run-off from stockpiled debris/sediments from drainages which may cause siltation and reduction in the quality of adjacent bodies of water. The impacts are	• Take all precautions to prevent entering of run-off into streams, watercourses, or irrigation system. Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies. • Remove all	• Rajbari *pourashava*	• No visible degradation to nearby drainages, *khal*s or water bodies due to construction activities	• Duration of repair works	• Included in O&M cost

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	debris/sediments immediately. • Dispose debris/sediments at a designated site such as landfill. It is important that the designated disposal site's base is of a non-permeable membrane in order to prevent leachate that can contaminate the soil and groundwater.				
Air quality	Moving debris/sediments from drainages may create dusts during dry season. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Use tarpaulins to cover soils, sand and other loose material.	• Rajbari *pourashava*	• No complaints from sensitive receptors	• Duration of repair works	• Included in O&M cost
Acoustic environment	Temporary increase in noise level and vibrations. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Plan activities in consultation with Rajbari local authority so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance. • Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity. Complete work in these areas quickly.	• Rajbari *pourashava*	• No complaints from sensitive receptors	• Duration of repair works	• Included in O&M cost
B. Biological Characteristics						
Biodiversity	Activities in the built-up area of	• No trees, shrubs, or groundcover may be	• Rajbari *pourashava*	• No complaints from sensitive	• Duration of repair works	• Included in O&M cost

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
	Rajbaripourashava. There are no protected areas in or around subproject sites, and no known areas of ecological interest.	removed or vegetation stripped without the prior permission. • Prevent workers or any other person from removing and damaging any flora (plant/vegetation) and fauna (animal).		receptors		
C. Socioeconomic Characteristics						
Existing provisions for pedestrians and other forms of transport	Road closure is not anticipated. Traffic may be interrupted temporarily. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Maintain safe passage for vehicles and pedestrians during maintenance activities. • Erect and maintain barricades, including signs, markings, flags and flagmen informing diversions and alternative routes when required. • Notify affected sensitive receptors by providing sign boards informing nature and duration of maintenance activities and contact numbers for concerns/complaints. • Leave spaces for access between mounds of soil. • Provide walkways and metal sheets where required to maintain access across for people and vehicles. • Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools. • Consult businesses and institutions regarding	• Rajbari *pourashava*	• No complaints from sensitive receptors	• Duration of repair works	• Included in O&M cost

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		operating hours and factoring this in work schedules. • Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.				
Workers health and safety	Workers need to be mindful of the occupational hazards working in confined spaces such as closed drains. Potential impacts are negative and long-term but reversible by mitigation measures.	• Comply with requirements of Government of Bangladesh Labor Law of 2006 and all applicable laws and standards on workers H&S. • Ensure that all site personnel have a basic level of H&S training. • Produce and implement a O&M health and safety (H&S) plan which include measures as: (i) excluding the public from worksites; (ii) ensuring all workers are provided with and required to use personal protective equipment (reflectorized vests, footwear, gloves, goggles and masks) at all times; (iii) providing (H&S) training[14] for all site personnel; (iv) documenting procedures to be followed for all site	• Rajbari *pourashava*	• No complaints from sensitive receptors • No complaints from workers related to O&M activities • Zero accident	• Duration of repair works	• Included in O&M cost

[14] Some of the key areas that may be covered during training as they relate to the primary causes of accidents include (i) slips, trips and falls; (ii) personal protective equipment; (iii) ergonomics, repetitive motion, and manual handling; (iv) workplace transport; and (v) legislation and responsibilities. Training can provide the foundations of competence but it does not necessarily result in a competent worker. Therefore, it is essential to assess staff competence to ensure that the training provided is relevant and effective. Supervision and monitoring arrangements shall be in place to ensure that training has been effective and the worker is competent at their job. The level of supervision and monitoring required is a management decision that shall be based on the risks associated with the job, the level of competence required, the experience of the individual and whether the worker works as part of a team or is a lone worker.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
		activities; and (v) maintaining accident reports and records. • Arrange for readily available first aid unit including an adequate supply of sterilized dressing materials and appliances • Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers; • Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas; • Mark and provide sign boards. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate. • Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.				
D. Historical, Cultural, and Archaeological Characteristics						
Physical and	Construction works	• All fossils, coins,	• Rajbari	• Records of chance	• Duration of repair	• Included in O&M

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring	Cost and Source of Funds
cultural heritage	will be on existing drainages and built-up areas of Rajbari thus risk for chance finds is low.	articles of value of antiquity, structures and other remains of archaeological interest discovered on the site shall be the property of the government. • Prevent workers or any other persons from removing and damaging any fossils, coins, articles of value of antiquity, structures and other remains of archaeological interest. • Stop work immediately to allow further investigation if any finds are suspected.	*pourashava*	finds	works	cost

C. Institutional Capacity Development Program

112. The MDSC national and regional environmental specialists will be responsible for trainings on environmental awareness and management in accordance with both ADB and government requirements. Specific modules customized for the available skill set will be devised after assessing the capabilities of the target participants and the requirements of the project. Typical modules would be as follows: (i) sensitization; (ii) introduction to environment and environmental considerations in water supply and wastewater projects; (iii) review of IEEs and integration into the project detailed design; (iv) improved coordination within nodal departments; and (v) monitoring and reporting system. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to work sites. The proposed training project along with the frequency of sessions is presented in Table 14.

Table 14: Training Program for Environmental Management

Items	Pre-construction/prior to construction	Construction	
Training Title	Orientation workshop	Orientation program/ workshop for contractors and supervisory staffs	Experiences and best practices sharing
Purpose	To aware the participants of the environmental safeguard requirements of ADB and GOB and how the project will meet these requirements	To build the capacity of the staffs for effective implementation of the designed EMPs aimed at meeting the environmental safeguard compliance of ADB and GOB	To share the experiences and best practices aimed at learning lessons and improving implementation of EMP
Contents	**Module 1: Orientation** • ADB Safeguards Policy Statement • Government of Bangladesh Environmental Laws and Regulations **Module 2: Environmental Assessment Process** • ADB environmental process, identification of impacts and mitigation measures, formulation of an environmental management plan (EMP), implementation, and monitoring requirements • Review of environmental assessment report to comply with ADB requirements • Incorporation of EMP into the project design and contracts	• Roles and responsibilities of officials/contractors/consultants towards protection of environment • Environmental issues during construction • Implementation of EMP • Monitoring of EMP implementation • Reporting requirements	Experiences on EMP implementation – issues and challenges Best practices followed
Duration	1 day	1 day	1 day on a regular period to be determined by PMO, PIUs, and PMSC
Participants	LGED, DPHE, PMO, and PMO staffs (technical and environmental) involved in the project implementation	PMO PIUs Contractors	PMO PIUs Contractors

D. Staffing Requirement and Budget

113. Costs required for implementing the EMP will cover the following activities:

(i) Updating IEE, preparing and submitting reports and public consultation and disclosure;
(ii) Application for environmental clearances; and
(iii) Implementation of EMP, environmental monitoring program and long-term surveys.

20. The infrastructure involved in each scheme is generally straightforward and will take between three and nine months to build. Environmental monitoring during construction will also be straightforward and will involve periodic site observations and interviews with workers and others, plus checks of reports and other documents. This will be conducted by MDSC environmental management specialist assisted by the PMO environment officer. The environmental management specialist will use the IEE as necessary and perform tasks as specified in the TOR. Therefore no separate budget required for MDSC environment management specialist.

21. The cost of mitigation measures and surveys during construction stage will be incorporated into the contractor's costs, which will be binding on him for implementation. The surveys will be conducted by the contractors.

22. The operation phase mitigation measures are again of good operating practices, which will be the responsibility of Rajbari *pourashava*. All monitoring during the operation and maintenance phase will be conducted by LGED and DPHE, therefore, there are no additional costs.

23. The indicative costs to implement the EMP are shown in Tables 15 and 16 (by source of funds).

Table 15: Indicative Cost of EMP Implementation

	Particulars	Stages	Unit	Total Number	Rate (Taka)	Cost (Taka)	Cost covered by
A.	**Mitigation Measures**						
1.	Compensatory plantation measures	Construction	Per tree	50	1,500	75,000	Civil works contract
B.	**Monitoring Measures**						
1.	Air quality monitoring	- Pre-construction - Construction	Per location	20	30,000	60,000	Civil works contract
2.	Noise levels monitoring	- Pre-construction - Construction	Per location	20	10,000	200,000	Civil works contract
C	**Capacity Building**						
1.	(i) Orientation workshop for officials involved in the project implementation on ADB Safeguards Policy Statement, Government of Bangladesh environmental laws and regulations, and environmental assessment process; (ii) induction course	Module 1 – immediately upon engagement of the MDSC environmental specialists Module 2 – prior to award of civil works contracts (twice a year for 4 years)	lump sum		Module 1 – 30,000 Module 2 – 30,000 Module 3 – 30,000	90,000	Covered under MDSC contract

	Particulars	Stages	Unit	Total Number	Rate (Taka)	Cost (Taka)	Cost covered by
	contractors, preparing them on EMP implementation and environmental monitoring requirements related to mitigation measures; and taking immediate action to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of implementation; and (iii) lessons learned information sharing	Module 3 – prior to start of Phase 2 and upon completion of the project					
D.	**Consultants Costs**						
1.	MDSCnational environmental specialist (1 person)	Responsible for environmental safeguards of the project	person months (spread over entire project implementation period)	60 person months	320,000 per person month	1,280,000	Remuneration and budget for travel covered in the MDSC contract
2.	MDSC regional environmental specialists (3 persons)	Responsible for environmental safeguards of the project	person months (spread over entire project implementation period)	60 each = 180 person-months	320,000 per person-month	57,600,000	Remuneration and budget for travel covered in the MDSC contract
E.	**Administrative Costs**						
1.	Legislation, permits, and agreements	Permit for excavation, tree-cutting permits, etc	Lump sum		50,000	50,000	These consents are to be obtained by contractor at his own expense.
		Environmental assessment and environmental clearances as per ECA and ECR requirements Obtaining right of way clearances with related national agencies.	Lump sum		100,000	100,000	LGED DPD cost for municipal infrastructures
F.	**Other Costs**						
1.	Public consultations and information	Information disclosure and	As per requireme	Lump sum		1,000,000	Covered under MDSC

	Particulars	Stages	Unit	Total Number	Rate (Taka)	Cost (Taka)	Cost covered by
	disclosure	consultations during preconstruction and construction phase, including public awareness campaign through media	nt				contract
2.	GRM implementation	Costs involved in resolving complaints (meetings, consultations, communication, and reporting/information dissemination)		Lump sum		1,000,000	PMO cost
3.	Any unanticipated impact due to project implementation	Mitigation of any unanticipated impact arising during construction phase and defect liability period		Lump sum	Contractor's liability	As per insurance requirement	Civil works contract – contractor's insurance

Table 16: Indicative Cost of EMP Implementation – Per Source of Funding

	Particulars	Stages	Unit	Total Number	Rate (Taka)	Cost (Taka)	Cost covered by
A. Contractors							
1.	Compensatory plantation measures	Construction	Per tree	50	1,500	75,000	Civil works contract
2.	Air quality monitoring	- Pre-construction - Construction	Per location	20	30,000	60,000	Civil works contract
3.	Noise levels monitoring	- Pre-construction - Construction	Per location	20	10,000	200,000	Civil works contract
4.	Legislation, permits, and agreements	Permit for excavation, tree-cutting permits, etc	Lump sum		50,000	50,000	These consents are to be obtained by contractor at his own expense.
5.	Any unanticipated impact due to project implementation	Mitigation of any unanticipated impact arising during construction phase and defect liability period		Lump sum	Contractor's liability	As per insurance requirement	Civil works contract – contractor's insurance
	Subtotal					**720,000**	**US$9,000**
B. MDSC							
1.	Public consultations	Information	As per	Lump		1,000,000	Covered under

	Particulars	Stages	Unit	Total Number	Rate (Taka)	Cost (Taka)	Cost covered by
	and information disclosure	disclosure and consultations during preconstruction and construction phase, including public awareness campaign through media	requirement	sum			MDSC contract
2.	(i) Orientation workshop for officials involved in the project implementation on ADB Safeguards Policy Statement, Government of Bangladesh environmental laws and regulations, and environmental assessment process; (ii) induction course contractors, preparing them on EMP implementation and environmental monitoring requirements related to mitigation measures; and taking immediate action to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of implementation; and (iii) lessons learned information sharing	Module 1 – immediately upon engagement of the MDSC environmental specialists Module 2 – prior to award of civil works contracts (twice a year for 4 years) Module 3 – prior to start of Phase 2 and upon completion of the project	lump sum		Module 1 – 30,000 Module 2 – 30,000 Module 3 – 30,000	90,000	Covered under MDSC contract
3.	MDSC national environmental specialist (1 person)	Responsible for environmental safeguards of the project	person months (spread over entire project implementation period)	60 person months	320,000 per person month	1,280,000	Remuneration and budget for travel covered in the MDSC contract
4.	MDSC regional environmental specialists (3 persons)	Responsible for environmental safeguards of the project	person months (spread over entire project	60 each = 180 person-months	320,000 per person-month	57,600,000	Remuneration and budget for travel covered in the MDSC contract

	Particulars	Stages	Unit	Total Number	Rate (Taka)	Cost (Taka)	Cost covered by
			implementation period)				
	Subtotal					**59,970,000**	**US$749,625**
C. Administrative Cost (Recurring) – PMO							
1.	Legislation, permits, and agreements	Environmental assessment and environmental clearances as per ECA and ECR requirements Obtaining right of way clearances with related national agencies.	Lump sum		100,000	100,000	LGED DPD cost for municipal infrastructures
2.	GRM implementation	Costs involved in resolving complaints (meetings, consultations, communication, and reporting/information dissemination)		Lump sum		1,000,000	PMO cost
	Subtotal					**1,100,000**	**US$13,750**
	Total					**61,790,000**	**US$772,375**

IX. MONITORING AND REPORTING

114. PMO will monitor and measure the progress of EMP implementation. The monitoring activities will correspond with the project's risks and impacts, and will be identified in the EIAs/IEEs for the projects. In addition to recording information on the work and deviation of work components from original scope PMO, PIUs, and MDSC will undertake site inspections and document review to verify compliance with the EMP and progress toward the final outcome. Corrective actions to be taken quickly and reported in monitoring reports.

115. MDSC will submit monthly monitoring and implementation reports to PMO, who will take follow-up actions, if necessary. PMO will submit semi-annual monitoring reports to ADB. The suggested monitoring report format is in **Appendix 7**. Subproject budgets will reflect the costs of monitoring and reporting requirements. For projects likely to have significant adverse environmental impacts during operation, reporting will continue at the minimum on an annual basis. Monitoring reports will be posted in a location accessible to the public.

116. LGED and DPHE will document monitoring results, identify the necessary corrective actions, reflect them in a corrective action plan, and for each quarter, will study the compliance with the action plan developed in the previous quarter. Compliance with loan covenants will be screened by ADB.

117. ADB will review project performance against the commitments as agreed in the legal documents. The extent of ADB's monitoring and supervision activities will be commensurate

with the project's risks and impacts. Monitoring and supervising of social and environmental safeguards will be integrated into the project performance management system. ADB will monitor projects on an ongoing basis until a project completion report is issued. ADB will carry out the following monitoring actions to supervise project implementation:

(i) conduct periodic site visits for projects with adverse environmental or social impacts;
(ii) conduct supervision missions with detailed review by ADB's safeguard specialists/officers or consultants for projects with significant adverse social or environmental impacts;
(iii) review the periodic monitoring reports submitted by EAs to ensure that adverse impacts and risks are mitigated, as planned and as agreed with ADB;
(iv) work with EAs to rectify to the extent possible any failures to comply with their safeguard commitments, as covenanted in the legal agreements, and exercise remedies to re-establish compliance as appropriate; and
(v) prepare a project completion report that assesses whether the objective and desired outcomes of the safeguard plans have been achieved, taking into account the baseline conditions and the results of monitoring.

X. CONCLUSION AND RECOMMENDATIONS

118. The process described in this document has assessed the environmental impacts of all elements of Rajbari drainage subproject. All potential impacts were identified in relation to design and location, construction, and operation phases.

119. Planning principles and design considerations have been reviewed and incorporated into the site planning process whenever possible; thus, environmental impacts as being due to the project design or location were not significant.

120. Most of the individual elements of the subproject are relatively small and involve straightforward construction and operation, so impacts will be mainly localized and not greatly significant. Most of the predicted impacts are associated with the construction process, and are produced because that process is invasive, involving trenching and other excavation. However, the routine nature of the impacts means that most can be easily mitigated. Mitigation measures have been developed to reduce all negative impacts to acceptable levels. Mitigation will be assured by a program of environmental monitoring to ensure that all measures are implemented, and will determine whether the environment is protected as intended. It will include observations on- and off-site, document checks, and interviews with workers and beneficiaries. Any requirements for corrective action will be reported to the ADB.

121. The stakeholders were involved in developing the IEE through discussions on-site and public consultation, after which views expressed were incorporated into the IEE and in the planning and development of the subproject. The IEE will be made available at public locations in the city and will be disclosed to a wider audience via the ADB and LGED project websites. The consultation process will be continued and expanded during project implementation to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation. A grievance redress mechanism is described within the IEE to ensure any public grievances are addressed quickly.

122. The PMO and MDSC will be responsible for monitoring. The MDSC will submit monthly monitoring reports to PMO, and the PMO will send semi-annual monitoring reports to ADB. ADB will post the environmental monitoring reports on its website.

123. The EMP will assist the PMO, MDSC, and contractors in mitigating the environmental impacts, and guide them in the environmentally sound execution of the proposed project. The EMP will also ensure efficient lines of communication between the implementing agency, project management unit, and contractors. A copy of the EMP shall be kept on-site during the construction period at all times. The EMP shall be made binding on all contractors operating on the site, and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document shall constitute a failure in compliance.

124. Therefore the proposed subproject is unlikely to cause significant adverse impacts and net environmental benefits to citizens of Rajbari will be positive. The potential impacts that are associated with design, construction and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures.

125. As per Government of Bangladesh Environment Conservation Act, 1995 (ECA, 1995) and Environment Conservation Rules (ECR, 1997), the subproject is categorized as “red” and Location Clearance Certificate (LCC) and Environmental Clearance Certificate (ECC) must be obtained from the DoE.

126. Based on the findings of the IEE, there are no significant impacts and the classification of the subproject as Category “B” is confirmed. No further special study or detailed environmental impact assessment (EIA) needs to be undertaken to comply with ADB SPS (2009).

Appendix 1: Rapid Environmental Assessment Checklist

Screening questions	Yes	No	Remarks
A. Project siting Is the project area adjacent to or within any of the following environmentally sensitive areas?	✓		Rajbari *pourashava* covers an area of 11.86 km^2 with population density of 4829 persons per km^2.The area is predominantly residential.
Cultural heritage site		✓	
Protected area		✓	
Wetland		✓	
Mangrove		✓	
Estuarine		✓	
Buffer zone of protected area		✓	
Special area for protecting biodiversity		✓	
B. Potential environmental impacts Will the project cause…		✓	
Encroachment on historical/cultural areas; disfiguration of landscape by road embankments, cuts, fills, and quarries?		✓	Not applicable. Construction works will be on existing ROW of earthen drains in built-up areas of Rajbari.
Encroachment on precious ecology (e.g. sensitive or protected areas)?		✓	Not applicable. There are no protected areas in or around subproject sites, and no known areas of ecological interest in Rajbari.
Alteration of surface water hydrology of waterways crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?	✓		Excavations may result to silt-laden runoff during rainfall which may cause siltation and reduction in the quality of adjacent bodies of water. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.
Deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?	✓		Due to excavation, run-off from stockpiled materials, and chemical contamination from fuels and lubricants. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.
Increased local air pollution due to rock crushing, cutting and filling works, and chemicals from asphalt processing?	✓		Conducting works at dry season and moving large quantity of materials may create dusts and increase in concentration of vehicle-related pollutants. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.
Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation during project construction and operation?		✓	Not applicable. Construction will not involve use explosives and chemicals. Excavation will be done manually. Construction contractors will be required to implement health and safety (H&S) plan.
Noise and vibration due to blasting and other civil works?	✓		Temporary increase in noise level and vibrations may be caused by excavation equipment, and the transportation of equipment, materials, and people. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.
Dislocation or involuntary resettlement of people?		✓	Not applicable. Land acquisition and resettlement are not required for the subproject.
Dislocation and compulsory resettlement of people living in right-of-way?		✓	Not applicable. There are no encroachers or residential/commercial structures in the ROWs
Disproportionate impacts on the poor, women and children, indigenous peoples or other vulnerable groups?		✓	Not applicable.
Other social concerns relating to inconveniences in living conditions in the project areas that may trigger cases of upper respiratory problems and		✓	Not applicable.

Screening questions	Yes	No	Remarks
stress?			
Hazardous driving conditions where construction interferes with pre-existing roads?		✓	Road closures are not required. Construction contractors will be required to implement traffic management plan and coordinate with Rajbari local authority.
Poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as STI and HIV/AIDS) from workers to local populations?		✓	Construction contractors will be required to provide sanitation facilities and ensure proper waste management at all times. Contracts will include provisions on STI and HIV/AIDS.
Creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?		✓	Construction contractors will be required to ensure cleanliness at all times to prevent breeding of mosquitoes and rodents.
Accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials?		✓	Not applicable.
Increased noise and air pollution resulting from traffic volume?		✓	Not anticipated.
Increased risk of water pollution from oil, grease and fuel spills, and other materials from vehicles using the road?		✓	Not anticipated.
Social conflicts if workers from other regions or countries are hired?		✓	Priority in employment will be given to local residents.
Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	Improved management systems through capacity building and institutional development will ensure reduced burden on services and infrastructure.
Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		✓	Not applicable. Construction will not involve use of explosives and chemicals.
Community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning.		✓	Operational area will be clearly demarcated and access will be controlled. Only worker and project concerned members will be allowed to visit the operational sites.
Climate Change and Disaster Risk Questions The following questions are not for environmental categorization. They are included in this checklist to help identify potential climate and disaster risks.	**Yes**	**No**	**Remarks**
Is the Project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami or volcanic eruptions and climate changes (see Appendix I)?	✓		The proposed drainage structures may be subject to river flooding and others relevant to climate changes. Appropriate considerations have been taken to mitigate the impacts.
Could changes in temperature, precipitation, or extreme events patterns over the Project lifespan affect technical or financial sustainability (e.g., increased extreme rainfall increases flooding, damaging proposed infrastructure)?	✓		
Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (e.g., high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)?		✓	Proposed project will not impact any marginalized population, rural-urban migrants, illegal settlement, etc.
Could the Project potentially increase the climate or disaster vulnerability of the surrounding area		✓	Not applicable

Screening questions	Yes	No	Remarks
(e.g., by paving vulnerable groundwater recharge areas, or using water from a vulnerable source that is relied upon by many user groups, or encouraging settlement in earthquake zones)?			

Appendix 2: Environmental Standards and Application Fees

1. The standards for air, water, sound, odor and other components of the environment applicable to the project shall be determined in accordance with the standards specified in Schedules 2, 3, 4, 5, 6, and 8 of ECR, 1997.

	Standards	**ECR, 1997 (Rule 12) http://www.moef.gov.bd/html/laws/env_law/178-189.pdf**
1.	Air	Schedule 2
2.	Inland surface water	Schedule 3
	Drinking water	
3.	Sound	Schedule 4
4.	Sound Originating from Motor Vehicles or Mechanized Vessels	Schedule 5
5.	Emission from Motor Vehicles	Schedule 6
7.	Odor	Schedule 8

2. The standard limits of discharge of liquid waste and gaseous emissions applicable to the project shall be determined in accordance with the standards specified in Schedule 9 and 10

	Environmental Component	**ECR, 1997 (Rule 13) http://www.moef.gov.bd/html/laws/env_law/178-189.pdf**
1.	Sewage Discharge	Schedule 9
2.	Waste from Industrial Units or Projects Waste (see discharge to inland surface water and irrigated land)	Schedule 10

3. The fees for issuance of environmental clearance certificate and its renewal shall be payable in accordance with Schedule 13. The fees for analysis of samples of water, liquid waste, air and sound and also the information or data derived from such analysis are described in Schedule 14.

	Fees	**ECR, 1997 (Rule 14 and 15) http://www.moef.gov.bd/html/laws/env_law/178-189.pdf**
1.	Environmental clearance certificate or renewal	Schedule 13
2.	Supplying various analytical information or data or test results of samples of water, effluent, air and sound	Schedule 14

[1]"SCHEDULE – 13

Fees for Environmental Clearance Certificate or Renewal
[See Rules 7(5), 8(2) and 14]

1. Industrial unit or project

Investment (in Taka)	Fees for Environmental Clearance Certificate (in Taka)	Certificate Renewal Fee
(1)	(2)	(3)
(a) Between Tk. 100,000 and 5,00,000	Tk. 1,500	One-fourth of the fees in Column (2).
(b) Between Tk. 5,00,000 and 10,00,000	Tk. 3,000	-Do-
(c) Between Tk. 10,00,000 and 50,00,000	Tk. 5,000	-Do-
(d) Between Tk. 50,00,000 and 10,000,000	Tk. 10,000	-Do-

[1] *Schedule-13 was substituted by Notification S.R.O. No. 234-Law/2002 dated 24/08/2002 and came into force on 26/08/2002 being the date of publication in Bangladesh Gazette extraordinary issue.*

(1)	(2)	(3)
(e) Between Tk. 10,000,000 and 2,00,000,000	Tk. 25,000	One-fourth of the fees in Column (2).
(f) Between Tk. 2,00,000,000 and 5,00,000,000	Tk. 50,000	-Do-
(g) Above Tk. 5,00,000,000	Tk. 1,00,000	-Do-

Appendix 3: Sample Outline Spoils Management Plan

I. Spoils information

- A. Materials type
- B. Potential contamination
- C. Expected volume and sources
- D. Spoil classification

II. Spoils management

- A. Transportation of spoil
- B. Storage of spoil
- C. Contaminated spoil
- D. Approved reuse and/or disposal sites

III. Records of reuse and/or disposal

Appendix 4: Sample Outline Traffic Management Plan

A. Principles

1. One of the prime objectives of this TMP is to ensure the safety of all the road users along the work zone, and to address the following issues:
   (i) the safety of pedestrians, bicyclists, and motorists traveling through the construction zone;
   (ii) protection of work crews from hazards associated with moving traffic;
   (iii) mitigation of the adverse impact on road capacity and delays to the road users;
   (iv) maintenance of access to adjoining properties; and
   (v) addressing issues that may delay the project.

B. Operating Policies for TMP

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

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

3. **Figure A2 to Figure A12**illustrates the operating policy for TMP for the construction of water pipes and the sewers along various types of roads.

C. Analyze the impact due to street closure

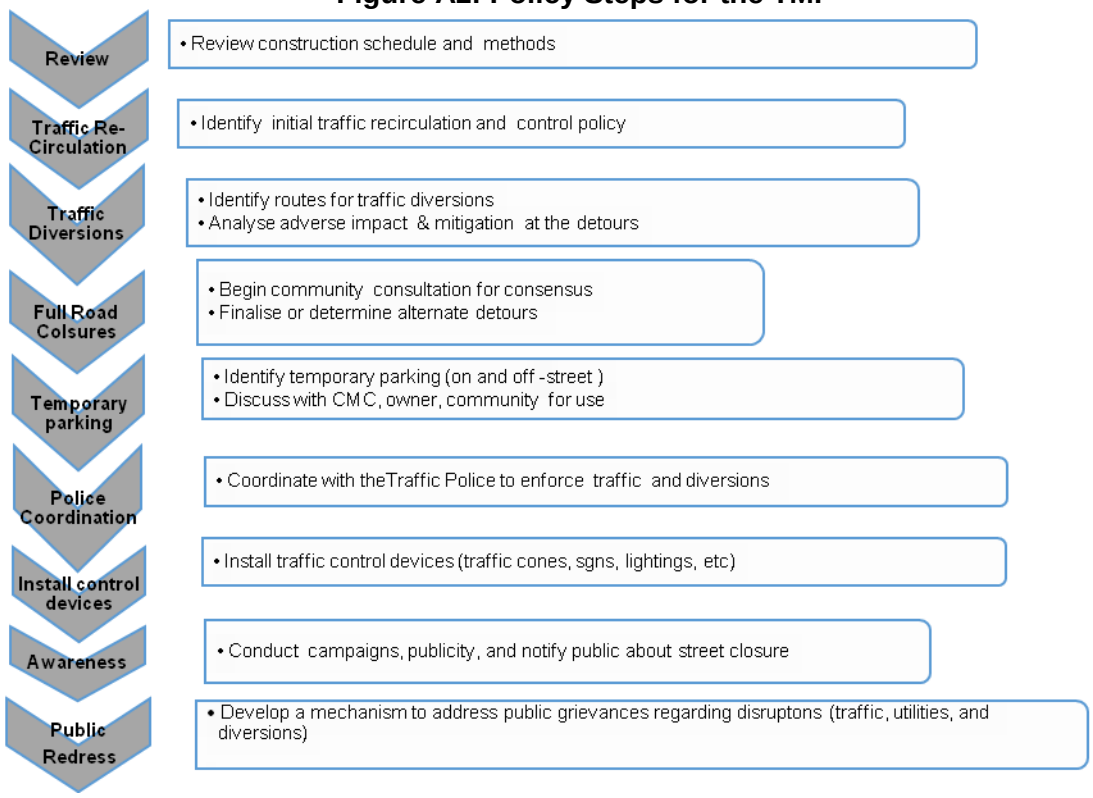
4. Apart from the capacity analysis, a final decision to close a particular street and divert the traffic should involve the following steps:

   (i) approval from the ULB/CMC/Public Works Department (PWD) to use the local streets as detours;
   (ii) consultation with businesses, community members, traffic police, PWD, etc, regarding the mitigation measures necessary at the detours where the road is diverted during the construction;

(iii) determining of the maximum number of days allowed for road closure, and incorporation of such provisions into the contract documents;
(iv) determining if additional traffic control or temporary improvements are needed along the detour route;
(v) considering how access will be provided to the worksite;
(vi) contacting emergency service, school officials, and transit authorities to determine if there are impacts to their operations; and
(vii) developing a notification program to the public so that the closure is not a surprise. As part of this program, the public should be advised of alternate routes that commuters can take or will have to take as result of the traffic diversion.

5. If full road-closure of certain streets within the area is not feasible due to inadequate capacity of the detour street or public opposition, the full closure can be restricted to weekends with the construction commencing on Saturday night and ending on Monday morning prior to the morning peak period.

Figure A1: Policy Steps for the TMP



D. Public awareness and notifications

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

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

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

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

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

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

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

E. Install traffic control devices at the work zones and traffic diversion routes

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

- Signs
- Pavement Markings
- Channelizing Devices
- Arrow Panels

- Warning Lights

11. Procedures for installing traffic control devices at any work zone vary, depending on road configuration, location of the work, construction activity, duration, traffic speed and volume, and pedestrian traffic. Work will take place along major roads, and the minor internal roads. As such, the traffic volume and road geometry vary. The main roads carry considerable traffic; internal roads in the new city areas are wide but in old city roads very narrow and carry considerable traffic. However, regardless of where the construction takes place, all the work zones should be cordoned off, and traffic shifted away at least with traffic cones, barricades, and temporary signs (temporary “STOP” and “GO”).

12**.** **Figure A2 to Figure A12** illustrates a typical set-up for installing traffic control devices at the work zone of the area, depending on the location of work on the road way, and road geometrics:

- Work on shoulder or parking lane
- Shoulder or parking lane closed on divided road
- Work in Travel lane
- Lane closure on road with low volume
- Lane closure on a two-line road with low volume (with yield sign)
- Lane closure on a two-line road with low volume (one flagger operation)
- Lane closure on a two lane road (two flagger operation)
- Lane closure on a four lane undivided Road
- Lane closure on divided roadway
- Half road closure on multi-lane roadway
- Street closure with detour

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

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

16. In addition to the delineation devices, all the construction workers should wear fluorescent safety vests and helmets in order to be visible to the motorists at all times. There should be provision for lighting beacons and illumination for night constructions.

Figure A2&A3: Work on shoulder or parking lane and shoulder or parking lane closed on divided road

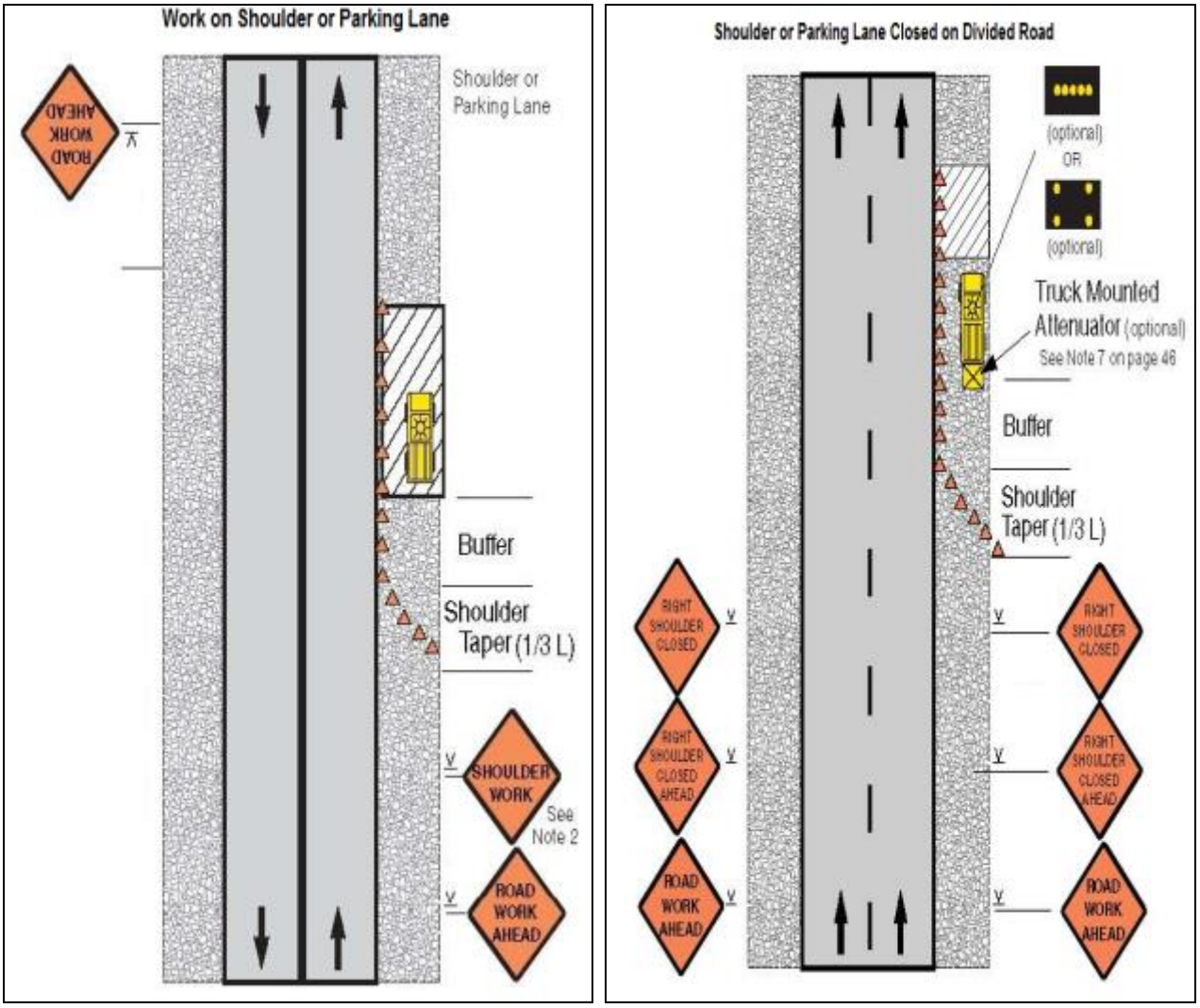
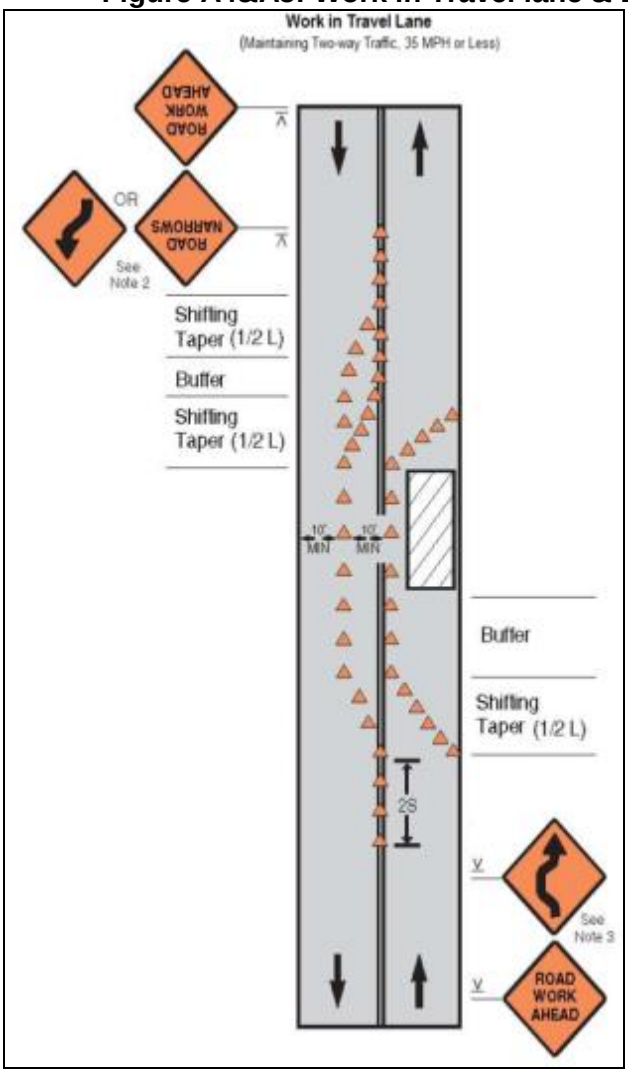


Figure A4&A5: Work in Travel lane & Lane closure on road with low volume



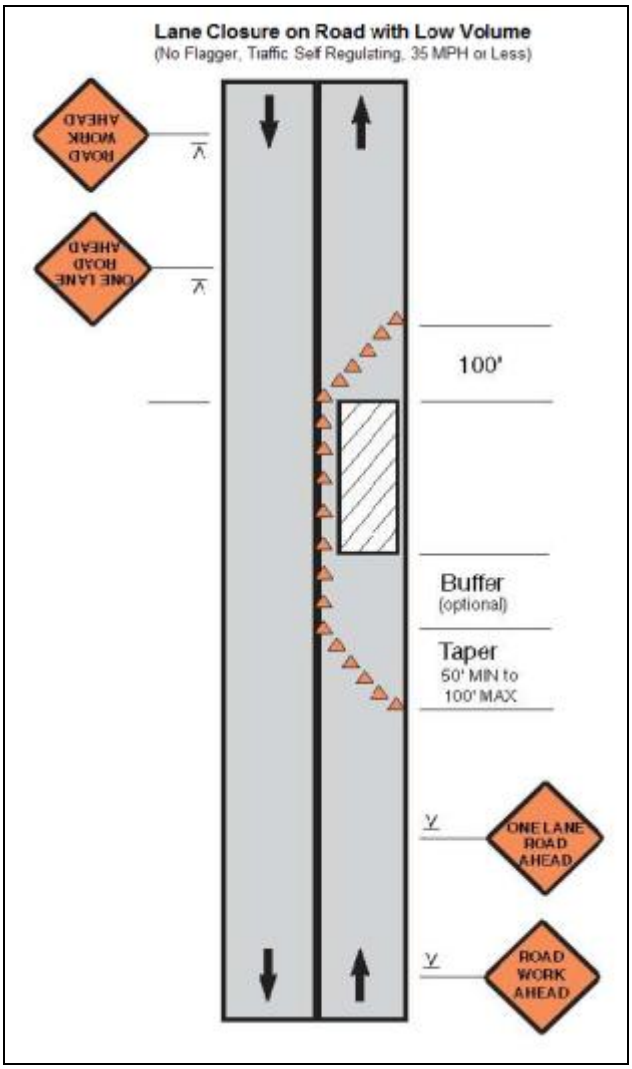


Figure A6&A7: Lane closure on a two-line road with low volume (with yield sign) & Lane closure on a two-line road with low volume (one flagger operation)

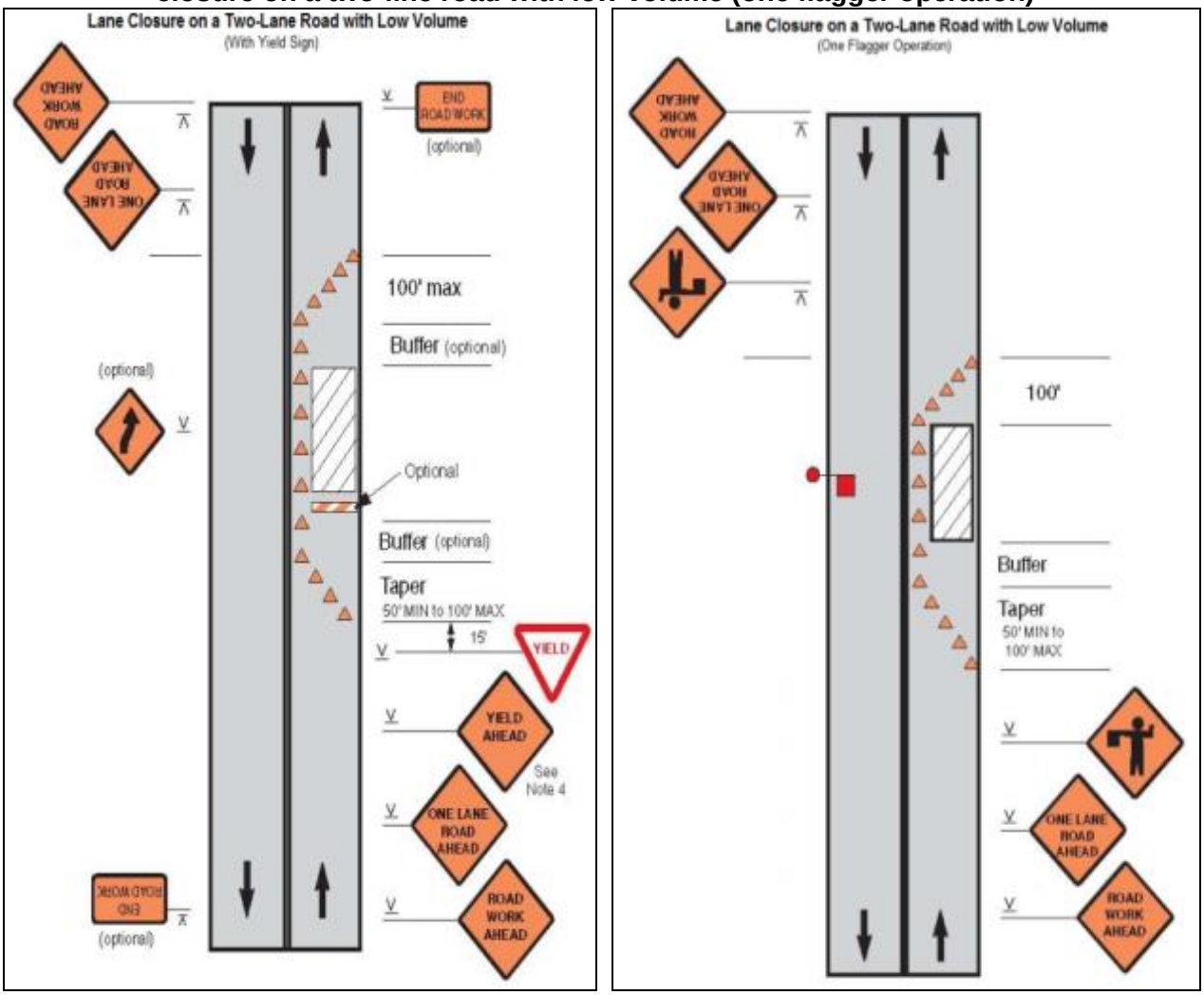


Figure A8&A9: Lane Closure on a Two-Lane Road (Two Flagger Operation) & Lane Closure on a Four-Lane Undivided Road

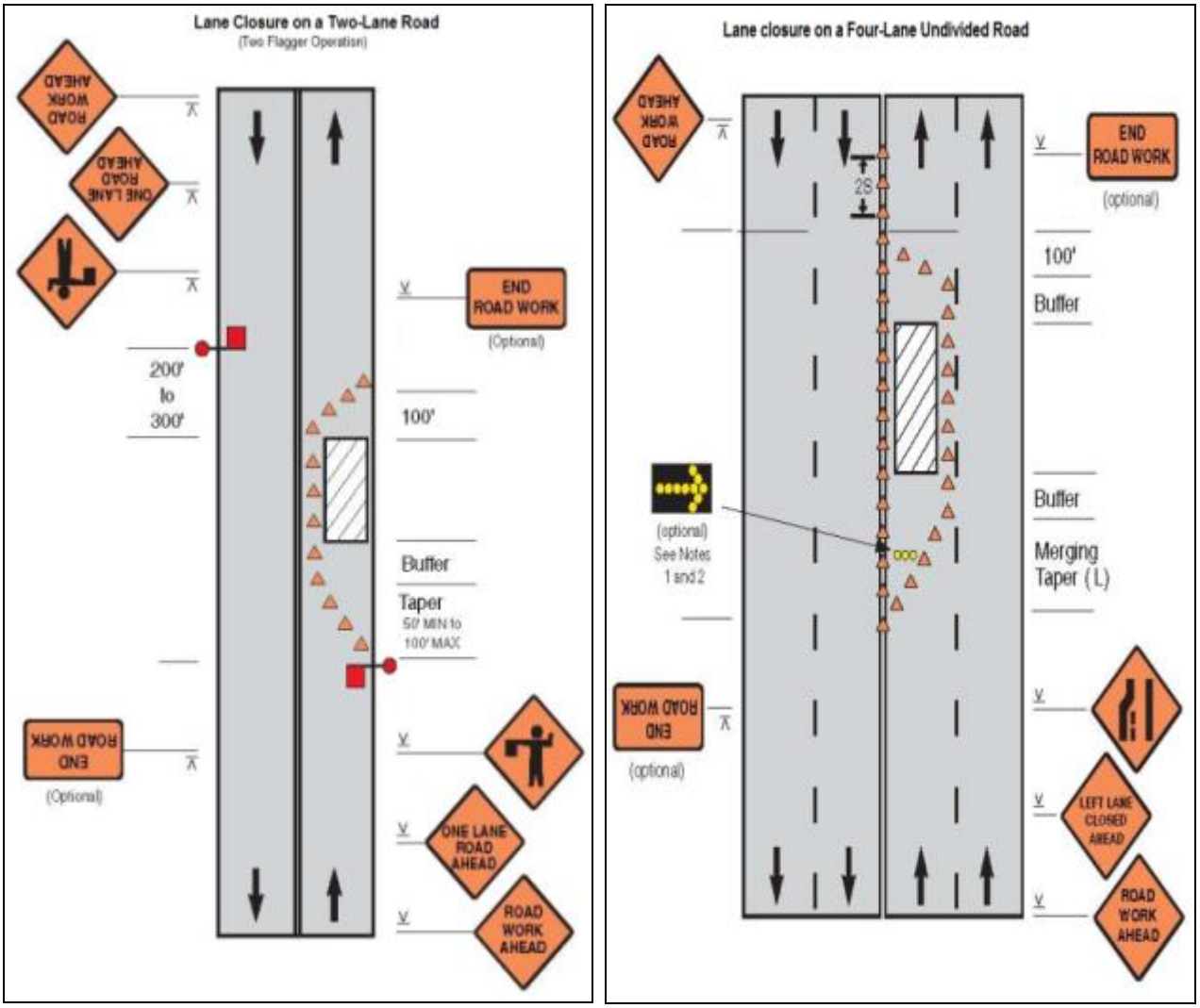


Figure A10&A11: Lane Closure nn Divided Roadway & Half Road Closure On Multi-Lane Roadway

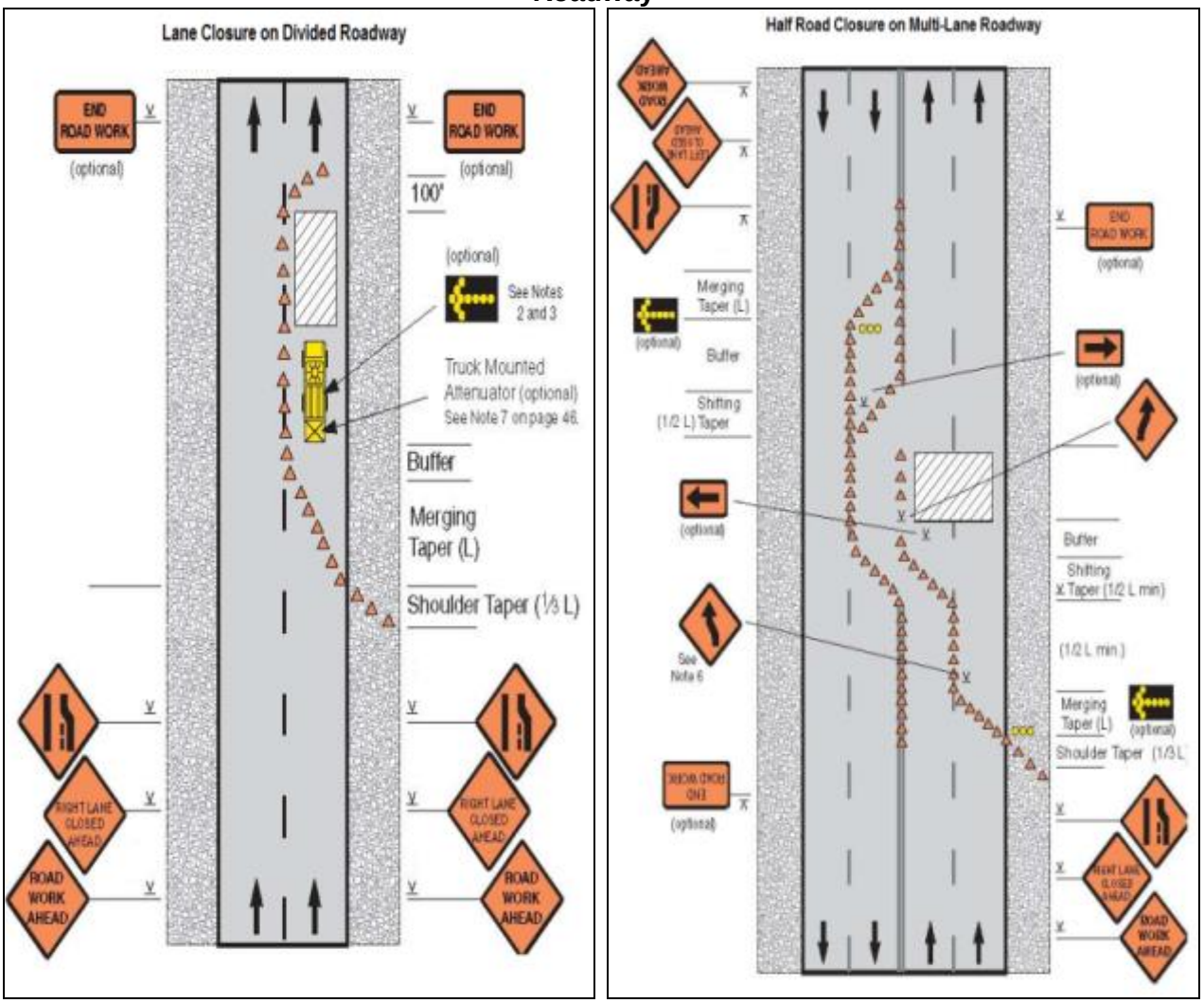
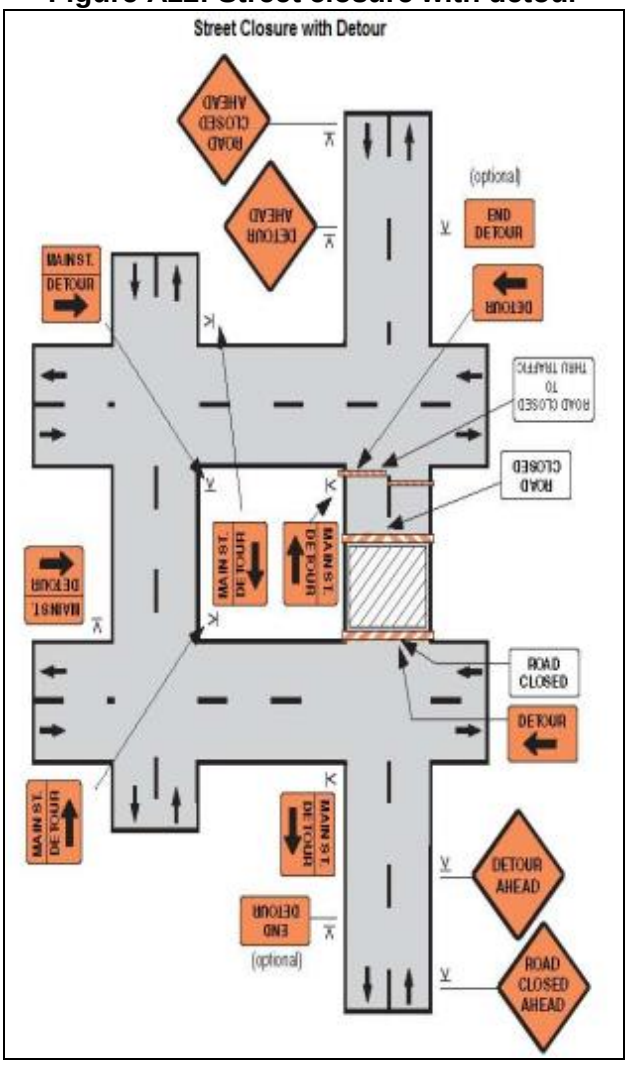


Figure A12: Street closure with detour



Appendix 5: Records of Public Consultations and FGDs

FGD Summaries- Drain Rajbari Pourashava

SL No.	Proposed Project Facility/Alignment Related to Which Discussion Held	Date	Venue	No. of Participants & gender	Overall Concerns Expressed Related to Project	Suggestions From People	Willingness to Participate in Project
1.	P-01: Drain	Aug 23, 2014	Binudpur Ward: 3	M= 09 F= 04 T= 13	Water logging/ congestion for long time; Houses at drainage side affected; siltation of canal	Drainage improvement to be properly done	Dwellers will be happy by drainage improvement
2.	P-03: Drain	Aug 23, 2014	28 Colony Mur Ward: 1	M= 10 F= 0 T= 10	Severity of drainage congestion	New drain alignment necessary; Drainage discharge to be made to beel; Improvement urgently needed	They will be very happy through improved drainage; Ready to co-operate

(M=No. of male participants; F= No. of female participants; T=Total participants)

PHOTOGRAPH

Location: Binodpur Date: Aug 23, 2014 for Drain P01

Location: Kazikanda Date: Aug 23, 2014 for Drain P03

PARTICIPANT LIST

Town: Rajbari Pourashava
Location: Binodpur Ward: 3 (P:01)
Meeting Place: Roadside
Date: Aug 23, 2014
Time: 3.00 pm

Sl	Name	Age	Sex	Cell No.	Occupation
1.	Md. Fazlul Sheikh	40	Male	01728200336	Small Trader
2.	Jagadish Bishwas	45	Male	01719876903	Small Trader
3.	Gopal Chandra Sarkar	42	Male	-	Business
4.	Sanjoy	35	Male	-	Driver (Auto Van)
5.	Shahjahan Master	55	Male	-	Rtd. Teacher
6.	Mantu	53	Male	-	Business
7.	Kuti Sarkar	50	Male	-	Business
8.	Razzak	55	Male	-	Tailor
9.	Md. Abdur Razzak	48	Male	01712508810	Business
10.	Anwara	60	Female	-	House Wife
11.	Khodeja	60	Female	-	House Wife
12.	Sufia	50	Female	-	House Wife
13.	Sajeda	50	Female	-	House Wife

Town: Rajbari Pourashava
Location: Ansar Camp, Kazikanda (P:03)
Meeting Place: Roadside Shop
Date: Aug 23, 2014
Time: 12.00 noon

Sl	Name	Age	Sex	Cell No.	Occupation
1.	Kazi Qushik Ahmed Shaheen	45	Male	01712049209	Player (Foot Ball)
2.	Md. Jahangir Sardar (user)	40	Male	01934536654	Rickshaw Puller
3.	Md. Omar Ali	33	Male	01864518881	Masion
4.	Kazi Mahtab Uddin (user)	48	Male	01712978795	Councillor (Pourashva)
5.	Kazi Hamidul Haque	45	Male	01742469249	Business
6.	Ibrahim Sheikh	25	Male	01736999560	Business
7.	Khandakar Golam Kibria	60	Male	01915757177	Service (Rtd.)
8.	Abdullah Al Mamun (user)	53	Male	01711582454	AE/Water, Pourashava)
9.	Shahadat Hossain	58	Male	01721661224	Service (Rtd.)
10.	Santu	40	Male	01916723146	Shop Keeper

Appendix 6: Sample Grievance Registration Form

(To be available in Bangla and English)

The _____Project welcomes complaints, suggestions, queries and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.
Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing *(CONFIDENTIAL)* above your name. Thank you.

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

FOR OFFICIAL USE ONLY

Registered by: (Name of Official Registering Grievance)	
Mode of Communication: Note/Letter E-mail Verbal/Telephonic	
Reviewed by: (Names/Positions of Officials Reviewing Grievance)	
Action Taken:	
Whether Action Taken Disclosed:	Yes No
Means of Disclosure:	

Appendix 7: Sample Semi-Annual Reporting Format

This template must be included as an appendix in the EIA/IEE that will be prepared for the project. It can be adapted to the specific project as necessary.

I. INTRODUCTION

- Overall project description and objectives
- Description of subprojects
- Environmental category of the sub-projects
- Details of site personnel and/or consultants responsible for environmental monitoring
- Overall project and sub-project progress and status

No.	Sub-Project Name	Status of Sub-Project				List of Works	Progress of Works
		Design	Pre-Construction	Construction	Operational Phase		
		☐	☐	☐	☐		
		☐	☐	☐	☐		
		☐	☐	☐	☐		

Compliance status with National/ State/ Local statutory environmental requirements

No.	Sub-Project Name	Statutory Environmental Requirements	Status of Compliance	Action Required

Compliance status with environmental loan covenants

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

II. COMPLIANCE STATUS WITH THE ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

- Provide the monitoring results as per the parameters outlined in the EMP. Append supporting documents where applicable, including Environmental Site Inspection Reports.
- There should be reporting on the following items which can be incorporated in the checklist of routine Environmental Site Inspection Report followed with a summary in the semi-annual report send to ADB. Visual assessment and review of relevant site documentation during routine site inspection needs to note and record the following:

(i) What are the dust suppression techniques followed for site and if any dust was noted to escape the site boundaries?
(ii) If muddy water was escaping site boundaries or muddy tracks were seen on adjacent roads;
(iii) Adequacy of type of erosion and sediment control measures installed on site, condition of erosion and sediment control measures including if these were intact following heavy rain;
(iv) Are there designated areas for concrete works, and re-fuelling?
(v) Are there spill kits on site and if there are site procedure for handling emergencies;

(vi) Is there any chemical stored on site and what is the storage condition?
(vii) Is there any dewatering activities if yes, where is the water being discharged;
(viii) How are the stockpiles being managed?
(ix) How is solid and liquid waste being handled on site?
(x) Review of the complaint management system;
(xi) Checking if there are any activities being under taken out of working hours and how that is being managed.

Summary Monitoring Table

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
Design Phase						
Pre-Construction Phase						
Construction Phase						
Operational Phase						

Overall Compliance with CEMP/ EMP

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

III. APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT

Brief description on the approach and methodology used for environmental monitoring of each subproject

- Monitoring of environmental IMPACTS on PROJECT SURROUNDINGS (ambient air, water quality and noise levels)
- Brief discussion on the basis for monitoring
- Indicate type and location of environmental parameters to be monitored
- Indicate the method of monitoring and equipment to be used
- Provide monitoring results and an analysis of results in relation to baseline data and statutory requirements

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

Air Quality Results

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

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

Water Quality Results

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

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

Noise Quality Results

Site No.	Date of Testing	Site Location	LAeq (dBA) (Government Standard)	
			Day Time	Night Time

Site No.	Date of Testing	Site Location	LAeq (dBA) (Monitoring Results)	
			Day Time	Night Time

IV. SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

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

V. APPENDIXES

Photos
Summary of consultations
Copies of environmental clearances and permits
Sample of environmental site inspection report
Others