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Ministry of Local Government, Rural Development and Cooperatives
Local Government Division

Improving Urban Governance and Infrastructure Program (IUGIP)

INITIAL ENVIRONMENTAL EXAMINATION

Sub-Project No: IUGIP/BAND /DR /01/2023

BANDARBAN POURASHAVA

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\$ 1.00 = BDT 105.4

ABBREVIATIONS

ADB	Asian Development Bank
AFD	Agence Française de Développement
AP	Affected Person
DoE	Department of Environment
DLI	Disbursement Linked Indicator
ECA	Environmental Conservation Act
ECC	Environmental Clearance Certificate
ECR	Environmental Conservation Rules
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ESMF	Environmental and Social Management Framework
FD	Forest Department
GoB	Government of Bangladesh
GRC	Grievance Redress Cell
GRM	Grievance Redress Mechanism
IEE	Initial Environmental Examination
IUGIP	Improving Urban Governance and Infrastructure Program
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	Operation and Maintenance
PMU	Project Management Unit
PPTA	Project Preparatory Technical Assistance
PRSP	Poverty Reduction Strategy Paper
RBL	Results-Based Lending
RP	Resettlement Plan
SPS	Safeguard Policy Statement
ToR	Terms of Reference
UGIAP	Urban Governance Implementation Action Plan

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
Mouza	-	government-recognized land area
Parishad	-	authority (Pourashava)
Pourashava	-	municipality
Pucca	-	good quality, well built, solid
Thana	-	police station
Upazila	-	sub district

WEIGHTS AND MEASURES

ha	-	hectare
km	-	kilometre
m	-	meter
mm	-	millimetre

NOTE{S}

- (i) In this report, "\$" refers to US dollars.
- (ii) —BDT refers to Bangladeshi Taka
For March 31, 2026: 1 \$= 122.70 BDT; 1 BDT= 0.00815 \$

PREFACE

This Initial Environmental Examination (IEE) has been prepared for the proposed drainage sub-project under the Improving Urban Governance and Infrastructure Program (IUGIP) in Bandarban Pourashava. The report has been prepared in accordance with the environmental safeguard requirements of the Asian Development Bank (ADB) Safeguard Policy Statement (SPS), 2009 and the applicable environmental regulations of the Government of Bangladesh. The IEE identifies potential environmental impacts of the sub-project and proposes mitigation and monitoring measures to ensure that adverse impacts are avoided or minimized.

This report has been prepared by the Management Design and Supervision Consultant (MDSC) in coordination with the Pourashava / Executing Agency (EA). While MDS Consultants have been deputed to assist the Pourashava / Executing Agency (EA) for the preparation of the IEE, the responsibility and ownership of the IEE rest with the EA. The key elements of the IEE Report focus on: Assessment of Compliance Guidelines of Environment Safeguards according to ADB, AFD and GoB policy.

DISCLAIMER

This Initial Environmental Examination (IEE) Report of Bandarban Pourashava, Under Management Design & Supervision Consultants for Improving Urban Governance and Infrastructure Program (IUGIP) based on Result based lending (RBL). Some of the information's have also been collected from the Pourashava personnel over telephone. Moreover, some information's have been collected by the respective experts of MDS consultant through intensive field visit which have been used in writing this report. If any information or data or any other things coincide with other project documents that are beyond our knowledge and fully coincidental event and we express apology for that.

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EXECUTIVE SUMMARY

Introduction

This Initial Environmental Examination (IEE) has been prepared for the drainage sub-project "Re-excavation of the Existing Army para to Shangu River Khal for Improvement of Drainage System" (Package No. IUGIP/BAND/DR/01/2023) under the Improving Urban Governance and Infrastructure Program (IUGIP) in Bandarban Pourashava, Bandarban District. The program is supported by the Asian Development Bank (ADB), Agence Française de Développement (AFD) and the Government of Bangladesh (GoB), and is implemented by the Local Government Engineering Department (LGED) under the Ministry of Local Government, Rural Development and Cooperatives. The sub-project aims to restore the drainage capacity of the khal to address persistent waterlogging and the associated environmental and public health problems. The IEE has been prepared in accordance with the ADB Safeguard Policy Statement (SPS), 2009 and the Environmental Conservation Rules (ECR), 2023 of GoB, to identify environmental impacts and ensure that appropriate mitigation and management measures are incorporated throughout the project cycle.

Policy, Legal and Administrative Framework

The sub-project has been assessed against the Environment Conservation Act, 1995, the ECR 2023, related national policies and rules on air, noise, labour, water and climate change, and ADB safeguard requirements. Under Schedule 1 of ECR 2023, river/canal/beel dredging and dredged material management up to 5 km falls under the orange category. As the khal re-excavation is 3000 m, the sub-project is Orange, which requires an IEE and an Environmental Clearance Certificate (ECC) from the Department of Environment (DoE). Under the ADB SPS 2009, the sub-project is Category B, because its impacts are site-specific, largely reversible and can be mitigated through standard measures. An IEE including an Environmental Management Plan (EMP) is therefore required.

Description of the Sub-project

The sub-project covers re-excavation of the existing Army Para to Shangu River Khal over 3000 m from (Ch. 0.00-1000.00m) & Part-02 From Chandabaz Para to Soshan Ghat area Part-01 Existing Khal (Ch. 0.00-2000.00m) at Wards Nos. 07, 08 & 09 under Bandarban Pourashava, Bandarban District. (Total Length=3000.0m). The khal has a trapezoidal section with side slopes generally of 1V:1.5H. It has been designed using the modified rational method and Manning's equation, with a 10% climate-change allowance. All works are along the existing khal corridor on Pourashava-owned land, so no land acquisition is required. The design estimates about Cutting 36,713 m³ and filling 1281.43 m³, so suitable spoil will be reused within the works and the surplus (about 35431.57 m³) will be handled under a Spoil Management Plan. The works are scheduled for FY 2026–2027.

Description of the Environment

The sub-project lies within Bandarban urban area and its built-up surroundings, where land has long been converted to urban use. There are no protected areas, ecologically sensitive areas, wetlands of environmental significance, mangroves or estuaries in or near the site. No historical, cultural or archaeological sites, and no indigenous peoples' settlements, are located within the project area. The existing khal is narrow, shallow and heavily silted. It is obstructed by water hyacinth mats and dumped solid waste, receives direct drain outlets and household pipes, and has unstable banks. As a result, stormwater cannot drain efficiently and seasonal waterlogging occurs in Wards 07, 08 and 09. Field observation found turbid, brownish, slow-moving to stagnant water with scum and floating waste, and no laboratory testing was carried out at this stage. According to the Pourashava Engineer, groundwater contains dissolved iron and may show turbidity, relatively high pH and elevated TDS in places (indicative only). The area has a tropical monsoon climate, with about 90% of rainfall between April and October. Air quality and noise were assessed qualitatively by field observation and are typical of a small urban setting, influenced mainly by traffic, roadside dust and open waste.

Terrestrial flora consists of homestead and bank-side species such as mango, jackfruit, kalojam,

coconut, guava, jambura, kadam, raintree, mahogany, banana and bamboo. Kochu, dholkolmi and grasses grow along the banks, and no endangered or protected species were recorded. Terrestrial fauna comprises common settlement-associated birds (crow, myna, sparrow, dove, kingfisher, heron, drongo), frogs, lizards, snakes, small mammals and butterflies, with cattle and goats grazing on land adjoining the khal. Aquatic vegetation is dominated by water hyacinth, duckweed and kochu. Small fish were observed, but the khal has limited aquatic habitat and fisheries value and no organized fishing takes place. The khal is not used for navigation or as a formal irrigation canal. Bandarban Pourashava has a population of 54,450 (Census 2022), with a literacy rate of 73.86%.

Assessment of Potential Environmental Impacts and Mitigation Measures

The potential adverse impacts are mainly construction-related. They include dust and vehicle emissions, noise and vibration, turbidity and localized deterioration of surface-water quality, generation and disposal of excavated spoil, temporary disturbance to limited aquatic habitat, traffic and access disruption, and occupational and community health and safety risks. These impacts are assessed as low to moderate, site-specific, temporary and reversible, and no significant adverse impacts on protected areas, ecological resources or cultural heritage are anticipated. Tree cutting will be avoided as far as practicable, and any tree that has to be removed will be replaced by two new trees. During operation, the main risk is that siltation, weed growth and solid waste dumping may return if routine maintenance is neglected. The sub-project is expected to bring significant benefits: better drainage and less waterlogging, fewer odour and mosquito problems, more stable banks, an improved khal-side footpath and environment, local employment, and greater resilience to climate variability.

Analysis of Alternatives

The analysis considered the “with project” and “without project” scenarios, alternative alignments, design and excavation sections, excavation methods, spoil management, and timing and work sequencing. The “without project” scenario would leave the khal silted and obstructed, with worsening waterlogging, stagnation, odour, mosquito breeding and bank erosion, and is not viable. The existing khal alignment was selected over a new canal or shifted alignment because it avoids land acquisition, resettlement and disturbance to new areas. A practical trapezoidal section with CC block pitching, RCC retaining wall and brick toe wall was preferred over excessive widening or deepening or untreated banks, as it balances hydraulic capacity, bank stability and ease of maintenance. Controlled mechanical excavation supported by manual work in narrow or community-access locations was chosen to limit dust, noise and community disturbance. Suitable spoil will be reused for bank formation, filling and levelling, and unsuitable or excess spoil will go to Pourashava-approved disposal sites, with no dumping in the khal, drains or agricultural land. Excavation will be done mainly in the dry season and in segments, to avoid spoil washout and maintain flow continuity, aquatic habitat and community access.

Information Disclosure, Consultation and Participation

On 10 May 2026, the MDSC Safeguard Team held two public consultations in Wards 06 and 08, after meeting the Pourashava Engineer. Forty-five people took part (31 men and 14 women), including residents of adjacent communities, businessmen, small entrepreneurs, job holders, day labourers and housewives. Participants strongly supported the sub-project and gave their consent, and No Objection Certificates were signed. Their main concerns were protection of mature trees on both sides of the khal (with an assurance of two trees planted for each tree cut), no adverse effect on the livelihoods of the poor, quality of work, and safety measures and alternative pedestrian arrangements during construction. A Key Informant Interview was also held on 12 May 2026 with the Pourashava Executive Engineer, who identified siltation, encroachment and solid waste as the main causes of waterlogging in Wards 07, 08 and 09. He stressed that the design must follow LGED drainage standards for self-cleansing velocity and structural stability, and committed to a long-term Operation and Maintenance (O&M) plan to prevent encroachment and dumping. Stakeholder concerns have been reflected in the mitigation measures, and information disclosure and consultation will continue throughout the project cycle.

Grievance Redress Mechanism (GRM)

A three-tier Grievance Redress Mechanism (GRM) has been established for social and environmental grievances. At the first level (field/ward), the contractor and the PIU-designated safeguard focal person resolve complaints within 7 days. Unresolved issues go to the second level, the Pourashava-level Grievance Redress Cell headed by the Panel Mayor, which aims to resolve them within 15 days. Major or unresolved issues go to the third level, where the PMU Safeguard Officer and MDSC specialists resolve them within 30 days. Complainants may also use the country's legal system at any stage, or the ADB Accountability Mechanism. All grievances will be documented by the PIU and reviewed periodically by the PMU Safeguard Officer.

Environmental Management Plan (EMP)

The EMP sets out mitigation measures, environmental monitoring requirements, institutional responsibilities, training and budget for the pre-construction, construction and operation phases. Key measures include water spraying and tarpaulin covering of trucks to control dust, and daytime-only noisy works with silencers fitted to equipment. Other measures are temporary silt traps and bunds, segmented excavation without complete dewatering, a ban on fish catching by workers, and an approved Spoil Management Plan with testing of sediment and spoil. A Traffic and Access Management Plan, occupational and community safety measures, and compensatory plantation of two trees for each tree cut are also included. During operation, Bandarban Pourashava will carry out regular desiltation, weed and waste removal, maintenance of slope protection, and control of illegal discharges, with silt traps or screens at drain outfalls where needed.

Air, noise, surface-water and sediment quality will be monitored before, during and after construction. The Contractor implements the EMP and submits monthly monitoring reports, the Management Design and Supervision Consultants (MDSC) support and verify compliance, the Project Implementation Unit (PIU) supervises at Pourashava level, and the Project Management Unit (PMU) oversees the process and reports to ADB semi-annually. The estimated cost of mitigation and monitoring is BDT 4,42,500.

Conclusion

The IEE concludes that the proposed re-excavation of the Army Para to Shangu River and Chandabaz Para to Soshan Ghat area Khal in Bandarban Pourashava is environmentally sound and socially acceptable. The anticipated adverse impacts are minor, localized and reversible, and can be effectively managed through the EMP. The sub-project is consistent with ADB safeguard requirements and national environmental regulations, and no further detailed environmental assessment is required. It will improve drainage, reduce waterlogging, enhance environmental quality and strengthen climate resilience, and can proceed to implementation subject to compliance with the prescribed safeguards, regulatory requirements and monitoring obligations.

1 INTRODUCTION

1.1 Background

1. Bangladesh has a population of approximately 162 million and experienced rapid urbanization with the growth of many secondary towns over the last three decades. About 28 per cent of the total population now lives in urban areas where the population growth rate is much higher than the overall national growth rate. With the present high increase- trend in urban population, it is justifiably anticipated that by year-2020, such population will constitute nearly 40 percent of the national aggregate. One principal cause of such rapid growth is the presence of better opportunities spanning economic, communication, education, health and other social aspects in the urban areas.
2. Proposed Project Readiness Services of Result Based Lending (RBL) for Improving Urban Governance and Infrastructure Program (IUGIP) with financial assistance from the ADB & AFD are for Urban Development in 63 mainstream pourashavas. The selected Pourashavas are:
1) Basurhat 2) Brahmanbaria 3) Banshkhali 4) Chandanaish 5) Nazirhat 6) Raozan 7) Sandwip 8) Faridganj 9) Hajiganj 10) Matlab South 11) Daganbhuiyan 12) Sonagazi 13) Khagrachhari 14) Raipur 15) Ramganj 16) Ramgoti 17) Chowmuhani 18) Kulaura 19) Rangamati 20) Bhanga 21) Boalmari 22) Kaliganj 23) Kaliakair 24) Tungipara 25) Bhairab 26) Hossainpur 27) Pakundia 28) Kalkini 29) Manikganj 30) Munshiganj 31) Mirkadim 32) Araihasar 33) Monohordy 34) Goalanda 35) Naria 36) Madhupur 37) Alamdanga 38) Keshabpur 39) Monirampur 40) Mohespur 41) Bheramara 42) Kumarkhali 43) Gangni 44) Gafargaon 45) Madan 46) Nokla 47) Shariakandi 48) Rohanpur 49) Shibganj 50) Nazipur 51) Santhia 52) Bagha 53) Bhabaniganj 54) Charchat 55) Keshorhat 56) Naohata 57) Sundarganj 58) Ulipur 59) Patgram 60) Chunarughat **61) Bandarban** 62) Bandarban and 63) Chhatak .
3. 25 Pourashavas Operation and Maintenance (O & M) are selected Pourashavas as- 1) Barguna 2) Pirojpur, 3) Nabinagar, 4) Laksam 5) Laxmipur, 6) Gopalganj, 7) Kishoreganj, 8) Rajbari, 9) Chuadanga 10) Benapole 11) Jashore, 12) Magura, 13) Meherpur, 14) Muktagacha 15) Netrakona, 16) Sherpur, 17) Chapai Nawabganj, 18) Joypurhat 19) Naogaon, 20) Bera 21) Ishwardi, 22) Shahjadpur, 23) Lalmonirhat, 24) Nilphamari 25) Panchagarh.

4. The Local Government Engineering Department (LGED) under the Local Government Division (LGD) of the Ministry of Local Government, Rural Development and Cooperatives (MLGRD&C), will be the executing agency for the project.
5. Infrastructure sub-projects proposed under IUGIP (RBL) encompass a variety of types of urban infrastructure and services including those shown in Table 1-1

Table 1-1: Sub-projects Components of Proposed IUGIP (RBL)

Sector / sub projects	Activities	Components
Urban Transport & communication	Road way Provision	Bridge Replacement
		Drainage/Culverts
		Roadway Widening/Resurfacing
Urban Drainage	Road way Drainage	Roadside Drains
	Area drainage	Outfall
		Main Drain
		Secondary and Tertiary Drains
		Retention Pond
Public use facilities	Municipal facilities	Market/Community Centres
		Municipal and Kitchen Markets
		Improvement of Slaughter houses
		Bus and Truck Terminals
		Street lights
		Footpaths
Low Income Neighborhoods (LINs)	System improvement	Repair/Replacement of Lines
	Community Facility	Community Toilets
	Septic tank	Vacuum Units

6. The overall objectives of the project are to strengthen the selected Pourashavas to reduced urban poverty and improved living conditions through planned, inclusive and sustainable urbanization, better city governance, and improved infrastructure and service provisions. The outcome will be better municipal governance and service delivery improved.

1.2 Sub-project Scope

7. The proposed sub-project package is IUGIP/BAND/DR/01/2023. Re-Excavation & Beautification of the Existing Khal for Improvement of Drainage System Part-01 From Army Para to Shangu River (Ch. 0.00-1000.00m) & Part-02 From Chandabaz Para to Soshan Ghat area Part-01 Existing Khal (Ch. 0.00-2000.00m) at Wards Nos. 07, 08 & 09 under Bandarban Pourashava, Bandarban District. (Total Length=3000.0m).

1.3 Purpose of the report

8. The initial environmental examination aims to provide guidance on safeguard screening, assessment, institutional arrangement, and process to be followed for components of the project, where design takes place after board's approval. This IEE (i) assesses the capability of the project proponents to implement national laws and ADB's requirements, and identifies needs for capacity building; (ii) describes the project and its components; (iii) explains the general anticipated environmental impacts and mitigation measures for the sub-projects; (iv) specifies the requirements that will be followed in relation to screening and categorization, assessment, and planning, including arrangements for meaningful consultation with affected people and other stakeholders and information disclosure requirements; (v) specifies implementation procedures, institutional arrangements, and capacity development requirements; and (vi) specifies monitoring and reporting requirements. Moreover, this IEE is to ensure, in line with ADB ESMF, that the drainage sub-project, in the entirety of its project cycle, will not deteriorate or interfere with the environmental sensitivity of the project area, but rather improve environmental quality.

1.4 Scope of this report

9. This report fulfils the requirements of IEE under the provisions of the ECR, 2023. The IEE identifies potential environmental and social impacts and issues associated with undertaking the proposed sub-project. It provides an outline of the potential positive and negative impacts because of the Project and proposes suitable mitigation and management measures. The scope of this report and the subsequent IEE is specific to the sub-project. It does not provide any assessment for any other/future developments or activities at the location or anywhere else within Bandarban town. Should any further development be planned as result of either this sub-project or other related work, additional planning and assessment to the requirements of the GOB must be carried out specifically in relation to that proposed development.

1.5 Approach and Methodology

10. The primary purpose of the IEE is to investigate and describe impacts of the proposed sub-project to the existing environmental elements. Specifically, the study aims to predict the potential impacts of the project activities and recommend mitigation and abatement measures for impacts (in the pre-construction, construction, after completion of works and measures for impacts (in the pre-construction, construction, after completion of works and operational stages of development) that are considered potentially adverse to the surrounding environment. In general, this IEE intends to:
 - Examine and describe the existing status of the various ecological, physical and human related components surrounding the project area;
 - Predict the potential significant impacts of the project on the surrounding environment during the pre-construction, construction, after completion of works, operations and maintenance stages and recommend appropriate mitigation and abatement measures; and
 - Identify residual impacts of the sub-project and recommend appropriate short-term and long-term management plans.
11. Data Sources of IEE the following documents were used as reference in the preparation of the IEE report:
 - Primary data collected from extensive field visit in the Pourashava.
 - Available technical reports, Pourashava Development Plan from Pourashava and various government agency of DAE, DPHE, BMD etc.
 - Available laws, rules, regulations, acts, policies from Bangladesh Government websites
 - Maps from open sources and various governmental and non-governmental websites
 - Data from secondary literatures including books and relevant websites.

2 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

12. This chapter presents the policy, legal, and administrative framework applicable to the proposed subproject under the Improving Urban Governance and Infrastructure Program (IUGIP). It outlines the relevant environmental safeguard requirements of the Asian Development Bank (ADB), the applicable laws, rules, and regulations of the Government of Bangladesh (GoB), and the institutional arrangements relevant to environmental assessment, review, clearance, implementation, monitoring, and reporting.
13. The purpose of this chapter is to establish the regulatory and safeguard context within which the proposed subproject will be planned, implemented, and monitored. It also explains the environmental categorization of the subproject and the implications of such categorization under the ADB Safeguard Policy Statement (SPS), 2009, and the applicable national regulatory framework.

Regulatory Requirements for the Project

14. The proposed subproject is subject to both the environmental safeguard requirements of the financing agencies and the environmental regulatory requirements of the Government of Bangladesh. Therefore, environmental assessment and management of the subproject must be undertaken in accordance with the relevant provisions of the ADB Safeguard Policy Statement (SPS), 2009, as well as the applicable national laws, policies, rules, regulations, and administrative procedures.
15. At the national level, the key institutions relevant to environmental regulation and compliance include the Ministry of Environment, Forest and Climate Change (MoEFCC) and the Department of Environment (DoE). These institutions are responsible for environmental policy formulation, environmental regulation, environmental clearance, and compliance monitoring. Other sector agencies may also be relevant depending on the nature and location of the subproject, including agencies responsible for water resources, fisheries, agriculture, local government, labour, occupational health and safety, and disaster management.
16. At the project level, the Local Government Engineering Department (LGED) is the executing agency of the program, while the concerned Pourashava acts as the implementing agency for subproject-level implementation. Environmental assessment, mitigation, monitoring, and reporting are to be undertaken through the project's institutional arrangements, including the Project Management Unit (PMU), Project Implementation Unit (PIU), consultants, and contractors.
17. The proposed subproject must therefore comply with the applicable safeguard requirements of ADB and the relevant environmental regulations of Bangladesh throughout the stages of planning, design, construction, operation, and maintenance.

2.1 GOB Environmental Policy, Regulation and Guidelines

18. The national environmental legal framework of Bangladesh provides the basis for environmental protection, pollution control, conservation of natural resources, occupational health and safety, and environmental clearance of development activities. The key policies, acts, rules, and guidelines relevant to the proposed subproject are discussed below.

2.1.1 National Environmental Policy, 2018

19. The National Environmental Policy, 2018 provides the overall policy direction for environmental conservation and sustainable development in Bangladesh. It emphasizes environmentally sound development planning, conservation of ecosystems and biodiversity, pollution control, sustainable use of natural resources, and climate resilience across different sectors.
20. The policy is relevant to the proposed subproject because it requires that development interventions be planned and implemented in a manner that prevents environmental

degradation and promotes sustainable management of environmental resources. For drainage and canal improvement works, this implies careful consideration of impacts on surface water, aquatic ecology, land use, local communities, and environmental quality.

2.1.2 National Environmental Policy, 1992

21. The National Environmental Policy, 1992 was the first comprehensive policy document that established the national framework for environmental action in Bangladesh. The policy aims to maintain ecological balance, protect and improve environmental quality, and ensure environmentally sustainable development.
22. The policy remains relevant to the proposed subproject, as it supports environmental assessment of development activities and emphasizes the need to prevent pollution and degradation of environmental resources. The proposed khal re-excavation and drainage improvement works should therefore be implemented in a manner that protects the local environment and avoids adverse impacts on surrounding communities and natural resources.

2.1.3 Bangladesh Environment Conservation Act, 1995

23. The Bangladesh Environment Conservation Act (ECA), 1995 is the principal legislation governing environmental protection in Bangladesh. The Act provides for conservation and improvement of environmental quality, control and mitigation of pollution, declaration of ecologically critical areas, and environmental clearance of development projects.
24. The Act is relevant to the proposed subproject because it establishes the legal basis for environmental regulation, including the requirement for environmental clearance for certain categories of projects and activities. It also empowers the Department of Environment to regulate emissions, discharges, and environmentally harmful activities.

2.1.4 Environment Conservation Act (Amendment 2000, 2002 and 2010)

25. Subsequent amendments to the Environment Conservation Act strengthened the regulatory framework by introducing provisions relating to environmental offences, compensation for environmental damage, restrictions on environmentally harmful activities, and additional controls over activities affecting hills, wetlands, water bodies, and pollution sources.
26. These amendments are relevant to the proposed subproject, particularly in relation to protection of water bodies, prevention of pollution, and compliance with environmental standards during implementation of canal re-excavation and associated works.
27. **Relevance to the sub-project** - According to this law no industrial unit or project shall be established or undertaken without obtaining, in the manner prescribed by rules, a letter from the Director General.

2.1.5 Environmental Conservation Rules (ECR) ,2023

28. These are the first set of rules, promulgated under the Environment Conservation Act of 1995 (so far there have been multiple amendments to this set of rules, recently gazetted ECR, 2023 supersedes all. The Environment Conservation Rules (ECR) has classified the projects into following four categories based on their site conditions and the impacts on the environment;

- (a) Green,
- (b) Yellow,
- (c) Orange and
- (d) Red.

Various industries and projects falling under each category have been listed in Schedule-1 of ECR 2023.

29. According to the Rules, Environmental Clearance Certificate is issued to all existing and proposed industrial units and projects, falling in the Green Category without undergoing EIA. However, for category Yellow, Orange and for red projects, require location clearance certificate

and followed by issuing of Environmental Clearance upon the satisfactory submission of the required documents. Green listed industries are considered relatively pollution-free, and therefore do not require site clearance from the DoE. On the other hand, Red listed industries are those that can cause 'significant adverse' environmental impacts and are, therefore, required to submit an EIA report. These industrial projects may obtain an initial Site Clearance on the basis of an IEE based on the DoE's prescribed format, and subsequently submit an EIA report for obtaining Environmental Clearance.

30. Depending upon location, size, and severity of pollution loads, projects/activities have been classified in ECR 2023 into four categories: Green, Yellow, Orange, and Red respectively, to nil, minor, medium, and severe impacts on important environmental components (IECs).

31. **Relevance to the sub-project** – As per Schedule 1 of the Environment Conservation Rules (ECR), 2023, river/canal/beel dredging and dredged material management up to 5 km falls under the orange category. Since the proposed subproject involves re-excavation of the existing Mora Gugalichara Khal for improvement of Drainage System with a total length of 1,740 m, the subproject falls within this category under the Government of Bangladesh regulatory framework. Accordingly, the subproject is subject to the applicable environmental clearance requirements for Orange-category projects under ECR, 2023. Under the Asian Development Bank (ADB) Safeguard Policy Statement (SPS), 2009, the subproject has been classified as Category B because the anticipated environmental impacts are site-specific, temporary, and largely reversible, and can be mitigated through appropriate measures. Therefore, an Initial Environmental Examination (IEE) has been prepared for the subproject. Key issues requiring assessment include spoil generation and disposal, temporary deterioration of surface water quality, impacts on aquatic habitat and drainage flow, dust and noise during construction, traffic and access disturbance, and worker and community health and safety. These impacts are not expected to be significant or irreversible, provided that the prescribed mitigation and monitoring measures are properly implemented.

2.1.6 Air Pollution Control Rules, 2022

32. The government has published a new rule based on section 20 of The Bangladesh Environment Conservation Act, 1995. Aiming to protect environmental health. The main objectives of this rule are to prevent, control, and reduce air pollution. The government will appoint a Director General who will be responsible for managing and maintaining the environmental issue. The Air pollution (Control) Rules 2022 has specified several types of pollution such as pollution caused by factories, vehicles, construction, garbage, etc. According to the new rule, there will be a committee that will impose damages and punishment for such pollution. As stated by the rule, the government will give rewards to those who will protest against pollution and not cause any type of pollution.

2.1.7 Noise Pollution Control Rules 2006

33. According to the Environment Protection Act 1995, the government formulated the noise pollution Rules & Regulation in 2006. This regulation recommends to keep the sound level: at 50 dB in quieter areas from 6am until 9pm and at night 40 dB; similarly, in residential areas in the day at 55 dB and at night 45 dB; in mixed areas, 60 dB in the day time and at night 50 dB; in commercial areas in the day, 70 dB and at night 60 dB; and, in industrial areas in the day, 80 dB and at night 70 dB.

2.1.8 Bangladesh Labour Act 2006 and Conservation Services Rules 2015

34. The Bangladesh Labour Act was promulgated in 2006. The legislation pertains to the occupational rights and safety of factory workers and the provision of a comfortable work environment and reasonable working conditions. The amendment in 2013 introduced a good number of important items like workers' welfare, rights and safety and industrial safety and expansion of the industry (particularly relevant for this project).

35. This Act applies to the proposed project as it will involve construction and erection of structures. The occupational health and safety of the workers is covered under this Act. It is

mandatory for every factory to keep its workers abreast of work risk(s) through providing all workers with personal protection equipment.

36. In 2015, the Bangladesh government introduced the Bangladesh Labour Rules. Some of the relevant points of these Rules are health and fire safety. The Bangladesh Labour Act 2006 consolidated and repealed 25 previous labour-related laws including the Dock Labourers Act, 1934, the Factories Act, 1965, among others.

2.2 Other Acts and Policies relevant to Environmental Safeguards of RBL Program

37. In addition to the Environmental Conservation Act and Rules, there are several other Acts, Rules and policies dealing especially with water supply, sanitation, noise, forests, wildlife, labour welfare and occupational health and safety.

38. The Ministry of Environment, Forests and Climate Change (MoEFCC) prepare the environmental policies. MoEFCC also has formulated regulation toward clearance of projects from environmental angles based on environmental impact assessment report. The Department of Environment (DoE) is responsible for environmental issues while forest issues are looked after Forest Department (FD). Over the years the MoEFCC has adopted number of legal instruments in the form Acts for the protection and conservation of the environment. Table 2-1 summarizes the Environmental Legislation applicable to the sub- project.

Table 2-1: Summary of Applicable Environmental Legislations

Sl. No.	Environmental Legislation / Act	Objective	Relevance to the Project	Responsible Institution
1	- National Environmental Policy, 1992 - National Environmental Policy, 2018	Ensure that development components do not pollute the environment or degrade resources. It sets out the basic framework for environmental action together with a set of broad sectoral action guidelines.	- Restriction on operations which cannot be initiated in ecological critical areas - Regulation on vehicles emitting smoke which is harmful to the environment - Follow standards on quality of air, water, noise and soil - Sets limits for discharging and emitting waste	Ministry of Environment and Forests, And Climate Change
2	Environmental Conservation Rules, 2023	Establishes a framework for environmental assessment in a comprehensive way	- Option to affected persons for grievances related to environment safeguards - Follow standards on quality of air, water, noise and soil	Department of Environment (DoE)
3	National Environmental Management Action Plan (NEMAP), 1995	An action plan to identify key environmental issues affecting Bangladesh, identifies actions for reducing the rate of environmental degradation and improve quality of life.	Sectoral agencies to coordinate with MoEFCC in preparing environmental guidelines	Ministry of Environment and Forests, And Climate Change
4	Environment Court Act, 2000 and subsequent amendments in 2003	Establishment of Environment Court for trial of an offence or for compensation under environmental law, such as environment pollution.	Option to affected persons for grievances related to environment safeguards.	Ministry of Environment and Forests, And Climate Change

5	The Forest Act (1927) and Forest (Amendment) Act (2000)	An act to control trespassing, illegal resource extraction and provide a framework for the forestry revenue collection system;	Requires clearances for any project within forest areas and clearances for any felling, extraction, and transport of forest produce.	Department of Forests
6	National Forest Policy (1994)	To conserve existing forests and bring about 20% of the country's land area under the Forestation Programme and increase reserved forests by 10% per year until 2015	Incorporate tree planting in the subproject Clearance for any felling, extraction, and transport of forest produce	Department of Forests
7	The Bangladesh Wildlife (Conservation & Security) Act, 2012	To conserve and protect wildlife in Bangladesh including designation of protected areas. Protection of wildlife is provided with lists of species with four schedules: first, second, third and fourth schedule. The fourth schedule species have the highest level of protection.	Consultation and necessary permits required if the project would affect the wildlife in the project area.	Department of Forests
8	National Safe Drinking Water Supply and Sanitation Policy of 1998	Ensures access to safe water and sanitation services at an affordable cost	Pourashavas and water sanitation authorities will take actions to prevent wastage of water. They will take necessary steps to increase public awareness to prevent misuse of water. Pourashavas shall be responsible for solid waste collection, disposal and their management	Ministry of Local Government, Rural Development, and Cooperatives
9	National Water Act 2013	Ensures Bangladesh water sources are free from any type of pollution. Pollution from water in urban outfalls and reservoirs, e.g., lakes, canals, ponds and ditches may result in amenity losses, fisheries depletion, health problems, fish, and aquatic species contamination.	Secure clearance certificate on water resource development subprojects	Ministry of Water Resources
10	Wetland Protection Act 2000	Advocates protection against degradation and resuscitation of natural water-bodies such as lakes, ponds, beels, khals, tanks, etc. affected by man-made interventions or other causes. Prevents the filling of publicly-owned water bodies and depressions in urban areas for preservation of the natural aquifers and environment. Prevents unplanned construction on riverbanks and indiscriminate clearance of vegetation on newly accreted land.	In case of impact on the natural water bodies within the project area	Ministry of Water Resources

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

2.3 Applicable International Agreements

39. A side from the legal framework on environment, Bangladesh is also a party to several international conventions, treaties, and protocols related to environmental protection. The applicable international conventions, treaties, and protocols are described in Table 2-2.

Table 2-2: Relevant International Conventions, Treaties, and Protocols Signed by Bangladesh

Conventions	Years	Ratified/Accessed (AC)/Accepted (AT)/ Adaptation (AD)	Relevance
Convention on Wetlands of International Importance ("Ramsar Convention":1971)	1999	20.04.1992 (ratified)	Protection of significant wetland and prevention of draining or filling during construction
Convention on Biological Diversity, (Rio de Janeiro, 1992.)	1992	05.06.1992	Protection of biodiversity during construction and operation.
Convention on Persistent Organic Pollutants, Stockholm.	2001	In process	Restrict use of different chemicals containing POPs.
United Nations Framework Convention on Climate Change, (New York, 1992.)	1992	15.04.94	Reduction of emission of greenhouse gases.
Convention on Biological Diversity, (Rio De Janeiro, 1992.)	1992	03.05.94	Conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.
Kyoto protocol to the United Nations Framework Convention on Climate Change		21.8.2001 (AC) 11.12.1997 (AD)	Reduction of emission of greenhouse gases.
International Convention for Protection of Birds, Paris	1950	Signed	Protection of the birds in their wild state.
Convention Concerning the Prevention and Control of Occupational Hazards caused by Carcinogenic Substances and Agents, Geneva.	1974	Signed	To protect workers against hazards arising from occupational exposure to carcinogenic substances and agents.
Convention Concerning the Protection of Workers Against Occupational Hazards in the Working Environment due to Air Pollution, Noise and Vibration, Geneva	1977	Signed	Protection of workers' health against occupational hazards in the working environment due to air pollution, noise and vibration.
Convention Concerning Occupational Safety and Health and the Working Environment, Geneva.	1981	Signed	Ensuring occupational health and safety of workers in all branches of economic activity.
Vienna Convention for the Protection of the Ozone Layer, Vienna	1985	02.08.90 (AC) 31.10.90 (entry into force)	Preventing human activities that may have adverse effects on ozone layer.
Convention Concerning Occupational Health Services, Geneva.	1985		Convention Concerning Occupational Health Services, Geneva.
Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal.	1987	31.10.90 (Entry into force)	Reduction of the abundance of the substances that deplete the ozone layer in the atmosphere, and thereby protect the earth's fragile ozone Layer.
Convention Concerning Safety in the Use of Chemicals at Work, Geneva.	1990	Signed	Regulating the management of chemicals in the workplaces I order to protect workers from the harmful effects of these substances.
London Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, London.		18.03.94 (AC) 16.06.94 (entry into force)	To strengthen the control procedure and extend the coverage of Montreal Protocol to new substances.

Preparedness, Response and Cooperation (London, 1990.) 30.11.90 United Nations Framework Convention on Climate Change, New York	09.06.92	15.04.94	Achieving stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.
Convention on Biological Diversity, Rio De Janeiro	05.06.92	03.05.94	Conservation of biological diversity (or biodiversity) and sustainable use of its components.
Agenda 21, UNCED, Rio de Janeiro	1992	Signed	Ensuring sustainable development.
Copenhagen Amendment to the Montreal protocol on Substances that Deplete the Ozone Layer, Copenhagen, 1992	1992	27.11.2000 (AT) 26.2.2001 (Entry into force)	Extending the coverage of Montreal Protocol to new substances
Montreal Amendment of the Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal	1990	27.7.2001 (Accepted) 26.10.2001 (Entry into force)	Controls in the trade of ozone depleting substances and the use of licensing procedures to control the import and export of new, recycled and reclaimed ozone depleting substances.

2.4 Environmental Categorization and Standards of Bangladesh Environmental Category: DoE

40. For the purpose of issuance of Environmental Clearance Certificate, the industrial units and projects shall, in consideration of their site and impact on the environment, be classified into the following four categories: (a) Green (b) Yellow (c) Orange and (d) Red. The industries and projects included in the various categories are specified in sub-rule (1) have been described in Schedule-1. The ECA indicates that all industrial units or projects must obtain a Location Clearance Certificate (LCC) and Environmental Clearance Certificate (ECC) from the Department of Environment (DoE). No industrial unit/project shall be established or undertaken without obtaining environmental clearance from DoE in the manner prescribed by the rules.
41. **Category of RBL Program Activities per ECR, 2023;** As per Schedule 1 of the Environment Conservation Rules (ECR), 2023, river/canal/beel dredging and dredged material management up to 5 km falls under the Orange category. Since the proposed subproject involves re-excavation and improvement of the Existing Mora Gugalichara Khal with a total length of 1,740 m, the subproject falls within this category under the Government of Bangladesh regulatory framework. Bandarban Pourashava drainage sub-project is classified as Environmental Category B as per ADB SPS as no in-significant impacts are envisioned. This initial environmental examination has been prepared in accordance with ADB SPS's. Table 2-3 describes DoE classification for drain sub-project.

Table 2-3: Category Proposed RBL Activities per ECR, 2023 (Section-1)

RBL Program activity	Components	ADB SPS 2009	Assessment requirements	DoE Classification	Assessment & clearance requirements
Urban Drainage and Canal improvement	Khal re-excavation (Cutting and Filling), Slope Protection (RCC Retaining Wall, Brick Toe Wall, CC Block), Footpath, Culvert	Category-B	IEE Report	Orange	Applicable

42. The Department of Environment (DoE) issued an environmental clearance letter for the Improving Urban Governance and Infrastructure Program (IUGIP) vide Letter No. 22.02.0000.018.72.029.23.177 dated 25 June 2023 (DoE Approval Letter, Appendix-09). The clearance covers the road, drain and municipal facilities-related subprojects under IUGIP. However, as the proposed subproject involves re-excavation of an existing khal, an

updated/additional clearance letter from the DoE will be obtained for the khal re-excavation works.

2.5 Categorization

43. The government's overall urban program covers 335 Pourashavas and 12 city corporations to reduce urban poverty and improve living conditions. The results-based lending (RBL) program will cover 63 Pourashavas and is aligned with the government plan and policies. It is also aligned with the country partnership strategy for Bangladesh, 2021– 2025, which promotes a culture of responsiveness and accountability as part of good urban governance. The program is aligned with ADB's Strategy 2030, supporting key operational priorities related to addressing remaining poverty and reducing inequalities; accelerating progress in gender equality; tackling climate change, building climate and disaster resilience, and enhancing environmental sustainability; making cities more livable, and strengthening governance and institutional capacity. It will directly contribute to the government's international commitments.
44. Success and lessons drawn from UGIIP and other ADB's urban sector projects of Bangladesh to inform the RBL program design include (i) using governance performance as a basis for the allocation of investment was an effective approach; (ii) conducting institutional capacity and community awareness to strengthen the municipal governance and sustainable delivery of services; (iii) the demonstrated impacts of IUGIPs generate high demand among Pourashavas; and (iv) implementation of infrastructure component of the project, coupled with timely technical support and capacity building, is pivotal to ensuring project readiness and implementation progress in a highly challenging context- the LGED demonstrated this capacity.
45. The proposed subproject has been screened in accordance with the environmental safeguard requirements of the Asian Development Bank (ADB) Safeguard Policy Statement (SPS), 2009. As part of the screening process, an environmental assessment was undertaken using the relevant Rapid Environmental Assessment (REA) checklist applicable to drainage and canal improvement works. The screening results indicate that the proposed subproject may generate some environmental impacts during pre-construction, construction, and operation phases. However, these impacts are expected to be site-specific, temporary, and largely reversible, and can be effectively avoided, minimized, or mitigated through appropriate design, construction management, and implementation of mitigation measures. Accordingly, the subproject is classified as Category B under the ADB Safeguard Policy Statement (SPS), 2009, and an Initial Environmental Examination (IEE) has therefore been prepared.
46. Accordingly, the subproject is classified as Category B under the ADB SPS, 2009. In line with ADB requirements for Category B projects, an Initial Environmental Examination (IEE) has been prepared. The IEE identifies the likely environmental impacts of the proposed works and specifies the mitigation measures, environmental monitoring requirements, institutional responsibilities, and reporting procedures necessary to ensure environmental compliance throughout the project cycle.
47. In addition to ADB safeguard categorization, the applicable requirements of the Government of Bangladesh (GoB) environmental regulatory framework, including the environmental clearance procedures of the Department of Environment (DoE), have also been reviewed. The relationship between ADB safeguard requirements and national environmental regulatory requirements is discussed in the following sections.

2.6 Environmental Category: as per ADB's Safeguard Policy Statement 2009

48. The Safeguards Policy Statement (SPS 2009) of ADB provides guidance on the environment category of sub-projects based on the degree of anticipated environmental impacts. ADB environmental safeguards objectives are: (i) to ensure the environmental soundness and sustainability of sub-projects and (ii) to support the integration of environmental considerations into the sub-project decision-making process. ADB environmental safeguards

are triggered if a project is likely to have potential environmental risks and impacts. The initial process of categorization involves filling out a sectoral Rapid Environmental Assessment (REA) checklist. A project is classified as one of the four environmental categories (A, B, C, or FI) based on the most environmentally sensitive component. Categories are as follows:

Category A: Project that is likely to have significant adverse environmental impacts which are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment (EIA), including an environmental management plan (EMP), is required.

Category B: Project with potential adverse environmental impacts that are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination (IEE), including an EMP, is required.

Category C: Project that is likely to have minimal or no adverse environmental impacts. An EIA or IEE is not required, although environmental implications need to be reviewed.

Category FI: Project is classified as category FI if it involves the investment of ADB funds to, or through, a financial intermediary.

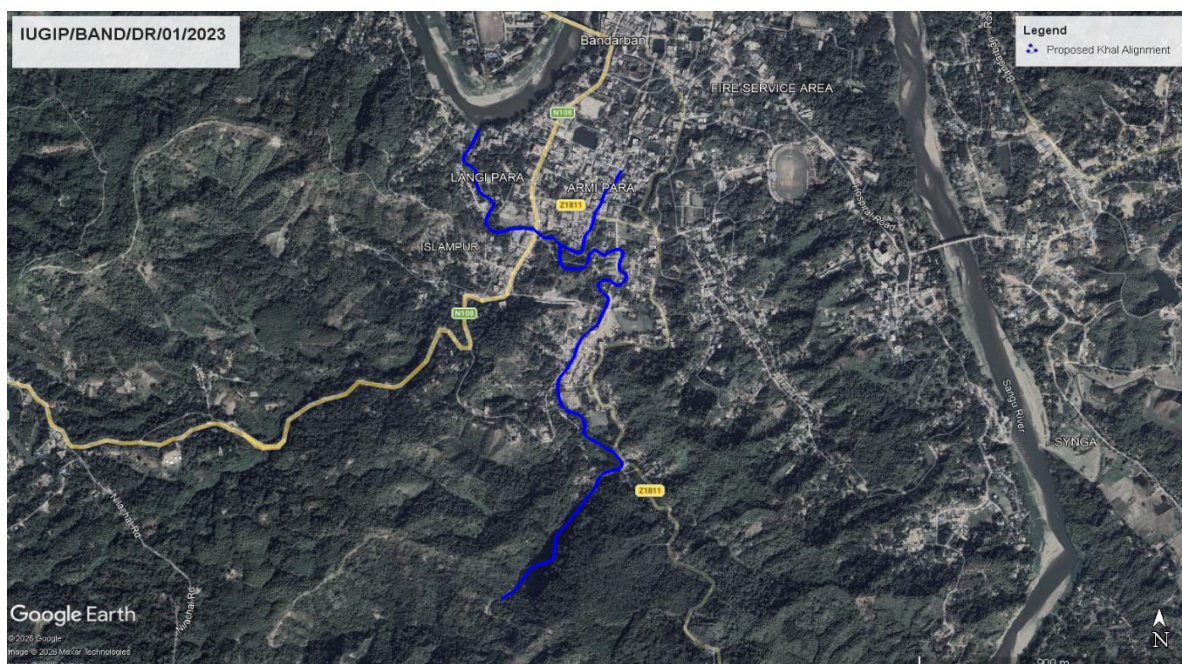
49. The sub-project has been categorized as B for environment under the ADB's Safeguards Policy Statement 2009 (SPS).

3 DESCRIPTION OF THE SUB-PROJECT

3.1 Sub-project Location and Surroundings

50. Bandarban Pourashava is a class-A type Pourashava and one of the renowned Pourashavas in southern Bangladesh. Most of the roads of this municipality have uneven-rough surface, damaged topping and pavement sides, narrow in width and without roadside footpath and thus incapable of accommodating road traffic. The road surfaces are worn out partly and, in some cases, entirely. Traffic congestion, delay, accidents, pedestrian and parking difficulties, air and noise pollution are among the problems. Justifiably, they call for intervention varying from normal significant maintenance to large improvement/reconstruction. Due to the presence of canals and ditches on the side of most of the roads, the road shoulders are badly damaged due to the flow of water in the canal. The roadside drains are inadequate due to insufficient capacities and incorrect gradients. No people/vehicles can move in this road due to water logging/damaged condition in rainy season. That's why Pourashava demanded the development of this roads and drains through improvement of dense carpeting, RCC road, RCC drain and partial beautification besides road. The nearby urban residents in surrounding locality will be benefited from improvement of the proposed sub-project for creating better business and livelihood opportunities. No economic activities will be impeded resulting losses in income or asset during construction period. There is no need to be acquired any land for the construction as required land is available under the possession of the Bandarban Pourashava.
51. This report contains the Initial Environmental Examination (IEE) for the drainage sub-project of Bandarban Pourashava in Bandarban District under Bandarban Division. The sub-project components are located within the existing urban area of Bandarban Pourashava and its immediate built-up surroundings, where the land has already been converted to urban use. The proposed drainage works are located within the existing urban infrastructure network and on Pourashava/government-owned land, with no requirement for additional land acquisition. The sub-project sites do not fall within or near any protected area, ecologically sensitive area, wetland of environmental significance, mangrove, estuary, or other known critical natural habitat. The proposed interventions are therefore confined mainly to the existing developed urban environment and are intended to improve drainage capacity, reduce waterlogging, and enhance the overall urban environmental condition of Bandarban Pourashava.

Figure 3-1: Location of Proposed sub-project under Bandarban Pourashava



3.2 Sub-project summary

52. The Sub-project Package IUGIP/BAND/DR/01/2023. Re-Excavation & Beautification of the Existing Khal for Improvement of Drainage System Part-01 From Army Para to Shangu River (Ch. 0.00-1000.00m) & Part-02 From Chandabaz Para to Soshan Ghat area Part-01 Existing Khal (Ch. 0.00-2000.00m) at Wards Nos. 07, 08 & 09 under Bandarban Pourashava, Bandarban District. (Total Length=3000.0m). The construction of Khal will be constructed under the IUGIP.
53. The subproject includes the following major components: (i) earthwork involving cutting and filling for khal re-excavation and alignment improvement; (ii) 600 mm-wide Uniblock footpath on both sides; (iii) slope protection works through brick toe wall, RCC retaining wall, CC block; (iv) Tree plantation; and (v) construction and/or rehabilitation of culvert.

Table 3.1: Proposed sub-project in Bandarban Pourashava

SI No.	FY	Name of Package	PDP SL	Scheme Name/ Name of works	Length
				Name of Sub-Project: Re-Excavation, Beautification & Footpath of the Existing Khal for Improvement of Drainage System 3000.00m, RCC Retaining Wall 454.00m, Footpath 240.00m & Seating 07 nos at Wards Nos. 07, 08 & 09 under Bandarban Pourashava in Bandarban District.	
1	2026-2027	IUGIP/BASU/DR/01/2023		Re-Excavation & Beautification of the Existing Khal for Improvement of Drainage System Part-01 From Army Para to Shangu River (Ch. 0.00-1000.00m) & Part-02 From Chandabaz Para to Soshan Ghat area Part-01 Existing Khal (Ch. 0.00-2000.00m) at Wards Nos. 07, 08 & 09 under Bandarban Pourashava, Bandarban District. (Total Length=3000.0m).	3000
2				Improvement of Part-01 Canal Side Footpath by Uni-Block Paver (Ch. 500.00-740.00m) at Wards Nos. 07, 08 & 09 Under Bandarban Pourashava, Bandarban District. (Total Length=240.00m).	240
				Grand Total (A+B) =	R=240.00 D=3000.00

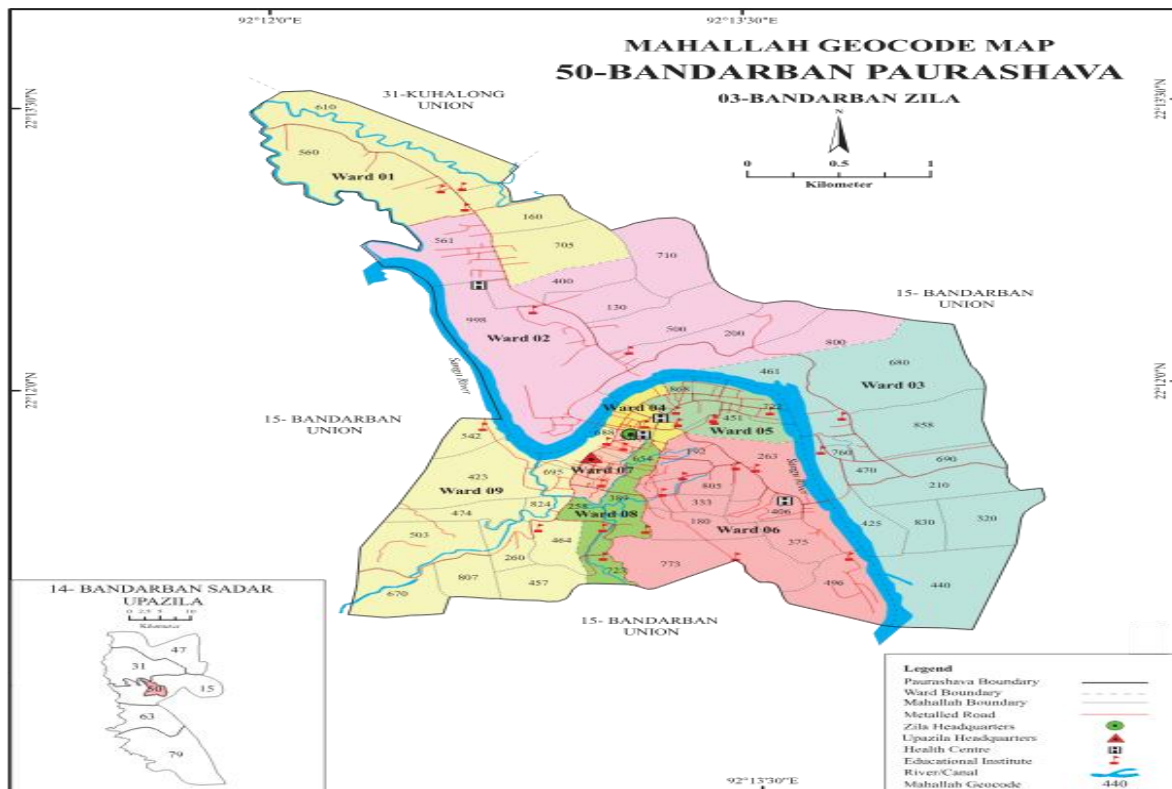


Figure 3-2: Bandarban Pourashava Map

3.3 Existing Condition and Need for the Sub-project

54. Bandarban Pourashava, a Class-A municipality of Bandarban District, is experiencing rapid urbanization and gradual expansion of residential and commercial areas. However, the existing natural drainage system within the Pourashava, particularly the proposed khal corridor from the offtake point to the river outfall, is in a severely deteriorated condition. Khal become significantly narrow and shallow due to continuous sediment deposition, encroachment along the banks, and the absence of regular maintenance or re-excavation. In several locations, the khal section is heavily clogged by aquatic weeds such as water hyacinth, dense vegetation, and deposited organic materials, which severely obstruct the natural flow of stormwater. Additionally, indiscriminate dumping of municipal solid waste along the khal banks and within the channel has further reduced the effective flow section. The canal banks are irregular and unstable, with locally formed earthen crossings, fallen vegetation, and informal access points interrupting the natural longitudinal flow of water.
55. As a result of the degraded condition of the khal, the existing drainage capacity of the Khal has been significantly reduced. During moderate to heavy rainfall events, stormwater runoff generated from surrounding wards and adjacent catchment areas cannot be discharged efficiently through the existing drainage path. Consequently, rainwater accumulates in nearby low-lying areas, homesteads, agricultural lands, and local roads, causing seasonal waterlogging. This situation creates substantial inconvenience for local residents, disrupts agricultural activities, damages local infrastructure, and contributes to environmental degradation. Prolonged stagnation of water in the affected areas also increases the risk of water-borne diseases and deteriorates overall public health conditions.
56. Therefore, the proposed sub-project for re-excavation, widening, reshaping, and proper alignment of the khal is urgently required to restore its natural drainage function and ensure uninterrupted stormwater discharge to the river. The improvement works will restore the original conveyance capacity of the khal and establish a continuous and unobstructed drainage path from the upstream catchment to the downstream river outfall. The proposed interventions will significantly improve hydraulic efficiency, facilitate rapid discharge of stormwater and reduce the occurrence of seasonal waterlogging within the Pourashava area. Implementation of the sub-project will provide substantial benefits to the surrounding communities by protecting

residential areas, agricultural lands, and local infrastructure from flooding while also improving environmental quality and supporting sustainable urban development within Bandarban Pourashava.



Figure 3-3: Existing Condition of Proposed Khal

3.4 Design Concept

57. The design considerations adopted for design were as follows:

58. LGED's Drainage design manual and standards followed. The Trapezoidal section has been proposed in this sub-project considering hydraulic capacity, structural stability of side slopes, ease of maintenance and preservation of natural characteristics. The design of Khal involves hydrological analysis of rainfall intensity and the total run off from the catchment area. The modified rational method has been adopted for estimation of peak runoff for a definite frequency and duration from particular drainage basin. Following the estimation of peak discharge, hydraulic sizing of the drainage sections has been designed using Manning's equation to ensure adequate conveyance capacity and self-cleansing velocity. The side slopes are kept gentle, generally 1V:1.5H, ensuring that the embankments remain structurally stable under saturated conditions. To prevent bank erosion and ensure slope stability, RCC retaining wall, Brick toe wall and CC block pitching are proposed along the channel slopes.

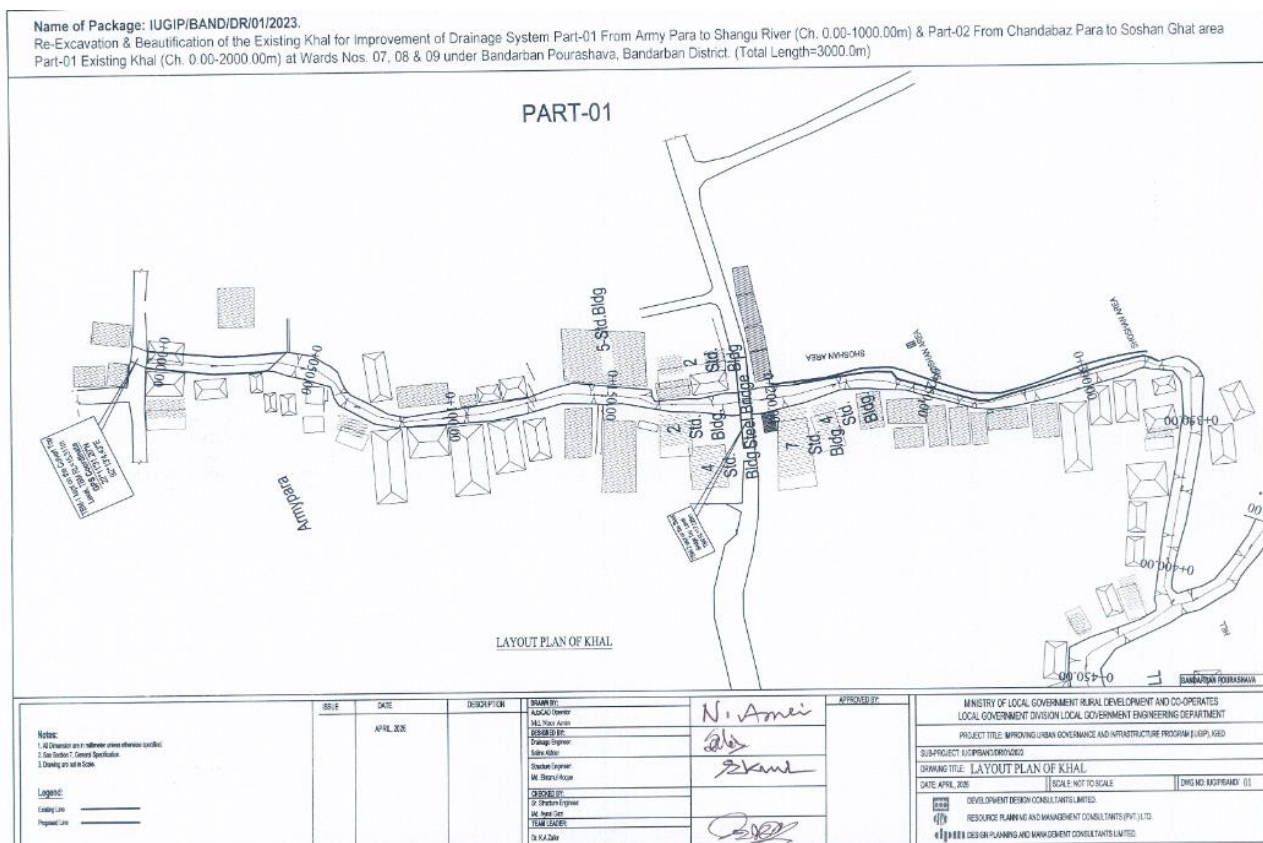


Figure 3-4: Cross-Section of Khal in Pourashava

59. Based on the detailed design and quantity estimation, the total estimated volume of earth cutting/excavation is 36,713m³, while the total estimated volume of earth filling is 1281.43 m³. These quantities indicate that a substantial amount of excavated material will be generated during implementation and therefore require proper management.
60. The excavated material generated from the khal re-excavation works will, as far as possible and subject to its suitability, be reused within the subproject for filling, bank formation, leveling, and other approved works. This will reduce the need for off-site disposal and minimize environmental impacts associated with spoil handling. Any excess, unsuitable or waste spoil that cannot be reused in the works will be handled in a controlled manner. Such material will be removed from the khal edge, temporarily stockpiled only at designated locations and transported to approved disposal sites in consultation with the Pourashava. Spoil will not be dumped into water bodies, low-lying land, agricultural land, drainage channels, or locations where it may obstruct flow, create waterlogging, or cause nuisance to nearby residents. A Spoil Management Plan should be implemented as part of the Environmental Management Plan (EMP) to guide the reuse, temporary storage, transport, final disposal and site restoration associated with the re-excavated spoil.

3.5 Implementation Schedule

61. Substantial time is required spanning the continuum of sub-project preparation, approval, survey, design & estimate, contract award and contract execution. Efforts need to be made to meticulously follow the schedule should a timely implementation of work is aimed at.

Usually, the construction work season in Bangladesh runs from October through May (eight months). Construction works are sometimes impeded for the following reasons.

- Early floods in April/May,
- Late floods in September/October,
- Natural calamities (cyclone/tornado, excessive floods) occur in April/May and October/November.

62. Normally, the best construction period is only for 6 months a year (October to March). The construction period is sometimes squeezed to 4 months due to natural calamities.

63. However, sometimes, based on time constraint or exigency, construction work may even need to be carried out in the monsoon. Besides, whenever possible, simultaneousness of activities can be ascertained and cashed in on and consequently, quantum of work can be maximized through efficient planning and adoption of best available practice.

64. Summing up, over on 12-months period, implementation schedules are advisable to take between August 2026 and February 2028. A tentative time- schedule for implementation (only as indication) is shown Table 6.

Table 3-2: Sub-project Implementation Schedule

Period																							
	2026							2027												2028			
Items of Work	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
Assessment of the Sub-project Supported by MDSC Team in field visit																							
Preparation and approval of Sub-project																							
Compliance of Sub-project and Approval																							
Tendering of Sub-project																							
Evaluation of Sub-project and work order																							
Execution of Physical work																							
Final Inspection and certificate																							

4 DESCRIPTION OF THE ENVIRONMENT

4.1 Methodology used for the sub-project study

65. Data for this study has been primarily collected through comprehensive literature survey, discussion with stakeholder agencies, and field data provided by the Pourashava. The literature survey broadly covered the following:

4.1.1 Secondary Data

- i. sub-project details, reports, maps, and other documents available with the ADB, MDS consultants, LGED, and Bandarban Pourashava;
- ii. relevant acts and extraordinary gazettes, and guidelines issued by Government of Bangladesh agencies; and
- iii. literature on land use, soil, geology, hydrology, climate, socioeconomic profiles, and environmental planning documents collected from Government of Bangladesh agencies and websites.

4.1.2 Primary Data

66. Therefore, several visits to the sub-project sites were made by the persons of Pourashava engineering section and supplied to MDSC to assess the existing environment (physical, biological, and socioeconomic) and gather information with regard to the proposed sites and scale of the proposed sub-project. Demographic information, archaeological and religious places, densely populated pockets, and settlements were gathering from PDP and other documents.

4.1.3 Data Analysis and Interpretation

67. 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. The IEE including specific description of the environment and corridor of impact has been updated as necessary based on the final detailed design.

4.2 Physical Characteristics Topography, Geology and Soil

65. Bandarban region falls under North-Eastern Hills Region. Northern and eastern Hilly areas of Bangladesh comprise two main kinds of topography - a) Low Hill Ranges (Dupi Tila and Dihing Formations), b) High Hill or Mountain Ranges (Surma and Tipam Formations). High hill or mountain ranges comprise an almost parallel ridge running approximately north-south and with summits reaching 300-1000 m. They have very steep slopes - generally >40%, often 100% and are subject to landslide erosion. They are mainly underlain by consolidated shales, siltstones and sandstones. This unit covers most of Chittagong Hill Tracts including Bandarban. All the mountain ranges of the Hill Tracts are almost hogback ridges. They rise steeply, thus looking far more impressive than their height would imply, and extend in long narrow ridges, whose tops are barely 30m wide. Most of the ranges have scarps in the west, with cliffs and waterfalls.

South of the Karnafuli there are seven main mountain ranges within Bangladesh. The Muranja range raises out of the Chunoti hills 5 km east of Harbang, and strikes in a southeasterly direction. Its well-known peaks are Muranja (502m), Nashpo Taung (586m), and Basitaung (664m). East of the Muranja range and also roughly parallel to it are the Tyanbang, Batimain and Politali ranges. The Tyanbang or Chimbuk range rises south of Sangu River and continues into Myanmar. Its main peaks are Lulaing (720m), Thainkhiang (894m), Kro (868m), Rungrang (849m), and Tindu (898m). On a branch of the Lulaingkhal, near Lulaing peak, there is a waterfall of 107m height. The high peaks within Bangladesh are Waibung (808m), Mowdok Tlang (905m), Rang Tlang (958m), Mowdok Mual (1,004m) and Tajingdong, which is the highest peak of Bangladesh, officially called as Bijoy (1,280m).

4.3 Climate Conditions

65. Bandarban region experiences a subtropical monsoon climate with the mean maximum and minimum temperature range max. 25.6° – 33°C and min. 12.4° – 25.3° C and the average annual rainfall is 2582 mm. The 80% rainfall takes place in May-September and the rest months of the year remain nearly dry.



Source: <http://www.meteoBLUE.com>

Figure 4-1: Historical Climatic Record at Bandarban Region

4.4 Surface Water and Ground Water

68. The sub-projects cross large number of water bodies such as small and medium ponds, which are used for multiple purposes. Water body encompasses 8.09% of the total area of Bandarban Municipality. Sangu River is the major water body which passes through the Pourashava. Also, there are 5 khals (chharas) within the Pourashava area such as Hafezghonar Khal, Penchhara Khal, Taracha Khal, Goda Khal and Miskey Khal. Also there are 71 ponds and 33 ditches which contribute to the Pourashava both environmentally and economically. The surface water in ponds is not saline but is not suitable for drinking purposes. All the ponds are man-made and used for fishing, water supply and domestic use. The sources of surface water (ponds & ditches only) are polluted by domestic waste, unhealthy sanitation and extensive use of fertilizer in the agriculture. Soon, water supply is going to be very critical in the Pourashava. Water supply problem can be substantially resolved by properly using Sangu River

69. During the field visit, the baseline condition of surface water in the proposed khal was assessed through direct visual observation of water colour, flow condition, odour, aquatic vegetation, sediment deposition, bank condition, and evidence of solid waste or wastewater entry. Throughout the alignment, the khal water was consistently turbid and brownish in colour, with slow-moving to stagnant flow in several reaches. Multiple drain outlets were observed discharging directly into the khal from adjoining roads and built-up areas, and household water pipes were seen connected directly at the khal edge in residential sections. In some reaches, particularly near built-up frontages, the water surface showed heavy accumulation of solid waste (plastic bags, bottles, and other litter) together with a greyish, foam/scum-covered surface, indicating significant local water quality degradation. These conditions indicate reduced drainage efficiency and possible deterioration of local surface-water quality. Although no laboratory testing was carried out at this stage, the observed physical condition including direct drain discharge points and solid waste accumulation suggests the need for proper spoil management, protection of water flow before, during and after construction by the contractor, and water-quality monitoring before, during and after implementation of the subproject.

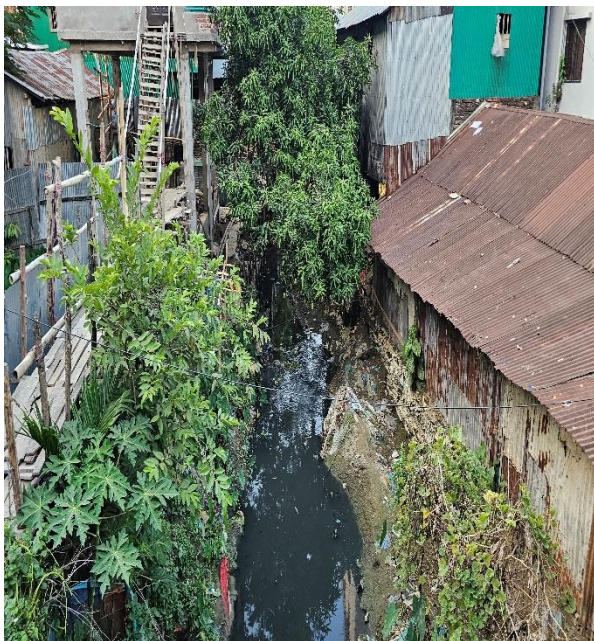


Figure 4-2: Current surface water condition along the khal

70. Hydrogeological, Bandarban Pourashava is situated within the northeastern alluvial and piedmont plains of the Bandarban district, is characterized by a stratified aquifer system featuring a highly responsive shallow water-bearing zone (0 to 60 meters) and a deeper, more resilient confined-to-semi-confined aquifer system typically exceeding 150 meters. Groundwater levels are heavily governed by monsoonal dynamics, showing rapid, substantial recharge between June and October due to intense regional precipitation, followed by significant drawdown during the dry pre-monsoon months (January to April) when intensive abstraction for Boro rice cultivation and domestic water supply demand.
71. The Pourashava Engineer also informed that groundwater in Bandarban Pourashava contains a considerable amount of dissolved iron and may show turbidity, relatively high pH and elevated total dissolved solids (TDS) in some locations. These conditions may affect the domestic usability of groundwater if appropriate treatment or filtration is not provided. As no laboratory groundwater quality testing was undertaken as part of this IEE, the reported groundwater-quality conditions are based on information provided by the Pourashava Engineer and should therefore be considered indicative. If groundwater is used for construction activities, worker camps, or domestic purposes during project implementation, the contractor shall ensure that the water is suitable for its intended use. In particular, drinking water supplied to workers shall meet the applicable drinking-water quality requirements. Tube wells and other groundwater sources used during construction shall also be properly protected from surface contamination. Where groundwater is used for drinking or domestic purposes, water-quality testing for relevant parameters, including pH, iron, manganese, TDS, arsenic, chloride, and microbiological parameters, shall be undertaken as specified in the Environmental Monitoring Plan.

4.5 Flooding and Drainage Condition

72. Flooding and drainage congestion are important environmental and urban management issues in Bandarban Pourashava, particularly during the monsoon season. The Pourashava is influenced by local khals/drainage systems, which carry stormwater runoff from surrounding catchments toward downstream. During heavy rainfall, excess runoff from residential areas, agricultural land, local roads, and low-lying areas depends on these natural and man-made drainage paths for runoff discharge.
73. The Khal is an important part of the local drainage network, serving Wards 07, 08 and 09 along its alignment. However, the existing khal has become narrow, shallow, silted, and partially obstructed in several locations due to sediment deposition, aquatic weed growth, bank-side vegetation, solid waste dumping, and lack of regular maintenance. As a result, the drainage capacity of the khal has been reduced and stormwater cannot be discharged efficiently during rainfall events. This contributes to seasonal waterlogging in adjacent low-lying areas, agricultural land, local access routes and nearby settlements.
74. During the field visit, stagnant or slow-moving water was observed in parts of the khal, along with sediment accumulation, aquatic weeds, floating waste and local bank instability. These conditions indicate poor flow, reduced self-cleansing capacity, and possible deterioration of surface-water quality. In some stagnant sections, aquatic weed growth and greenish water conditions may indicate nutrient enrichment and possible algal growth. Such conditions may create odour nuisance, mosquito breeding, and public health concerns if the khal remains blocked and poorly maintained.
75. Local information indicates that the Pourashava area is vulnerable to seasonal flooding and drainage congestion during intense monsoon rainfall. Floodwater and storm runoff from surrounding areas may accumulate when the khal and connected drains are blocked by silt, waste, aquatic weeds, or local obstructions. Therefore, the proposed re-excavation of the Khal over its 3000 m length is necessary to restore drainage capacity, improve stormwater conveyance, reduce waterlogging, and support better environmental conditions within the Pourashava.

4.6 Air Quality & Dust

76. Ambient air quality in the subproject area is influenced mainly by vehicular movement, roadside dust, open waste dumping and localized small-scale commercial activities. No major industrial air emission source was identified within the immediate influence area of the proposed sub-project during the field visit. However, the local air environment is still vulnerable to dust nuisance and odour problems, particularly in core Pourashava areas with poor road surfaces, unmanaged solid waste. These issues are relevant because they may be intensified temporarily during excavation, spoil handling, movement of construction vehicles and transport of materials.
77. For the proposed khal re-excavation subproject, the most important air-quality concerns are expected during the construction phase. These will mainly arise from: (i) dust generated from excavation and handling or re-handling of excavated soil; (ii) dust and fine particles from temporary spoil stockpiles; (iii) emissions from trucks, excavators, and other diesel-powered construction machinery; and (iv) temporary nuisance caused by the transport of excavated spoil and construction materials along local roads. If not properly managed, these impacts may affect nearby residents, pedestrians, roadside businesses, and sensitive receptors such as schools, mosques, and houses located near the khal corridor. Therefore, dust control and emissions management during construction are important elements of the Environmental Management Plan (EMP). Moreover, to meet the baseline and compliance requirements of the subproject, the contractor will carry out air-quality monitoring before commencement of the works, periodic monitoring during construction, and follow-up monitoring after completion of the works, in accordance with the EMP. With proper implementation of mitigation and monitoring measures, the anticipated air-quality impacts are expected to remain temporary, localized, and manageable.

4.7 Noise Level

78. The existing acoustic environment in the subproject area is influenced mainly by vehicular movement, commercial activity, and normal day-to-day urban activity within the Pourashava. At present, no major industrial or high-intensity stationary noise source was identified within the immediate influence area of the proposed sub-project. Based on field observation, the principal existing noise sources in the area are motorcycles, vans, tempos, mini trucks, tractors, votvoti, and other small and medium-sized vehicles using the local road network during daytime and, to a lesser extent, at night.
79. During the field visit, the baseline noise environment was assessed qualitatively through direct observation of traffic activity, proximity of roads and settlements, presence of commercial activity, and identification of nearby sensitive receptors, such as houses, schools, mosques, and roadside establishments. The field observations suggest that the existing noise environment is generally moderate and typical of a small urban Pourashava setting, although short-term localized increases in noise occur when vehicles pass through narrow roads or busy roadside sections. No major factory- or industry-related noise source was observed near the khal corridor during the site visit.
80. In Bangladesh, the applicable area-wise noise standards are prescribed under the Noise Pollution Control Rules, 2006. According to the ECR-related reference material available for this IEE, the standard limits are 50 dB(A) daytime and 40 dB(A) nighttime for silent areas; 55 and 45 dB(A) for residential areas; 60 and 50 dB(A) for mixed areas; 70 and 60 dB(A) for commercial areas; and 75 and 70 dB(A) for industrial areas. To meet the baseline and compliance requirements of the subproject, the contractor will carry out noise monitoring before commencement of the works, periodic monitoring during construction, and follow-up monitoring after completion of the works, in accordance with the EMP. Monitoring should be undertaken particularly at representative and sensitive locations near settlements, educational or religious institutions, and other receptors located close to construction activity. The monitoring results will be recorded and reported as part of

environmental monitoring and EMP implementation. With proper implementation of mitigation and monitoring measures, the anticipated noise impacts are expected to remain temporary, localized, and manageable.

4.8 Biological Characteristics Ecological Resources

81. The study area is represented by both urban and rural environments with the domination of terrestrial ecosystems. The study area also possesses some aquatic ecosystems of both perennial (i.e., river) and seasonal (i.e., floodplain) nature. Each of the major categories is further divided into subcategories.
82. The ecological setting is mostly with wetland and homestead vegetation. Homestead vegetation has a positive effect on improvement of soil moisture through the shading and mulching process. Trees growing at homesteads also provide easy access to fuel wood, fodder and other products. There is also no presence of any eco-fragile zone/protected area/Ramsar site or any other ecologically important wetland/nesting- breeding ground. There is no record of any rare/endemic species or sighting of migratory species from the proposed site and study area. Two major types of fauna viz. terrestrial and aquatic fauna have been identified in and around the area.

4.8.1 Terrestrial Flora

83. Sub-project components are located in Bandarban urban area or in its immediate surroundings that are experiencing rapid urbanization. Field observations along the Khal alignment confirm this pattern: The terrestrial flora of Bandarban is a highly biodiverse mosaic of tropical semi-evergreen and moist-deciduous forests that thrive across the rugged terrains of the Chittagong Hill Tracts. The dense upper canopy is dominated by valuable timber trees like Kanak (*Schima wallichii*), Teak (*Tectona grandis*), and Chhatim (*Alstonia scholaris*), alongside dense secondary thickets of native Muli bamboo (*Melocanna baccifera*) that cover entire hill slopes. Beneath these giants, a rich undergrowth of shrubs and herbs flourishes, featuring resilient plants such as Bara Shialmuti (*Chromolaena odorata*) and Thankuni (*Centella asiatica*) which the local indigenous communities heavily rely on for traditional ethnomedicinal remedies. Along the high-altitude ridges and wet rocky slopes near natural springs, wild orchids, clubmosses, and wild banana (*Musa*) species serve as crucial hydrological indicator plants, completing a unique vertical ecosystem that is highly vital to Bangladesh's overall environmental health.
84. Bank-side grasses and low vegetation are also present along the khal reaches, together with dense stands of kochu (*Colocasia esculenta*) growing directly at the water's edge in several sections, and weedy flowering shrubs such as dholkolmi (*Ipomoea carnea*) along adjoining field bunds and embankments. These are environmentally relevant because they help bind the soil surface and provide minor habitat for common insects, frogs, and small birds. Common associated plant groups observed include grasses, reeds, sedges, kalmi, helencha, kochu, dholkolmi, water hyacinth, and duckweed. In several reaches, particularly near residential and built-up frontages, water hyacinth forms a dense floating mat across the full width of the khal, further reducing flow and worsening stagnation.



Figure 4-3: Status of terrestrial vegetation along the Khal

4.8.2 Terrestrial Fauna

85. The immediate subproject area supports common settlement-associated fauna rather than specialized forest wildlife. Based on field observation and the character of the urban khal corridor, the fauna likely to be found in and around the subproject area include common birds such as crow, myna, sparrow, dove, kingfisher, heron and small perching birds (e.g., drongo), along with lizards, frogs, toads, snakes, and small mammals typically associated with homesteads, roadsides, open land and drainage channels. Field observations also confirmed common butterflies and other insects in bankside grass and herb cover, and domestic livestock cattle and goats are grazing in open fields directly adjoining the khal, reflecting the mixed homestead-agricultural character of the surrounding land use. No evidence of rare, endangered, or legally protected species was recorded within the immediate khal corridor during the field visit for the IEE.



Figure 4-4: Status of terrestrial fauna along the proposed Khal

4.8.3 Aquatic Flora

86. The Mora Khal and its adjoining sections support some aquatic and semi-aquatic vegetation, particularly in those reaches where water remains stagnant or slow-moving and sediment has accumulated over time. During the field visit, several sections of the khal were observed with dense aquatic weed cover and marginal vegetation, especially near shallow edges, culvert/bridge reaches, and residential frontages. In multiple locations, water hyacinth (*Eichhornia crassipes*) forms a continuous mat across the full width of the khal, at times with exposed sediment visible beneath thinning patches, indicating the extent of siltation beneath the vegetation cover. Other reaches show a finer mat of small floating/emergent weed (consistent with duckweed), while kochu (*Colocasia esculenta*) and mixed grasses dominate the immediate banks. These vegetation types have developed under conditions of reduced flow, siltation, and limited maintenance.
87. In the context of the proposed subproject, such aquatic vegetation is environmentally relevant because it contributes to flow obstruction, localized water stagnation, sediment trapping, and reduced drainage efficiency. At the same time, these vegetated sections provide limited habitat for small aquatic organisms and support incidental use by domestic livestock and waterfowl (ducks, goats) observed grazing and foraging along the banks during the field visit. However, the aquatic vegetation present in the subproject khal is not considered to be of high conservation significance.



Figure 4-5: Status of aquatic vegetation in Khal

4.8.4 Aquatic Fauna and Fisheries

88. The present condition of the Khal indicates a highly modified aquatic environment characterized by slow-moving or stagnant water, siltation, aquatic weed growth, localized solid-waste disposal, and shallow water conditions in some reaches. During the field visit, small fish were observed in the khal, indicating that the existing water body continues to provide some aquatic habitat despite its degraded condition. However, the observed water quality, limited flow, siltation, and accumulation of waste may constrain the abundance and diversity of aquatic fauna and limit the suitability of the khal as a productive fish habitat.
89. The khal may provide temporary or localized habitat for small indigenous fish and other common aquatic organisms, particularly during the monsoon when water depth and hydraulic connectivity increase. Fish may also move into the khal from connected water bodies during periods of higher water levels. However, based on the field observation and the existing

physical condition of the khal, it is considered to have limited aquatic habitat and fisheries value in its present condition. No organized or significant fishing activity was observed within the proposed khal alignment during the field visit. The presence of fish observed during the site visit is shown in Figure 4.6, providing evidence of aquatic fauna within the existing khal and indicating that the water body retains some capacity to support aquatic life.

Figure 4.6: Observation of some small fish in the Khal during the field visit

4.8.5 Socioeconomic Characteristics

90. Maximum people in Bandarban Pourashava are not conscious about their transportation problem but narrow road inadequate numbers of roads etc. are the major transport problem for this Pourashava which are hampering the socio-economic situation of that Pourashava. As there is few pipes water supply provision of Bandarban Pourashava authority, the households themselves establish electric motor instead of hand tube well & khals for piped water supply to meet individuals' water demand. People of Bandarban Pourashava are gradually being motivated themselves by increasing their willingness in participation of development activities through contributing land, labor, money, advice and others matter. It's a positive sign for Pourashava for developing socioeconomic situation. The population of the project area was 41434 in 2011 within an area of about 3760.62 acre. With an annual growth rate of 3.01%, the forecasted population of Bandarban Pourashava is 49513 in the year 2017 and it will be 89657 in the year 2037. The gross density of the project area will be 24 PPA (person per acre) in 2037. Due to the maximum concentration of residence in Ward No. 04, the density of population will also be higher (189 PPA) in this award in 2037. Whereas ward 09 (8 PPA in 2037) and ward 03 (15 PPA in 2037) will have the lowest concentration of residences.¹

91. The existing man-made drains are katcha and pucca. aggregate 154.95 km road network and roads to be repaired is 10.230km and drain to be repaired is 5.079 Km. Observably, most of these roads have uneven-rough surface, damaged topping and pavement sides owing to lack of maintenance, mostly narrow in width, hence incapable of accommodating generated traffic. While visiting different roads, the team observed that the surfaces are worn out partly and, in some cases, entirely. Justifiably, they call for intervention varying from normal significant maintenance to large Rehabilitation/reconstruction. Rests of the households are using hand tube wells as main source of water supply for drinking and cooking purpose. **(Source: Bandarban Master Plan data).**

92. Bandarban Pourashava has an average literacy rate of 72.21% (7+ years), male 30.9% and female 32.5% and the national average of 30.4% literate. (BBS, 2011). Educational institutions:

¹ BBS – Population and Housing Census 2022

there are total 23 primary schools in Bandarban Pourashava which teach children from baby to std. five. Bandarban Pourashava currently has 3 government high schools and 2 private high schools along with 3 primaries cum high schools who are committed to provide high school education to their students. Presently, the Pourashava has 2 madrasas where students teach from elementary to Fazil level (equivalent to Degree). Besides, more small scale nurani madrasas and moktobs are available within the Pourashava the Pourashava currently has total four colleges. These are Bandarban Govt. College (Ward No. 06), Bandarban Women College (Ward No. 01), Bandarban Cantonment Public School & College (Ward No. 02) and newly established Bir Bahadur School & College (Ward No. 6).

93. **Transportation:** Generally, transport system depends on various things such as driving personnel (driver, helper, pedestrian and passenger) and authority personal (traffic system, signal surface of road and management) of any urban areas. A main transport media is auto rickshaw, bus, private car and mixed vehicular in municipal area and level of transport management is good and moderate. Bad road (i.e. narrow, broken road, big hole in the mid-point of road), bad transport (old and bad condition in the vehicles) and rent problems (rough behave and over rent) are the main hindrance of transportation system.
94. **Waste Management:** Waste management is one of the important urban environmental issues in Bandarban Pourashava. Waste collection in the Pourashava generally operates on a door-to-door basis; however, in areas where waste collection vans are unable to access due to narrow lanes or poor road conditions, waste bins have been placed instead to collect household waste locally. Some waste bins provided under IUGIP were also observed at selected locations within the Pourashava, helping to some extent in collecting waste from nearby areas; however, the number and coverage of bins are not sufficient to manage the overall municipal waste generation and in many places waste is still disposed of informally in open spaces, roadside areas, drains, and low-lying places due to inadequate collection coverage, lack of awareness, and gaps in the disposal system. The Pourashava has designated a 3.15-acre site for municipal solid waste disposal; however, the site does not function as a fully engineered sanitary landfill and lacks adequate environmental protection measures such as leachate collection, surface runoff control, fencing, or proper access management.
95. **Agriculture, Fishery & Tourism:** Agricultural farming practices within most of the study area have adjusted to the agro climatic conditions prevailing in the Kharif (March-October) and the Rabi (November-February). Main Crops: The major agricultural crops of Bandarban district are rice, wheat, jute, oilseed, vegetable, spice, sugarcane, tobacco, etc. Among rice crops aman occupies the largest area followed by aus and boro. The fruit crops are banana, coconut, pine apples & Mangos. The crop which is very commonly grown and is very special of this district is Amrapali Mango. The common fruits found in this district are coconut, Bananas, Pine Apple, mango and Litchi.

4.9 Historical, Cultural and Archaeological Characteristics

There is total 115 religious centers. Of them, there are 43 mosques, 17 temple, 25 Buddhist Bihar & kyang, 10 church, and 20 other religious centers. Other religious centers refer to crematorium, majar, asroms, etc. The popular place are Golden Temple, Bandarban Fatema Rani Church, Bandarban Arun Sarki Town Hall, Central Durga Temple, Bandarban Central Eidgah, Baitur Rahman Jam'e Mosque, Bandarban.

5 ASSESSMENT OF POTENTIAL ENVIRONMENTAL AND MITIGATION MEASURES

96. 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 MDSC study and potential impacts.

97. The corridor of impact considered includes the existing alignment, bed width, side slopes, banks and adjoining influence area of the Khal for re-excavation, rehabilitation and enhance drainage efficiency. No additional land is required beyond the existing khal corridor and associated Pourashava-owned land. Categorization of the subproject and formulation of mitigation measures have been guided by the REA checklist for Khal Excavation/ re-excavation and ADB SPS, 2009.

5.1 Impact Assessment Methodology: Planning and Design Phase

98. Planning principles and detailed design considerations have been reviewed and incorporated into the site planning process. The proposed works are located along the existing khal alignment and on land under Pourashava control. Access to the subproject area is available through existing roads, khal-side paths, culvert crossings, and local community access points. Since the proposed intervention mainly involves rehabilitation and improvement of an existing khal, planning and design have focused on minimizing environmental impacts while restoring hydraulic capacity, improving bank stability, reducing waterlogging, and enhancing overall drainage performance.

5.1.1 Sub-project Selection Criteria

99. The environmental assessment and review framework specifies environmental criteria to avoid or minimize adverse impacts during the identification and finalization of subprojects. For the present scheme, design and site-selection considerations include: (i) use of the existing khal corridor to avoid land acquisition; (ii) minimization of disturbance to vegetation and existing access routes; (iii) provision of bank protection and slope stabilization; (iv) incorporation of spoil management measures. In addition, climate change adaptation and resilience considerations have been incorporated into the design, particularly in relation to increased rainfall, runoff, drainage congestion, bank erosion, and long-term functionality of the khal system. The climate resilience measures adopted in the design are summarized in **Table 5-1**.

Table 5-1: Actions to Mitigate Climate Change Impacts and Improve Climate Resilience

Sl. No.	Climate Change Effect	Mitigation Measures
A.	Climate change effect	
1.	Increased rainfall quantity and runoff Increased frequency of storms	- Improve operation and maintenance arrangements; - Work with relevant stakeholders to manage runoff and flood discharge effectively; - Improve solid waste collection and disposal; - Control encroachments; - Improve public awareness to reduce dumping and blockage of the khal; - Provide CC block pitching/retaining protection/grass turving to protect khal banks from erosion.
B.	Impact Factor	
1.	Construction materials' quality	- Choose most durable materials possible, even if higher cost, e.g., concrete, bricks. - Monitor and control construction quality

2.	Rising temperatures	▪ Execute works during most favorable times of year and day. ▪ Monitor and control preparing, placing, and curing concrete and mortar, to ensure placement, etc., during most favorable times. ▪ Use plain high-quality un-rendered brick work and high-quality cement mortar in preference to rendered low-grade bricks ▪ Use sulphate resisting cement in vulnerable locations (higher heat gain during curing) or cement containing fly ash (less heat gain, so preferred).
3.	Run-off	▪ Use appropriate trapezoidal channel section; ▪ Maintain adequate conveyance capacity; ▪ Provide slope protection; ▪ Considering the effect of climate change the sustainability of sub-project have been increased by 10%. Sizes of where required, have been made large enough to facilitate normal plus additional flow of household, storm increased rainfall due to climate change.

5.1.2 Land Acquisition and Resettlement

100. The proposed sub-project will be implemented on Pourashava-owned land and along the existing drainage khal alignment. There are no encroachers or residential/ commercial structures in the proposed area as per the study of social and resettlement team. In addition, there is no squatters will be disturbed due to the proposed sub-project as per the social and resettlement assessment. Hence, no negative impacts are envisaged due to the sub- project.

101. The key principles considered in the design of the drainage subproject are: (i) prioritizing rehabilitation and re-excavation of the existing khal over new construction; (ii) using the existing khal corridor to avoid land acquisition; (iii) avoiding disturbance to nearby houses, access points, and community facilities as far as practicable; (iv) avoiding unnecessary tree cutting; (v) providing bank protection through turfing and CC block pitching; and (vi) reflecting community concerns and consultation findings in design and implementation planning.

5.1.3 Landscape and Existing Utilities

102. Since the proposed subproject is located within the existing drainage network, temporary disturbance to utilities, access routes, culvert crossings, and nearby structures may occur during construction. Therefore, pre-construction verification of utilities and preparation of a utility restoration and access management plan are required. The plan shall be prepared in coordination with the PIU, contractor, and field-level construction supervision personnel and approved by the PIU/MDSC before commencement of works.

5.1.4 EMP Implementation Training

103. Conducting special briefing and/or on-site training for the contractors and workers on the environmental requirement of the project to understand the requirement of the project and implementation of mitigation measures. Often lack of proper training to implement the EMP stipulated in the 'Bid Document' leads to mismanaged environmental safeguards. Therefore, a full pledged EMP before construction goes on-board with all involved parties: contractor, workers and representatives from PMU and PIU and MDSC to implement the EMP and therefore is necessary.

104. Furthermore, environmental, health and Safety (EHS) talk every day for 5-10 minutes needs to be arranged before construction starts every day at ground. Construction Phase

105. In the case of this subproject, (i) most individual elements are relatively small and involve straightforward civil works; (ii) most predicted impacts are associated with excavation, earth movement, spoil handling, weed removal, stockpiling, and transport of materials; and (iii) impacts will be mainly short-term, localized, and site-specific.

106. Although construction of these components involves relatively simple civil works, the invasive nature of khal excavation in built-up area, agricultural land, access routes, will result in temporary impacts on the environment and sensitive receptors. These anticipated impacts are not expected to be significant or irreversible, provided that the prescribed mitigation measures are implemented effectively.

107. Although construction of these project components involves quite simple techniques of civil work, the invasive nature of excavation and the sub-project sites in built-up areas of Bandarban Pourashava 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, Bandarban Pourashava Road improvement sub-project is unlikely to cause significant adverse impacts.

108. There is sufficient space in selected locations for temporary staging, equipment placement, and controlled stockpiling of materials, but the contractor shall minimize the duration of stockpiling and ensure that excavated spoil, removed aquatic weeds, and construction waste are handled in accordance with the approved EMP and Spoil Management Plan.

5.1.5 Worker Camps

109. If necessary; To accommodate the needs of the workforce, the contractor should provide suitable housing, adequate supplies of potable water, and toilet and bathing facilities within the housing area. Onsite facilities for preparing food need to be provided, or food service contracted. The contractor should provide means for disposing of wastewater from toilets, baths and food preparation areas either through a septic tank or through sock well or holding tank with removal by vacuum truck. Solid waste should be collected at waste bins and disposed of properly offsite. The labor camp should be located at a distance from any nearby community and workers transported daily to the construction sites. The labor camp should be set up at a selected and approved location for the duration of the contract, and located such that it does not interfere with or cause a nuisance for the local community. Complete closure of the camp is required at the end of the work, including removal of any underground tanks and above-ground structures.

5.1.6 Site and Route Maintenance

110. The contractor should plan haul routes to avoid congested areas and narrow roads, and schedule transportation to avoid peak traffic periods. Speed limits and other traffic rules need to be strictly enforced among drivers. Traffic detours need to be identified and marked in the event they are necessary to maintain traffic flow through the construction zone. Flagmen need to be posted at the start and finish of construction areas as necessary to direct the movement of traffic. Movable sanitary facilities should be provided at the site and kept clean, free of odors and usable. No materials should be stored onsite for longer than a day before their use. Excess materials should be removed after a segment is complete. The contractor should avoid trenching where damage might occur to buildings, and provide shoring and backfill with sand/cement admixture to prevent caving. The contractor should avoid stockpiling earth and construction materials in areas subject to flooding and flowing water. Loss of fuel oil, engine oil and other types of pollutants to the soil or to drainage courses will not be tolerated.

5.1.7 Topography, Geology and Soils

111. Significant amount of soil, sand, cement, brick chips will be required for this sub-project. 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.

112. Utilize readily available sources of materials. If contractor procures materials from existing borrow pits and quarries, ensure these conform to all relevant regulatory requirements. Borrow areas and quarries (If these are being opened up exclusively for the sub-project) must comply with environmental requirements, as applicable. No activity will be allowed until formal agreement is signed between PIU, landowner and contractor.

5.1.8 Surface Water Quality

113. Re-excavation of the khal, temporary stockpiling of spoil, runoff from exposed earth, and accidental leakage of fuel or lubricants may lead to increased turbidity, sediment-laden runoff, and temporary deterioration of surface-water quality. Therefore, the expected impacts are minor negative and short term, site-specific within a relatively small area and reversible by mitigation measures.

- Prepare and implement a spoils management plan
- Prioritize re-use of excess spoils and materials in construction activities. If spoils will be disposed, consult with Bandarban Pourashava 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 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.
- Monitor water quality according to the environmental management plan.

5.1.9 Groundwater Quality

114. Increased demand of groundwater is anticipated during the construction phase for construction activities and domestic purposes. Uncontrolled extraction of water may also affect availability of waters to locals. In addition to that, construction waste, if left unattended will result in forming leachate which will percolate through the soil strata and will reach underground water table and hence, will end up contaminating it. Mitigation measures will include

- Pumping of groundwater should be from deep aquifers of more than 30m to supply arsenic free water. Safe and sustainable discharges are to be ascertained prior to selection of pumps.
- Tube wells will be installed with due regard for the surface environment, protection of groundwater from surface contaminants, and protection of aquifer cross contamination.
- All tube wells, test holes, monitoring wells that are no longer in use or needed shall be properly decommissioned.
- Protect groundwater supplies of adjacent lands.

5.1.10 Air Quality & Dust

115. Construction during the dry season, excavation, spoil handling, and movement of vehicles and machinery may generate dust and increase concentrations of vehicle-related pollutants (such as CO_x, SO_x, PMs, NO_x, and HCs) which will affect people who live and work near the sites. The contractor shall damp down exposed soil, cover transported spoil and loose materials, maintain haul routes, minimize idling of vehicles, and monitor air quality as per the EMP. These impacts are expected to remain short-term, localized, and manageable with proper mitigation.

- Water will be sprayed to control the dust, which is the main way to suppress dust in the working site.
- Debris materials should be transported through truck covered by tarpaulin.
- Apply water to disturbed soils after demolition is completed or at the end of each day of clean up

- Prohibit demolition activities when wind speeds exceed 30 kph.
- Limit on-site vehicle speeds (on unpaved roads) to 20 kph.
- Monitor air quality.

5.1.11 Navigation / Local Movement

116. At present, the khal is not used for formal navigation because of its shallow depth, stagnant flow, weed infestation, and poor hydraulic condition. However, the khal corridor still has importance for local access and crossing, particularly where nearby residents use informal crossing points or move along the khal edge to reach houses, agricultural plots, roads, or community spaces. During construction, excavation works, spoil stockpiling, and movement of machinery may temporarily obstruct such local movement and access. The contractor shall maintain temporary crossing arrangements, ensure safe passage at important community access points, avoid blocking all access at one time, and provide advance notice and signboards in areas where movement may be temporarily restricted. After completion of the works, restoration of the khal section and improved bank condition are expected to improve the physical condition of the corridor and reduce existing inconvenience caused by unstable edges and blocked sections.

5.1.12 Irrigation and Local Water Management

117. Although the khal is not presently functioning as a formal irrigation canal, it has relevance for local water movement and drainage of adjacent land, especially because the alignment passes near or through agricultural areas. During construction, improper spoil disposal, temporary obstruction of flow, or careless excavation may adversely affect nearby low-lying land and local drainage patterns. To mitigate such impacts, excavation shall be carried out in segments, complete blockage of flow shall be avoided, spoil shall not be dumped where it obstructs water movement or irrigation paths, and temporary drainage continuity shall be maintained as far as practicable. In the long term, the re-excavated khal is expected to improve local drainage performance and support better seasonal water management in adjacent areas.

5.1.13 Agriculture

118. The existing degraded condition of the khal contributes to poor drainage and seasonal waterlogging, which may affect adjacent agricultural land. During construction, nearby agricultural land may face temporary inconvenience if excavated spoil is stockpiled carelessly, if access to plots is obstructed, or if runoff and sediment are not properly controlled. These impacts can be minimized through proper spoil management, controlled excavation, and maintenance of access. In the long term, re-excavation of the khal is expected to generate positive impacts for nearby agricultural land by improving stormwater drainage, reducing prolonged inundation, and lowering the risk of crop damage caused by blocked drainage and stagnant water.

5.1.14 Fisheries and Aquatic Habitat

119. The present condition of the Khal indicates a disturbed and low-value aquatic environment. Nevertheless, some sections may still provide limited seasonal habitat for small aquatic organisms during the monsoon or when hydraulic connectivity is present. During construction, re-excavation, weed removal, spoil handling, and disturbance of the khal bed may temporarily affect this habitat through increased turbidity, sediment disturbance, and short-term flow interruption. These impacts shall be mitigated by carrying out works in segments, avoiding complete blockage of water flow at one time, minimizing excessive turbidity, preventing spoil runoff into water-retaining sections, and properly disposing of removed aquatic weeds and sediments. In the longer term, improved hydraulic flow, reduced stagnation, and removal of excessive weed and sediment are expected to improve the environmental condition of the khal compared to the present degraded state.

5.1.15 Acoustic Environment

120. Construction activities will be far from settlements, far from 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 sub-project situated out of core area 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 Bandarban 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 85 decibels (dBA) when measured at a distance of 10m 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.

5.1.16 Aesthetics

121. Construction activities under the proposed khal will generate excavated spoil, removed aquatic weeds, sediment, packaging materials, empty containers, and other miscellaneous construction waste. If these materials are not properly managed, they may create visual nuisance, unpleasant odour, obstruction of local access, and deterioration of the general environmental condition of the khal corridor and adjacent residential areas. Uncontrolled stockpiling of spoil and removed weeds may also result in re-entry of waste materials into the khal during rainfall, thereby undermining the purpose of the subproject and causing additional nuisance to the surrounding community.
122. These impacts are expected to be short-term, localized, reversible and proper waste management measures are implemented throughout the construction period. The contractor shall therefore keep the worksite and adjoining areas clean and orderly at all times, remove spoil and waste regularly, avoid unnecessary stockpiling near houses and access points, and ensure that all transported materials are covered to prevent spillage. Temporary storage of removed weeds, sediment, and other wastes shall be allowed only at designated locations, and final disposal or beneficial reuse shall be undertaken in consultation with the Pourashava.

5.1.17 Biodiversity

123. The proposed subproject is located within a built-up and agriculture corridor of Bandarban Pourashava. There are no protected areas in or around sub-project sites, and no known areas of ecological interest. However, the Khal still supports limited aquatic and semi-aquatic biodiversity, including aquatic weeds, marginal vegetation, and seasonal habitat for small aquatic organisms. The present condition of the khal is already degraded by siltation, stagnant or slow-moving water, aquatic weed growth, waste dumping, and partial blockage. Even so, the khal remains environmentally relevant because some sections may still provide seasonal habitat for small fish, frogs, tadpoles, aquatic insects, snails, and other common aquatic organisms.
124. During construction, khal re-excavation works may temporarily affect aquatic biodiversity

through excavation of the khal bed, increased turbidity, disturbance of bottom sediments, removal of aquatic weeds and marginal vegetation, spoil handling, temporary obstruction of flow, and localized deterioration of water quality. If the works are not properly managed, complete blockage or dewatering of the khal at one time may cause unnecessary disturbance to the remaining aquatic habitat and may interrupt movement of aquatic organisms within water-retaining sections. These impacts are expected to be temporary, site-specific, and manageable, but they require careful mitigation because the work is being carried out directly within the khal channel.

125. To minimize/ mitigate the impacts, the works shall be carried out in segments, and the contractor shall ensure that the entire khal is not dewatered at once. Water flow continuity shall be maintained as far as practicable during excavation and construction sequencing shall be planned so that one section remains hydraulically connected while another is being worked on. Spoil, removed weeds and sediment shall not be dumped back into active water sections or in locations where they may wash back into the khal and affect aquatic habitat. Excessive turbidity shall be minimized through controlled excavation and spoil handling, and unnecessary removal of khal-side vegetation outside the approved working area shall be avoided. Workers shall be prohibited from catching fish, disturbing aquatic fauna, or disposing of wastes into the khal.

5.1.18 Traffic Congestion

126. Hauling of construction materials and operation of equipment on-site can cause traffic problems. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.

- Follow the traffic management plan given in Appendix 5 of this report.
- 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.
- 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 client age.
- Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.

5.1.19 Socio-economic Status

127. Work force will be required during the 12-month construction stage. This can result to 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.

5.1.20 Community Health and Safety

128. Construction in the khal corridor may pose risks to the public because of open excavation, unstable spoil heaps, movement of heavy machinery, dust generation, stagnant water, slippery surfaces, and temporary restriction of access. These risks are

especially relevant where the khal passes near residential areas, pedestrian routes, schools, mosques, culvert crossings, and other commonly used community spaces. If not properly managed, such hazards may lead to accidental falls, injury, unsafe crossing conditions, or nuisance to nearby residents.

129. The anticipated impacts on community health and safety are expected to be temporary and manageable, provided that appropriate preventive measures are implemented. The contractor shall clearly demarcate and barricade work zones, install visible warning signs in Bangla at important locations, maintain safe passage for pedestrians and local users, and avoid leaving open excavated sections unattended without protection. Machinery movement shall be controlled, especially near populated and sensitive locations, and dust shall be suppressed through water spraying where necessary.

130. Construction works will impede the access of residents and business in limited cases. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.

- Contractor's activities and movement of staff will be restricted to designated construction areas.
- Consult with Bandarban 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 specialist and landowner.
- 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 facilities); (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 environmental management specialist's attention immediately; and (iv) taking remedial action as per environment specialist's instruction.
- The contractor shall immediately take the necessary remedial action on any compliant/grievance received by him and forward the details of the grievance along with the action taken to the environment specialist within 48 hours of receipt of such compliant/grievance.

5.1.21 Occupational Health and Safety

131. The Contractor should have a basic safety and health plan in place for workers, in which workers are required to wear personal protective gear suitable to the type of work being performed and a worker is suitably trained (or experienced) in the work he/she is assigned to do. Emergency care should be available on call. The Contractor should maintain a record of accidents, which should be reviewed on occasion with the supervising engineer. The contractor should maintain a high standard of safety in the performance of work. Workers need to be informed of potential risks associated with activities conducted in the vicinity of moving equipment, and workers should not be allowed to enter deep trenches

unless they are properly shored.

132. 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 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 & rules 2015 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.
- Procedure and implement a site 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 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 moving equipment is outfitted with audible back-up alarms;
- Mark and provide signboards 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 duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.

5.2 Operation & Maintenance Phase

133.. During the operation and maintenance phase, the improved khal system will function under routine maintenance by Bandarban Pourashava. Environmental impacts during this phase are expected to be much lower than during construction because maintenance works will be small in scale and infrequent. However, continued effectiveness of the subproject will depend on regular desiltation, weed removal, maintenance of bank protection, and prevention of waste dumping and illegal discharges. If routine maintenance is not carried out regularly, the khal may again become clogged by sediment, aquatic weeds, and solid waste, resulting in deterioration of surface-water quality and drainage performance. Therefore, the Pourashava shall ensure regular cleaning of the khal, control of illegal discharges, and periodic monitoring of key water-quality parameters at representative locations, including the outfall, where required.

5.2.1 Surface/Waste Water Quality

134. During the operation phase, surface-water quality in the khal and at the outfall location may be affected if sediment, removed weeds, solid waste, organic matter, or polluted runoff are not properly managed. Poor maintenance may lead to accumulation of waste

and silt within the khal and at the mouths of secondary and tertiary drains discharging into the khal, which can contribute to deterioration of water quality, obstruction of flow, and reduced hydraulic performance, particularly during the dry season when flow is low and self-cleansing capacity is limited. Relevant water-quality parameters for monitoring may include pH, DO, BOD, COD, TDS, and other appropriate indicators, depending on site condition and monitoring requirements. To avoid these impacts, Pourashava authority shall ensure regular cleaning and desiltation of the khal, control of illegal discharges, prevention of dumping into the channel, and periodic testing of water quality at representative locations, including the outfall, where necessary. In addition, silt traps, screens, or similar control measures may be installed at the mouths of secondary or tertiary drains connected to the khal, where required, to reduce entry of sediment, floating waste and debris. The Pourashava authority shall also take appropriate measures to control dry-weather pollution, including removal of stagnant waste materials, prevention of wastewater entry, and regular inspection of connected drains. If monitoring shows deterioration beyond acceptable limits, appropriate corrective measures shall be taken.

5.2.2 Air and Noise Quality

135. Air and noise impacts during the operation and maintenance phase are expected to be minimal and localized, limited mainly to occasional maintenance activities such as weed removal, desiltation, repair of slope protection, and transport of maintenance materials. These activities may temporarily create minor dust, noise, and movement-related disturbance near the khal corridor, but such impacts are not expected to be significant if properly managed.

5.2.3 Biodiversity

136. There are no protected areas, critical habitats, or known ecologically sensitive sites within or near the sub-project area. However, the improved khal may support limited aquatic and bank-side biodiversity, including aquatic vegetation, frogs, snails, aquatic insects, small indigenous fish, grasses, and common birds.

137. Therefore, routine maintenance activities should be carried out carefully to avoid unnecessary disturbance to the khal environment. Removed weeds, silt, and waste shall not be dumped back into the khal or along its banks. No trees, shrubs, grasses, or groundcover shall be removed beyond the approved maintenance requirement without prior permission from the Pourashava authority. Any plantation, grass turfing or bank protection works established under the sub-project shall be maintained through the Pourashava's operation and maintenance budget. The Pourashava shall also discourage fishing with harmful methods, dumping of waste, discharge of wastewater and other activities that may degrade the ecological condition of the khal. Periodic inspection shall be carried out to ensure that the improved khal remains functional and that its limited aquatic and bank-side ecological values are not further degraded.

5.2.4 Solid Waste

138. Solid waste is one of the major causes of blockage and reduced functionality of the existing drainage system. During the operation and maintenance phase, improper disposal of household waste, market waste, plastics, organic waste, construction debris, and floating materials into the khal may again obstruct water flow, reduce drainage capacity, create odour nuisance, deteriorate water quality, increase mosquito breeding, and contribute to seasonal waterlogging. Therefore, proper solid waste management is essential to ensure the long-term sustainability of the khal improvement works.

139. The Pourashava authority shall ensure regular cleaning of the khal, removal of floating waste, periodic desiltation and timely disposal of waste materials from the khal banks and adjoining areas. Waste removed from the khal shall be collected, transported, and disposed of only at designated disposal locations. Waste, silt, aquatic weeds or other materials shall not be left along the khal edge for long periods, as these may wash back into the channel during rainfall. Screens, silt traps, or waste-catching arrangements may be provided at critical drain outfalls or entry points where floating waste frequently enters

the khal. Awareness activities shall be conducted for nearby residents, shop owners, and local communities to discourage dumping of waste into the khal and connected drains. Responsible Pourashava staff shall regularly inspect the khal condition and take corrective action if blockage, illegal dumping, or poor maintenance is observed.

Table 5-2: Scheme specific impacts & mitigations

Name of schemes	Length (m)	Existing Conditions & Impacts	Mitigations
Re-Excavation & Beautification of the Existing Khal for Improvement of Drainage System Part-01 From Army Para to Shangu River (Ch. 0.00-1000.00m) & Part-02 From Chandabaz Para to Soshan Ghat area Part-01 Existing Khal (Ch. 0.00-2000.00m) at Wards Nos. 07, 08 & 09 under Bandarban Pourashava, Bandarban District. (Total Length=3000.0m).	3000	- The khal is in poor condition and flows through a densely built-up, hilly area with steep, densely vegetated slopes. The channel is narrow, and flow is low and shallow in places. - Dark, stagnant water in some sections indicates pollution from household wastewater. The bed is heavily silted, with sludge, soil and gravel deposits and exposed silt where the water is shallow. - Large amounts of plastic and household solid waste are dumped on the banks and bed. - Residential and commercial structures encroach on the khal. Tin-shed houses and shops stand directly at the bank edge. - Household and drain outlets discharge directly into the khal. - Concrete retaining walls protect some bank sections, mainly on the road or built-up side. The opposite earthen banks are unprotected, steep and eroding, with fallen logs and dead trunks in the channel in places. - Informal bamboo and timber footbridges cross the khal. - Trees on the banks include mango, guava, papaya, palm, bamboo etc. - No fisheries activity was observed, owing to poor water quality and low, stagnant flow.	- General mitigation and monitoring actions will be followed - Conduct awareness campaigns for local residents prior to commencement of excavation works, covering construction activities and safety precautions. - Provide safe temporary crossings, or maintain existing footbridges, so access to homes and shops is not cut off. - Remove floating waste and surface debris manually before excavation. Collect and dispose of solid waste at designated sites, not on the banks. - Schedule excavation in the dry season and manage low flow and dewatering so that sediment-laden water is not discharged into the downstream khal. - Avoid stockpiling excavated soil within 1–2 m of the khal edge or on unprotected slopes. Transport spoil promptly to designated disposal sites. - Stabilize steep earthen slopes and keep excavation clear of the toe of hillside slopes. Place the brick toe wall and RCC retaining wall promptly after excavation to prevent slope failure where possible. - Protect existing trees where possible. Carry out compensatory plantation in line with the EMP. - Install warning signboards at both ends and along the alignment. Provide barricades and safety fencing near residences, roads and crossings.

			- Control dust and noise, restrict work to daytime, and provide PPE and safety measures for workers. - Operation & maintenance phase: - Ensure regular desiltation and cleaning of the khal by the Pourashava authority, with periodic water-quality monitoring at representative locations, including the outfall. - Install silt traps, screens, or similar arrangements at the mouths of drains and culverts discharging into the khal to reduce entry of sediment and floating waste. - Prohibit dumping of removed weeds, silt, and waste back into the khal or along its banks; conduct ongoing awareness activities for residents and shop owners to discourage dumping. - Maintain the retaining walls, toe wall, footpath, and plantation through the Pourashava's O&M budget. Inspect periodically to prevent blockage and bank erosion.
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5.2.5 Cumulative Impact Assessment

140. The cumulative impact assessment examined the interaction between the sub-project'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 sub-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 three 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 sub-project; and

141. Location and siting of the proposed infrastructures were considered to reduce impacts. Detailed designs integrate a number of measures, both structural and non-structural, to mainstream climate resilience into the Bandarban drainage sub-project, including (i) designed to the current best practice standard codes; (ii) built that the floods do not damage them; and (iii) side drains are to be kept free from wastes and siltation.

5.2.6 Socioeconomic and Socio-community

142. Concerns on existing provisions for pedestrians and other forms of transport will occur spatially during construction and O & M activities. Since the sub-project 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 Bandarban Pourashava. This can be considered a long-term cumulative benefit of the sub-project.

143. Upon completion of the sub-project, the socio-community will be the major beneficiaries. With the improved traffic management, they will be provided with reliable and climate-resilient road. In addition to improved environmental conditions, the sub-project will reduce occurrence of air borne-related diseases and exposure to climate extremes. People would spend less on healthcare and lose fewer working days due to illness, so their economic status should also improve, as well as their overall health. Beyond reducing the water-borne and water-washed diseases, providing better access to improved municipal services confers many other diverse benefits ranging from the easily identifiable and quantifiable (costs avoided, time saved) to the more intangible and difficult to measure (convenience, well-being). One set of the benefits related to health impacts that are relatively easy to quantify, are the cost-offsets (costs avoided due to less illness). Cost savings in health care are mainly due to the reduced number of treatments of air borne diseases cases. In addition, patients will avoid costs incurred by seeking treatment, including expenditures on care, drugs and transport and the opportunity costs of time spent on seeking care. Another set of benefits related to less illness are the avoided days lost, with respect to formal or informal employment, other productive activities in the household or school attendance. These are considered a long-term cumulative benefit.

6 ANALYSIS OF ALTERNATIVES

144. The primary objective of the analysis of alternatives is to identify the most suitable option for the proposed subproject that would minimize adverse environmental and social impacts while maximizing positive environmental, drainage, and community benefits. The analysis has considered the “with project” and “without project” scenarios, as well as relevant technical, environmental, social, and implementation alternatives for the re-excavation and beautification of the existing Khal under Bandarban Pourashava.
145. The proposed subproject involves the re-excavation of the existing Khal for improvement of the drainage system along 3000 m, construction of a 240.00 m Uni-Block paver footpath. The construction of Khal will be constructed under the IUGIP. The subproject has been planned along the existing khal alignment and within the available khal corridor as far as possible. Therefore, no major alternative alignment has been considered necessary, as shifting the alignment or constructing a new canal would require additional land, may create resettlement or land acquisition issues and could cause disturbance to new areas.
146. During subproject planning and design, alternatives were considered in relation to location, alignment, design section, excavation method, spoil management, implementation timing, and work sequencing. The selected option has been designed to restore the drainage capacity of the existing khal, reduce waterlogging, improve bank stability, manage excavated spoil properly, and avoid or minimize adverse impacts on nearby communities, agricultural land, local access, and aquatic habitat. Consultation with Bandarban Pourashava, local stakeholders, and the design team was also considered during finalization of the subproject.

6.1 With Project Alternative

148. Under the “with project” alternative, the existing Khal will be re-excavated, reshaped, and improved to restore its drainage function and enhance stormwater conveyance capacity. The proposed works will include khal re-excavation, slope protection through CC block pitching, RCC retaining wall, Toe brick wall, construction of footpath and improvement/rehabilitation of associated culvert and drainage structures where required.
149. The implementation of the subproject will contribute to improved drainage performance, reduction of seasonal waterlogging, better environmental conditions, and improved public convenience in the surrounding wards of Bandarban Pourashava. The major benefits of the “with project” alternative are as follows:
- I. The re-excavated khal will restore and improve the natural drainage capacity of the existing Khal.
 - II. Seasonal waterlogging in nearby residential areas, local roads, low-lying land, and agricultural areas will be reduced.
 - III. Improved flow conditions will reduce stagnation of water, bad odour, mosquito breeding, and related public health risks.
 - IV. Proper reshaping and slope protection of the khal banks will reduce bank erosion and improve the stability of the khal corridor.
 - V. Beautification works, footpath provision, and improved bank conditions will enhance the local environment and improve community use of the khal-side area.
 - VI. Reuse of suitable excavated material within the subproject will reduce the need for off-site disposal and minimize spoil-related environmental impacts.
 - VII. The project will create short-term employment opportunities for local people during construction and maintenance works.
 - VIII. In the long term, improved drainage and reduced waterlogging will support better living conditions, protection of local infrastructure, and improved overall environmental quality near the sub-project associated area.

150. Although the “with project” alternative may cause temporary construction-stage impacts such as dust, noise, spoil generation, traffic and access disturbance, temporary increase in water turbidity, and disturbance to limited aquatic habitat, these impacts are expected to be site-specific, short-term, and reversible. These impacts can be effectively managed through proper implementation of the Environmental Management Plan, Spoil Management Plan, traffic and access management measures, segmented excavation and regular monitoring.

6.2 Without Project Alternative

151. Under the “without project” alternative, the existing Khal would remain in its present degraded condition. The khal is currently affected by siltation, narrowing, shallow flow, aquatic weed growth, irregular banks, solid waste dumping, and partial obstruction of natural drainage flow. Without the proposed improvement works, the drainage capacity of the khal would continue to decline and the surrounding areas would remain vulnerable to seasonal waterlogging and environmental degradation. The “without project” alternative is not considered viable for the following reasons:

- I. The existing drainage congestion and waterlogging problems would continue and may become more severe over time.
- II. The khal would remain narrow, shallow, and silted, reducing its capacity to convey stormwater during rainfall.
- III. Stagnant water, aquatic weed growth, and waste accumulation would continue to create odour nuisance, mosquito breeding, and public health concerns.
- IV. Adjacent residential areas, local roads, low-lying lands, and agricultural areas would remain exposed to flooding and drainage problems.
- V. The existing degraded environmental condition of the khal corridor would not improve.
- VI. Bank erosion and irregular khal edges may continue to create safety risks and reduce the stability of the khal corridor.
- VII. No beautification, footpath, or environmental improvement benefit would be achieved for the local community.

152. Although the “without project” option would avoid temporary construction-related impacts, it would fail to address the existing drainage, environmental, and public health problems. Therefore, this option is not preferred.

6.3 Alternative Alignment

153. The proposed subproject has been selected along the existing Khal alignment. Construction of a new canal or shifting the alignment was not considered preferable because it may require land acquisition, affect private land or structures, create additional social impacts, and disturb areas that are not currently affected by the existing khal. Use of the existing khal alignment is therefore the most suitable option, as it minimizes land-related impacts and restores the function of the natural drainage corridor.

6.4 Alternative Design and Excavation Section

147. Different design options related to khal width, depth, side slope, and protection measures were considered during the design stage. Excessive widening or deep excavation could increase spoil volume, create additional disposal requirements, disturb adjoining land, and increase bank stability risks. On the other hand, insufficient excavation would not solve the existing drainage problem. Therefore, the selected design adopts a practical trapezoidal section based on hydraulic requirement, existing site condition, bank stability, ease of maintenance, and environmental considerations.

148. Slope protection through CC block pitching, RCC retaining wall and toe brick wall has been proposed to reduce bank erosion and maintain the stability of the khal. This option is considered more suitable than leaving the banks untreated, as untreated banks may be vulnerable to erosion, collapse, and re-siltation of the khal.

6.5 Alternative Excavation Method

149. Manual, mechanical, and combined excavation methods were considered. Fully manual excavation would create less machinery-related noise and emissions but would be slow and less practical for the required volume of earthwork. Fully mechanical excavation would be faster but may create higher dust, noise, vibration, turbidity, and disturbance to nearby communities if not properly controlled. Therefore, controlled mechanical excavation, supported by manual works in sensitive, narrow or community-access locations, is considered the preferred option.

6.6 Alternative Spoil Management

150. The proposed works will generate a considerable volume of excavated material. Uncontrolled dumping of spoil along the khal bank, agricultural land, low-lying areas, or drainage paths is not acceptable, as it may obstruct flow, wash back into the khal, create nuisance, and affect nearby land users. The preferred option is to reuse suitable excavated material within the subproject for bank formation, filling, leveling and other approved works. Unsuitable or excess spoil shall be transported to Pourashava-approved disposal sites in accordance with the Spoil Management Plan.

6.7 Alternative Timing and Work Sequencing

151. Major excavation works during the monsoon season may increase the risk of spoil washout, turbidity, flooding, and interruption of drainage flow. Therefore, excavation and spoil handling works should preferably be carried out during the dry season, as far as practicable. If any works are required during the wet season, additional erosion control, temporary drainage, and spoil protection measures shall be implemented.

152. Re-excavating or blocking the entire khal at one time may affect local drainage, aquatic organisms, access, and community safety. Therefore, phased or segmented excavation is preferred. Works shall be carried out section by section so that complete blockage or dewatering of the khal is avoided as far as practicable. This approach will help maintain flow continuity, reduce impacts on aquatic habitat, and minimize disturbance to nearby communities.

6.8 Material Usage and Sustainability Considerations

153. Under the circumstances, the sub-project aims to restore and improve the natural drainage capacity of the existing khal system within the Pourashava area. The proposed intervention mainly involves re-excavation of the existing khal to restore its depth and width, removal of accumulated sediments and aquatic vegetation, improvement of the channel alignment, and beautification of the khal corridor through bank protection and landscaping measures. These activities are designed to improve stormwater conveyance from the surrounding urban catchment areas and facilitate efficient drainage and discharge.

154. The sub-project focuses primarily on rehabilitation and improvement of an existing natural drainage channel rather than constructing a completely new infrastructure facility. Therefore, the project will involve moderate use of construction materials such as earthwork for channel reshaping, CC block pitching, RCC retaining wall and other slope protection materials for stabilization of the khal banks. Wherever feasible, locally available materials will be utilized to minimize transportation requirements, reduce construction costs, and lower environmental impacts.

155. The project will also incorporate environmentally sustainable practices such as proper management of excavated spoil materials, stabilization of khal banks through turfing and

vegetation, and plantation of suitable trees along the khal corridor to control erosion and enhance the surrounding landscape. These measures will contribute to improved environmental conditions, reduced soil erosion, and increased ecological value of the drainage corridor.

156. Vulnerabilities of Pourashavas to climate risks include (i) low-lying topography subject to flooding and waterlogging; (ii) changes in the landscape due to construction and urban expansion, with reduced capacity to buffer impacts from floods and landslides; (iii) poor awareness of vulnerable populations; and (iv) weak institutional capacities and strategic planning of Pourashavas in managing climate risks. Overall, Pourashavas need to address climate risks better through improved planning, zoning, and sustaining climate-resilient and gender responsive infrastructure and services.

157. It is clear from the above that without project scenario is undesirable and the location of sub-project has been strategically selected with only short-term and reversible environmental impacts. To make the project outcome and outputs sustainable, necessary measures have been included in the project design.

7 INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

158. The development and construction of any project will impact on the surrounding human and physical environment and will have beneficial or adverse effects. It is therefore essential that the community can fully understand the project, have the opportunity to express their views and to become directly involved in the project's overall decision-making process.

159. Public authority developers must take account of the community's views and include any useful suggestions to improve the sub-project. This may include suggestions to help further develop environmental protection measures thereby reducing environmental pollution, reducing the loss of environmental resources and improve the project's environmental and social benefits, thus helping achieve more sustainable development.

160. In accordance with the requirements of the ADB as defined in the SPS 2009, the "borrower will carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation" The following activities have therefore been carried out in his project in accordance with the ADB requirements.

7.1 Purpose of Public Consultations

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

162. In the preparation phase of this subproject, public consultations in each site, Key Informant Interviews (KIIs), Focus Group Discussion (FGD) meetings need to be conducted in the subproject areas. This process will be followed in the implementation and operation phase of the subproject. During the implementation phase, consultation will be carried out focusing on several issues like maintenance of safety and security of the workers, the process to manage resources, proper communication, avoid the impact on environment and society, etc. Before the operation phase, consultation meetings highlighting the maintenance of the subproject without affecting the community and environment, ensure cultural diversity and gender safety, etc. will also be carried out.

163. Consultations may be conducted through focus group discussions, interviews, and town meetings. The key stakeholders to be consulted include:

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

7.2 Approach and methodology for consultation

164. The approach undertaken for information disclosure and consultation involves the following key processes:

- i) Identification of key stakeholders such as primary (direct project influence) and secondary (indirect project influence) stakeholders;

- ii) Undertaking expert consultations;
- iii) Undertaking structured field consultations, interviews and FGD with the respective stakeholders; and
- iv) Assessing the influence and impact of the project on these stakeholder groups.

7.3 Future consultations during final detailed design stage

168. The stakeholder consultations for the final detailed design stage is not required if no change has taken place in the final detailed design.

169. Stakeholder consultation and participation is an essential process during subproject preparation. The process of engaging stakeholders and affected people involves key informant interviews, on-site discussions and random field interviews of stakeholders. In order to address the issues raised by the participants, Project consultants shall provide them an overall understanding of the subproject and its implementation, impacts (positive and negative), and subsequent environmental management plan and monitoring. Site-specific environmental and social problems/issues shall be addressed through discussion sessions and interactions among the participants and Project consultants.

7.4 Preliminary consultation

170. During 11 May 2026, the MDSC Safeguard Team conducted two public consultations in Wards 06 and 08 of the proposed subproject area, after holding a meeting with the Pourashava Engineer at the Pourashava Office. A total of 45 participants attended the consultation meetings, consisting of 30 males and 15 females. During this field visit, the consultants inspected the existing condition of the khal required improvements, alignments, any resettlement needs, and grievance redress mechanism. During the site visit, the local representatives, Executive Engineer, Municipal Engineer and others Pourashava staffs accompanied the consultants to assist in identifying the proposed khal alignments. Participants included representatives from adjacent communities, businessmen, small entrepreneurs, job holders, day labor, and housewives. The minutes of consultations including attendance sheet form with their signature are attached to

Appendix 6.

171. A summary of the consultation meetings, focus group discussions points are given below:

- (i) Participants were briefed about the objectives of the FGD from the environmental and social safeguard perspective;
- (ii) The future benefits of excavation/beautification of existing khal and the potential disturbances (air quality, noise, temporary disruption of their business/activated, etc.) during subproject implementation were discussed and concerned people were asked whether they are willing to accept the disturbances or not;
- (iii) All participants gave their consent for every step to be done for their improvement;
- (iv) 'No Objection Certificate (NOC)' was signed by the concerned people; (NOC is attached in the same sub-project DDR report)
- (v) Participants urged the Project consultant and Pourashava Engineers to ensure quality of the work;
- (vi) All were blissfully agreed to accept the trouble for a time being for the sake of their betterment;
- (vii) Parallel to this most of the respondents requested to protect trees particularly aged trees both sides of the khal;
- (viii) Inhabitants of those areas are assured that 2 trees will be planted for each tree cut;
- (ix) Participants suggested that the implementation of the subproject should not have any adverse impact on the livelihood of the poor; and
- (x) Participants requested to ensure proper safety measures during construction and alternative road arrangement for pedestrians.

Table 7-1: General topics and discussion during public consultation

Concern Topics	Response by LGED/PMCU
a) What is the excavation/beautification plan of the proposed khal.	a) The proposed plan includes re-excavation and desiltation of the khal to restore its flow capacity, removal of aquatic vegetation and solid waste, and clearance of obstructions. Bank stabilization and landscaping will be undertaken to prevent erosion and improve aesthetics, along with measures to control encroachment and maintain flow during construction.
b) Who will be responsible for excavation/ beautification and operations.	b) LGED will execute the excavation/ beautification and will be responsible for operation and maintenance of the proposed khal.
c) What will be the criteria for labor recruitment during construction?	c) This largely depends on the types of job and will be assessed on a case-to-case basis by the contractor according to needs.
d) Priority for jobs should also consider women; women can do the same work.	d) Priority will include women and there will not be any discrimination in daily wages.
e) Raising the issue of employment, he suggested that the local people should be the first ones to be employed in the project.	e) The consultant team explained that local people will be employed according to job requirement.

Table 7-2: Environmental issues/concerns discussed during public consultation

Environmental Issues/Concerns	The Contractor shall
a) Air Quality: Dust generation from excavation, drying spoil, and transport.	a) Control dust through regular watering of exposed surfaces and spoil; cover trucks during transport.
b) Water Quality: Increased turbidity, contamination from disturbed sediments and spoil runoff.	b) Avoid in-stream dumping; use silt traps and barriers; store spoil away from water bodies.
c) Sediment Contamination: Presence of heavy metals, sewage sludge, and microplastics in excavated spoil.	c) Conduct spoil testing; segregate contaminated material and dispose at approved sites.
d) Noise Pollution: Operation of excavation equipment causing disturbance.	d) Restrict work to daytime; maintain equipment to reduce noise levels.
e) Aquatic Ecology: Disturbance to aquatic flora and fauna due to excavation and dewatering.	e) Minimize disturbance area; avoid breeding seasons; ensure environmental flow where applicable.
f) Waste Management: Improper disposal of dredged spoil and debris.	f) Dispose spoil at designated sites; promote reuse where suitable (e.g., land filling).
g) Bank Erosion and Stability: Weakening of khal banks during excavation.	g) Implement slope protection (turfing, revetment) and stabilize banks immediately after excavation.
h) Odor Nuisance: Foul smell from decomposed organic sediments.	h) Limit spoil storage duration; cover and properly manage organic-rich spoil.
i) Public Health and Safety: Exposure to contaminated sediments and accident risks.	i) Provide PPE; install safety barriers and signage; restrict public access to work zones.
j) Traffic and Access: Movement of trucks causing congestion and safety risks.	j) Prepare traffic management plan; ensure safe routes and minimize disruption.
k) Community Impacts: Temporary access restriction and disturbance to nearby residents.	k) Maintain access pathways; inform community in advance; address grievances promptly.
l) Climate Resilience: Increased rainfall intensity affecting excavation works.	l) Schedule works considering weather; incorporate climate-resilient design and drainage measures.

Table 7-3: Outcome of the Public Consultation

Sl. No.	Key Issues/Demands	Perception of Community	Action to be Taken
1	Awareness of the project including coverage area	Yes, they are aware of the project that will be improved.	No need to take action.
2	In what way they may associate with the sub-project	They will give all types of cooperation for implementation of the sub-project	More consultation before start of the sub-project.
3	Presence of any forest, wildlife or any sensitive/ unique environmental components nearby the project area	Not anticipated	No need to take action.
4	Presence of historical/cultural/ Religious sites nearby	Not anticipated	No need to take action.
5	Unfavorable climatic condition	During the rainy season, the town become flooded if heavy rainfall occurs within short duration.	Design the Khal adequately.
6	Occurrence of flood	The city often inundated due to heavy rainfall for short duration. No major flood occurred recently.	Design the Khal adequately.
7	Drainage and sewerage problem facing	The town has proper master drains covering most portion of the city to carry waste water. Therefore, no major problem with water logging in normal condition.	Design the Khal adequately.
8	Availability of labour during construction time	Yes, Local labour is available.	No need to take action.
9	Dust and noise pollution disturbances during construction work	Yes, they know the impact will be short-term & negligible.	EMP will be prepared to minimize the impact.
10	Setting up construction camp site within the villages/project locality	Yes, no construction camp is required for this sub-project.	No camp or storage site within locality
11	Safety of residents during construction phase and plying of vehicle for construction activities	Yes, they are aware of the safety issues	Awareness programs will be taken before start of the construction work.

7.5 Summary of consultation meetings

172. The proposed khal improvement sub-project including excavation, rehabilitation and beautification which will improve the overall drainage system of the project area. At present the khal is partially filled with silt, waste and debris which creates waterlogging during the rainy season and causes environmental problems for the local community. After completion of the project, the drainage capacity of the khal will increase and stagnant water problems will be reduced significantly. The surrounding environment will become cleaner and healthier for the residents. Local people will be able to live in a better environment and the beautification of the khal banks will improve the aesthetic condition of the area. The project will also help protect nearby roads, houses and agricultural lands from waterlogging and flooding. Therefore, the local community strongly supports the implementation of this sub-project as it will improve environmental conditions and overall quality of life of the people living in the project area.

173. The meetings concluded with thanks from the chair to the participants. Photographs of the FGDs and/or community consultation are given below:



Figure 7-1: Photograph of FGD during Bandarban Pourashava visit

7.6 Key Informant Interviews (KII)

In addition to the public consultation and focus group discussions, one Key Informant Interviews (KIIs) were conducted on August 24, 2026. These interviews targeted specific administrative and technical experts to evaluate the subproject's feasibility and ensure its alignment with local departmental goals.

- Pourashava Executive Engineer:** The Executive Engineer provided critical technical data regarding the existing state of the drainage network. He identified that the primary cause of waterlogging in Wards 07, 08 and 09 is the severe siltation, local encroachment and solid waste accumulation. He emphasized that the design must strictly adhere to LGED's drainage standards to maintain a self-cleansing velocity and ensure the structural stability. He further committed to a long-term Operation and Maintenance (O&M) plan to prevent future encroachment and waste dumping.



Figure 7-2: Photograph of KII during Bandarban Pourashava visit

GRIEVANCE REDRESS MECHANISAM (GRM)

7.7 Common GRM

165.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.

166.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 PMU and management, design and supervision consultants (MDSC) to help ensure that their grievances are addressed.

167.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 complaint register in Pourashava offices. 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 (PMU) safeguard officer will have the overall responsibility for timely grievance redress 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.

7.8 General

168.The objective the grievance redress mechanism (GRM) is to resolve complaints as quickly as possible and at the local level through a process of conciliation; and, if that is not possible, to provide clear and transparent procedures for appeal. A well-defined grievance redress and resolution mechanism will be established to resolve grievances and complaints in a timely and satisfactory manner. All affected persons will be made fully aware of their rights, and the detailed grievance redress procedures will be publicized through an effective public information campaign

7.9 Grievance Redress Process

169.In case of grievances that are immediate & urgent in the perception of the complainant, the contractor & MDSC on-site personnel will provide most easily accessible/first level of contact for quick resolution of grievances. Contact phone numbers & names of the concerned PIU safeguard focal person & contractors; will be posted at all construction sites at visible locations.

a. 1st Level Grievance

170.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.

b. 2nd Level Grievance

171.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. The PIU designated safeguard focal person will be responsible to see through the process of redress of each grievance.

c. 3rd Level Grievance

172. The PIU designated safeguard focal person will refer any unresolved or major issues to the PMU safeguard officer and MDSC environmental and resettlement specialists. The PMU in consultation with these officers/specialists will resolve them within 30 days.

173. 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.

174. 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 PIU to be distributed to the affected communities, as part of the project GRM.

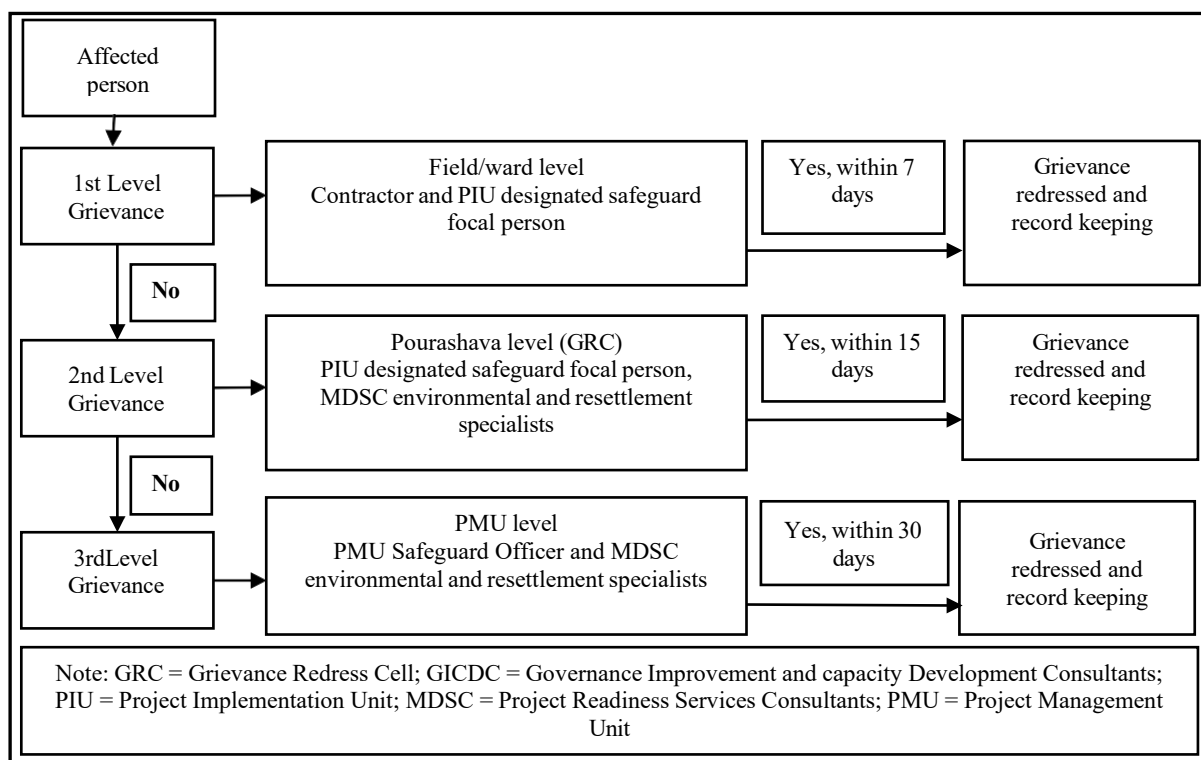


Figure 7-3: Project Grievance Redress Mechanism

7.10 Recordkeeping

175. 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 affected and outcome will be kept by PIU. The number of grievances recorded and resolved and the outcomes will be displayed/disclosed in the PMU office, Pourashava office, and on the web, as well as reported in monitoring reports submitted to ADB on a semi-annual basis.

7.11 Periodic Review

176. The PMU 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.

7.12 Costs

177. All costs involved in resolving the complaints (meetings, consultations, communication, information dissemination) will be borne by the concerned PIU at Pourashava-level; while costs related to escalated grievances will be met by the PMU. Cost estimates for grievance redress related to both for social and environmental issues are included in resettlement cost estimates.

8 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

8.1 Objectives of the EMP

178. The Environmental Management Plan (EMP) has been prepared to ensure that the potential environmental and social impacts of the proposed subproject are properly avoided, minimized, mitigated, monitored, and managed throughout the project cycle. The EMP has been prepared based on the baseline environmental conditions, impact assessment, operation and maintenance requirements, public consultation findings and analysis of alternatives.

179. The proposed subproject involves re-excavation and improvement of drainage system in the existing Mora Gugalichara Khal Uslapara Railway Culvert to Islam Uddin House, with a total length of 1,740 m under Bandarban Pourashava. The major works include khal re-excavation, earth cutting and filling, slope protection through CC block pitching, RCC retaining wall, footpath construction, and culvert improvement/rehabilitation. The specific objectives of the EMP are to:

- i. Ensure implementation of mitigation measures identified in the IEE;
- ii. Manage excavated spoil and removed debris of soil in an environmentally sound manner;
- iii. Protect surface water quality and prevent pollution of the khal and connected drainage system;
- iv. Minimize dust, noise, vibration, access disturbance, traffic disruption, and community health and safety risks during construction;
- v. Protect aquatic and bank-side biodiversity through segmented excavation and maintenance of flow continuity as far as practicable;
- vi. Avoid adverse impacts on agricultural land, local drainage, local movement, and community access;
- vii. Ensure occupational health and safety of workers during excavation, spoil handling, and works near the sub-project site;
- viii. Establish monitoring requirements for construction and operation phases;
- ix. Define institutional responsibilities for EMP implementation, supervision, monitoring, and reporting

180. A copy of the EMP must be kept on work sites at all times. This EMP is 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.

181. The contractor shall implement all construction-stage mitigation measures, including the Spoil Management Plan, traffic and access management measures, occupational health and safety measures, and environmental monitoring requirements. The Project Implementation Unit (PIU), Management Design and Supervision Consultant (MDSC), and Project Management Unit (PMU) shall supervise and monitor EMP implementation. During the operation phase, the Pourashava shall be responsible for routine operation and maintenance of the improved khal.

8.2 EMP- Mitigation Measures

182. The mitigation measures have been developed based on the likely impacts identified during planning, design, construction, and operation phases. The key environmental and social issues include spoil generation, water quality deterioration, aquatic habitat disturbance, dust and noise, local access disruption, impacts on agriculture and local

drainage, solid waste management, occupational health and safety, community health and safety, and long-term operation and maintenance of the khal.

183. The mitigation measures will be considered successful when comply with the Environmental Quality Standards (EQS), policies, legal requirements set by DoE and other relevant GoB organizations. In absence of DoE's own EQS, other relevant international or other recognized organization's quality standard will have to be followed.

Table 8-1: Environmental Management Plan – Mitigative Measures

Ref. No.	Issues & Impacts	Mitigation Measures	Responsible for	
			Implementation	Supervision
1.0 Pre-construction Phase				
1.1	Obtaining of SCC/NOCs Failure to obtain necessary consents, permits, SCC/NOCs as prescribed in environmental legislation framework (Chapter II) can result in design revisions and/or stoppage of the Works.	- The proposed road and drain will be constructed in Pourashava own land and existing road and drain networks, that's why all necessary consents, permits, clearance, etc. not required to be obtain before start of civil works (ensured from DDR report). - DoE will issue the ECC upon approval of the IEE/EIA study (including associated EMP). The ECC allows project construction to commence, and contains specific approvals requirements for matters such as pollution control and environmental monitoring. Note; The DoE has issued a letter for Improving Urban Governance and Infrastructure Program (IUGIP).	PIU/Contactor	PMU/MDSC
1.2	Final design and site planning Inadequate design may result in poor drainage performance, bank instability, erosion, or unnecessary environmental disturbance.	- Follow LGED drainage design standards and adopt a practical khal section considering hydraulic capacity, bank stability, ease of maintenance, and environmental conditions. - Use the existing khal alignment to avoid land acquisition and minimize social impacts. Include slope protection, grass turfing, CC block pitching, and climate-resilient design measures.	MDSC	PMU/MDSC
1.3	Updating of IEE and EMP based on necessary Specific impacts will be identified as per design updating and construction works	- Update IEE and EMP as per necessary of detail design and construction works - Ensure updated EMP is provided to contractors	PMU/ MDSC	MDSC
1.4	Utility and access verification Damage to utilities, culverts, crossings, access routes, or community facilities	- Conduct pre-construction verification of utilities, crossings, culverts, and local access points. - Prepare an access and utility management plan before starting works. - Inform local communities before restricting access.	Contractor	MDSC/PIU
1.5	Preparation & mobilization of field office	A detailed plan and drawing of the semi-pucca site office (Area: 50 sq. m) with the arrangement of sufficient natural light, fan, toilet, safe drinking water, hit protecting ceiling, damp proofing equipment, and so on will be developed & submitted to the Pourashava before beginning the construction work.	Contractor	MDSC/PIU
1.6	Spoil generation and management Excavated material may be poorly managed, causing obstruction of flow, nuisance, waterlogging, or impacts on agricultural land.	Prepare and obtain approval for a Spoil Management Plan before excavation. The plan shall identify reuse options, temporary stockpile locations, transport routes, approved disposal sites, runoff control measures, and site restoration requirements.	Contractor	MDSC/PIU
1.7	Preparation of Traffic and Access Management Plan	Prepare a Traffic and Access Management Plan identifying haul routes, temporary crossings, pedestrian access, warning signs, barricading, traffic control, and community notification	Contractor	MDSC/PIU

	Movement of equipment and transport of spoil/materials may disturb local traffic, pedestrians, and community access.	arrangements.		
1.8	Baseline environmental monitoring Lack of baseline data may make it difficult to assess construction-stage impacts.	- Conduct baseline air quality, noise level, and surface water quality monitoring at representative locations before construction starts, as required by the EMP. - Record results for comparison during construction and after completion.	Contractor	MDSC/PIU
1.9	Community information and consultation Local people may face inconvenience if construction schedule, access restrictions, and safety risks are not communicated.	Inform nearby residents, farmers, institutions, and local users about work schedule, access arrangements, safety measures, grievance contact points, and expected temporary disturbances.	PIU/ Contractor	MDSC/PIU
1.10	Construction Camps Location, & Stock Yards Poorly selected camp or storage areas may create sanitation, waste, drainage, and community nuisance issues.	- Select worker camp, material storage, and equipment parking areas away from the khal edge, water bodies, drainage paths, and nearby houses as far as practicable. - Obtain approval from PIU/MDSC before use.	Contractor	MDSC/PIU
1.11	Training and orientation Contractor and workers may fail to implement EMP due to lack of awareness.	- Conduct EMP orientation before construction. - Training shall cover spoil management, segmented excavation, aquatic biodiversity protection, waste management, dust/noise control, community safety, OHS, and grievance redress.	Contractor/ MDSC	PMU/PIU

2.0 Construction Phase				
2.1	Site preparation and mobilization Poor mobilization may create disturbance to local community. Mobilization	- Mobilize equipment, materials, and workers only within approved work areas. - Clearly demarcate the construction zone before starting works. - Avoid unnecessary occupation of khal banks, access routes, agricultural land, and community-use areas.	Contractor	MDSC/PIU
2.2	Khal re-excavation and earthwork Excavation may disturb khal bed, increase turbidity, destabilize banks, and temporarily affect local drainage.	- Carry out excavation carefully and according to approved design and method statement. - Maintain proper side slopes and avoid over-excavation. - Conduct excavation section by section to reduce disturbance and maintain drainage continuity as far as practicable.	Contractor	MDSC/PIU
2.3	Spoil management Excavated spoil may obstruct flow, wash back into the khal, damage agricultural land, block access, or create nuisance if poorly managed.	- Implement the approved Spoil Management Plan. - Reuse suitable excavated material for bank formation, filling, leveling, and other approved works. - Place temporary stockpiles only at designated locations away from the khal edge. - Do not dump spoil into the khal, drainage channels, agricultural land, low-lying areas, or access routes. Transport unsuitable/excess spoil to Pourashava-approved disposal sites.	Contractor	MDSC/PIU
2.4	Bank stability and slope protection	Maintain approved side slopes during excavation.	Contractor	MDSC/PIU

	Excavation and earthwork may cause bank erosion, slope failure, or re-siltation if protection is delayed.	- Provide grass turfing, CC block pitching, and other slope protection works as per design. - Complete bank protection works as soon as practicable after excavation. Repair any damaged or unstable slope immediately.		
2.5	Surface water quality Sediment runoff, disturbed bed material, spoil washout, fuel leakage, and waste disposal may deteriorate water quality.	- Minimize disturbance of bed material and control runoff from exposed soil. - Install temporary silt traps, bunds, or sediment control measures where required. - Store fuel, oil, and lubricants away from the khal and drainage paths. - Prevent discharge of wastewater, construction waste, spoil, or oil-contaminated materials into the khal.	Contractor	MDSC/PIU
2.6	Aquatic biodiversity and fisheries Re-excavation may temporarily disturb small fish, frogs, snails, aquatic insects, and other seasonal aquatic organisms.	- Avoid complete dewatering of the khal. - Maintain flow continuity as far as practicable. - Minimize turbidity through controlled excavation. - Prohibit workers from catching fish, disturbing aquatic fauna, or disposing waste into the khal. - Avoid unnecessary disturbance to water-retaining sections outside the active work zone.	Contractor	MDSC/PIU
2.7	Air quality and dust Excavation, spoil handling, vehicle movement, and material transport may generate dust and vehicle emissions.	- Spray water on exposed soil, haul roads, and dusty work areas. - Cover trucks carrying spoil and loose materials with tarpaulin. - Avoid overloading of trucks. - Limit vehicle speed near settlements and sensitive receptors. - Maintain equipment and vehicles properly and avoid unnecessary engine idling.	Contractor	MDSC/PIU
2.8	Noise and vibration Excavators, trucks, compactors, and other equipment may create temporary noise and vibration near houses, schools, mosques, shops, and pedestrians.	- Conduct noisy works during daytime only. - Avoid high-noise activities during night-time, prayer time, and other locally sensitive periods. - Use well-maintained equipment fitted with silencers. - Avoid unnecessary honking. - Inform nearby communities before noisy activities. - Provide hearing protection to workers where required.	Contractor	MDSC/PIU
2.9	Local access and movement Construction works, spoil heaps, machinery, and open excavation may restrict access to houses, agricultural plots, roads, informal crossings, and community facilities.	- Maintain safe temporary access and crossings for residents, pedestrians, farmers, and local users. - Avoid blocking all access points at the same time. - Provide advance notice before temporary access restrictions. - Install barricades, warning signs, and safe crossing arrangements at important locations.	Contractor	MDSC/PIU
2.10	Traffic management Transport of materials, spoil, and equipment may cause traffic congestion and accident risks on local roads.	- Implement the Traffic and Access Management Plan. - Use approved haul routes. - Schedule truck movement during low-traffic periods where practicable. - Provide flagmen, warning signs, speed control, and barricades near work zones and road crossings.	Contractor	MDSC/PIU

		Repair any road damage caused by construction vehicles..		
2.11	Agriculture and local drainage Spoil dumping, flow obstruction, and access restriction may affect nearby agricultural land, irrigation paths, and drainage of low-lying areas.	- Do not place spoil or materials on agricultural land, irrigation paths, local drainage routes, or access roads. - Maintain drainage continuity during construction. - Restore any temporarily disturbed agricultural access or drainage route after completion of works in each section.	Contractor	MDSC/PIU
2.12	Solid waste and construction waste Construction waste, packaging materials, removed vegetation, and general waste may create nuisance, block flow, or pollute the khal.	- Collect construction waste, packaging materials, removed vegetation, and general waste regularly. - Store waste only at designated locations. - Do not dump waste into the khal or along its banks. - Transport waste to Pourashava-approved disposal locations. - Keep the worksite clean and orderly.	Contractor	MDSC/PIU
2.13	Fuel, oil, and hazardous materials Leakage or spillage of fuel, oil, lubricants, or chemicals may contaminate soil and water.	- Store fuel and lubricants on an impermeable surface away from the khal and drainage channels. - Keep spill-control materials at site. - Refuel equipment only at designated locations. - Immediately clean any spills and dispose of contaminated materials safely.	Contractor	MDSC/PIU
2.14	Sensitive receptors Construction may disturb nearby houses, schools, mosques, shops, and other community facilities.	- Identify sensitive receptors before starting works. - Schedule noisy and disruptive activities to avoid sensitive periods. - Provide advance notice, safe access, dust suppression, and complaint contact information. - Take corrective action promptly if complaints are received.	Contractor	MDSC/PIU
2.15	Grievance redress and communication Community complaints may arise due to access restriction, dust, noise, waste, safety risks, or construction disturbance.	- Maintain a complaint register at site. - Display contact information for complaints. - Record all grievances and corrective actions. - Address complaints promptly in coordination with PIU and MDSC.	Contractor	MDSC/PIU
2.16	Groundwater Quality The potential exists for drinking water sources to be contaminated by the seepage of wastes from workers camps through the soil profile into the GW aquifer minimal (particularly if wells access the shallow aquifer).	- Workforce camps will be located away from water resources. All practical measures such as provision of septic tanks, color bin, garbage bags, and other sanitation facilities will be implemented at the construction camps to prevent the wastewater and solid wastes from entering well and groundwater recharge areas. - Wells used for drinking will be tested quarterly to ensure portability.	Contractor	MDSC/PIU

2.17	Socio-economic status Sub-project components will be located in Pourashava land and there is no requirement for land acquisition or any resettlements. Manpower will be required during the construction stage.	▪ 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. ▪ To ensure engage women employee as per gender action plan ▪ To ensure first priority engage disable labour as per gender action plan	Contractor	MDSC/PIU
2.18	Community Health and Safety Short-term 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 create hazard to pedestrians and children.	▪ Provide safety signage at construction sites visible to public ▪ Provide safety barriers near any trenches, and cover trenches with planks during non-work hours. ▪ Consult with 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 specialist and Pourashava. ▪ Recycling and the provision of separate waste receptacles for different types of waste shall be encouraged. ▪ 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 environmental specialist's attention immediately; and (iv) taking remedial action as per 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 environmental specialist within 48 hours of receipt of such complaint/grievance. ▪ Safety signage at all sites visible to public will be provided. ▪ Safety barriers near any trenches, and cover trenches with planks during non-work hours will be provided. ▪ 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. ▪ Properties and utilities will be restored or compensated to pre-work conditions if any damage occurred. ▪ Extensive barricades of the construction zone will be provided so that pedestrians do not come into direct contact with the machines, tools, material and other accessories; ▪ Provision of barricading will be done so that these do not create traffic safety problems. Supplementary aids tools such as signboards, reflectors and night lighting will be used to avoid possible accidents.	Contractor	MDSC/PIU

2.19	Workers Health and Safety There is invariably a safety risk when construction works such as excavation, sand filling, carrying of mixture materials, Shuttering, steel/wood work 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 major but reversible by mitigation measures.	- Comply with requirements of Government of Bangladesh Labor Law of 2006 & 2015 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 behaviour 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) at working times; (iii) providing (H&S) training for construction 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. - 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; (iii) providing fire extinguisher at construction site and (iv) sanitation facilities are available at all times. - Provide medical insurance coverage for workers; - Provide H&S orientation training to all workers to ensure that they are apprised of the basic site rules of work at the site, PPE, 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; - Disallow worker exposure to noise level greater than 85 dBA for duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively. - Provision of personal protection equipment (PPE) such as helmets, safety shoes & glass, gloves, and face masks, safety sign for the workers; provision of first aid box with basic apparatus will be available. (Bangladesh Labour Law of 2006, Bangladesh labor service rules 2015 and all applicable laws and standards on workers H & S.), - Tube well is the source of drinking water in this area. Thus, tube well water will be provided to labors for drinking & other purposes. Water quality is good in this area, water quality will be monitor when necessary	Contractor	MDSC/PIU
2.20	Submission of EMP Implementation Report Unsatisfactory compliance to EMP	- Appointment of supervisor/Manager to ensure EMP implementation - Timely submission of Progress report/environmental monitoring reports including pictures	Contractor	MDSC/PIU
3.0 Operation Phase				

3.1	Final spoil and waste disposal Remaining spoil, removed weeds, sediment, or construction waste may wash back into the khal or obstruct drainage.	Ensure all unsuitable/excess spoil, removed aquatic weeds, sediment, and construction waste are transported to Pourashava-approved disposal or landfilling locations. No waste shall remain along the khal bank or inside the khal.	Contractor	MDSC/PIU
3.2	Restoration of access and crossings Temporary disruption to pedestrian movement, agricultural access, or local crossings may continue after construction.	Restore all affected access points, temporary crossings, khal-side movement routes, and disturbed community access areas after completion of works.	Contractor	MDSC/PIU
3.3	Post-construction environmental monitoring Residual impacts on water quality, air quality, noise, or drainage condition may remain after completion.	- Conduct post-construction monitoring of surface water quality, noise, air/dust condition, and site cleanliness where required. - Compare results with baseline and construction-stage monitoring data.	Contractor	MDSC/PIU
3.4	Solid waste management Household waste, market waste, plastics, and floating debris may block the khal and reduce drainage capacity.	- Ensure regular removal of floating waste and debris from the khal. - Provide awareness to nearby residents and shop owners to prevent waste dumping. - Install screens, silt traps, or waste-catching arrangements at critical drain entry points where needed.	Pourashava	PIU / PMU as applicable
3.5	Routine khal maintenance Without regular maintenance, the khal may again become silted, clogged by weeds and waste, and lose drainage capacity.	Pourashava shall conduct regular cleaning, desiltation, aquatic weed removal, inspection of culverts, and maintenance of slope protection, footpath, and beautification works.	Pourashava	PIU / PMU as applicable
3.6	Biodiversity and bank-side vegetation Poor maintenance may degrade limited aquatic habitat or damage bank-side vegetation and turfing.	- Avoid unnecessary removal of grasses, shrubs, and bank-side vegetation. - Maintain grass turfing, plantation, and slope protection works. - Prevent harmful fishing methods, waste dumping, and disposal of pollutants into the khal.	Pourashava	PIU / PMU as applicable
3.7	Community health and safety during operation Damaged banks, blocked flow, unsafe crossings, or poor maintenance may create safety risks.	- Inspect khal banks, crossings, culverts, footpaths, and public-use areas regularly. - Repair damaged sections, maintain safe access, and respond to community complaints promptly.	Pourashava	PIU / PMU as applicable
3.8	Grievance redress Community concerns related to blockage, waste dumping, odour, access, or safety may remain unresolved.	- Maintain a complaint receiving and response system through the Pourashava - Record complaints and take corrective action within a reasonable time.	Pourashava	PIU / PMU as applicable

8.3 Environmental Monitoring Plan

184. The Environmental Monitoring Plan is an important tool for verifying the effective implementation of the Environmental Management Plan (EMP) for the proposed subproject. The monitoring plan provides guidance on the environmental issues/parameters, locations, frequency and responsibilities during the pre-construction, construction and operation phases of the subproject.

185. The purpose of environmental monitoring plan is to assess whether the mitigation measures proposed in the EMP are being properly implemented and whether they are effective in avoiding, minimizing, or mitigating adverse impacts. The monitoring results will also help identify any unexpected environmental issues during implementation and allow timely corrective actions.

186. For this subproject, monitoring will focus on the key issues identified in the IEE, including spoil management, surface water quality, dust and air quality, noise and vibration, aquatic biodiversity, local access and movement, agriculture and local drainage, solid waste management, community health and safety, occupational health and safety, and post-construction restoration. During operation, monitoring will focus on khal functionality, siltation, waste accumulation, slope protection, surface water quality and regular operation and maintenance by Pourashava.

187. The main objectives of the Environmental Monitoring Plan are to:

- i) Monitor the actual impacts of the subproject on physical, biological, and socioeconomic receptors within the khal corridor;
- ii) Verify whether the EMP mitigation measures are being implemented effectively;
- iii) Identify any unexpected impacts and recommend corrective actions;
- iv) Ensure compliance with applicable Government of Bangladesh requirements, ADB safeguard requirements, and contract obligations;
- v) Ensure proper management, reuse, transport, and disposal of excavated spoil and construction waste;
- vi) Ensure occupational and community health and safety during construction;
- vii) Monitor grievances, accidents and corrective actions

188. The contractor shall be responsible for carrying out construction-stage monitoring and maintaining records under the supervision of the PIU and MDSC. The MDSC shall review and verify monitoring results through field visits and reporting. The PMU shall review monitoring information and submit semi-annual environmental monitoring reports to ADB. During the operation phase, Pourashava shall be responsible for monitoring and maintaining the improved khal through its regular operation and maintenance system.

Table 8-2: Environmental Management Plan - Monitoring Actions

Ref. No.	Environmental Issues	Significant Impact	Purpose of the Monitoring	Monitoring Method			Responsibility	
				Method of Collecting and Reporting Data	Location	Duration and Frequency	Implementation	Supervision
1.0 Pre-construction Phase								
1.1	Obtaining of SCC/NOCs	Failure to obtain necessary consents, permits, NOC's can result in design revisions and/or stoppage of the Works.	Ensure compliance with GoB and ADB requirements before construction.	Obtaining certificates	PIU/Pourashava	Prior to contractor mobilization	PMU/PIU	MDSC/PMU
1.2	Inclusion of EMP in contract document	EMP requirements may not be implemented if not included in bidding and contract documents.	Ensure contractor's contractual obligation for EMP implementation.	Review bidding and contract documents.	PMU/PIU	Before contract award	PMU/PIU/ MDSC	PMU
1.3	Utility, access, and sensitive receptor verification	Damage to utilities, crossings, access routes, or sensitive receptors may occur	Identify utilities, access points, and sensitive receptors before works start.	Site inspection, consultation with Pourashava and local people	Sub-project area	Before construction	Contractor	PIU/MDSC
1.4	Construction Camps, & Stock Yards	Poorly selected sites may affect water bodies, agricultural land, drainage, access, or nearby residents.	Ensure camp and stockyard locations do not create environmental or social impacts.	Site inspection and approval by PIU/MDSC.		Before mobilization	Contractor	PIU/MDSC
1.5	Spoil Management Plan	Large volume of excavated spoil may cause waterlogging, flow obstruction, nuisance, and impacts on agricultural land if unmanaged.	Ensure proper planning for reuse, temporary stockpiling, transport, and disposal of spoil.	Review Spoil Management Plan, stockpile locations, haul routes, and disposal site approval	Contractor office, khal alignment, proposed disposal sites	Before excavation	Contractor	PIU/MDSC
1.6	Traffic and Access Management Plan	Construction vehicles and excavation may disrupt local access and movement.	Ensure safe access for residents, pedestrians and local users.	Review plan, access map, signage, temporary crossing arrangements, and community notification	Work sites and access routes	Before construction	Contractor	PIU/MDSC

Ref. No.	Environmental Issues	Significant Impact	Purpose of the Monitoring	Monitoring Method			Responsibility	
				Method of Collecting and Reporting Data	Location	Duration and Frequency	Implementation	Supervision
				procedure.				
1.7	EMP implementation training	Contractor and workers may not understand EMP requirements.	Build capacity for effective implementation of mitigation measures.	Training attendance record, training materials, photographs.	PIU / Project Site	Before mobilization	MDSC	PIU/MDSC
1.8	Baseline air, noise, soil/sediment and surface water quality	Without baseline data, construction-stage impacts cannot be properly compared.	Establish baseline condition before works start.	Air quality test, noise level measurement, surface water quality test, soil/sediment test	Representative locations near khal corridor, sensitive receptors, and outfall	Once before construction	Contractor	PIU/MDSC
2.0 Construction Phase								
2.1		Excavation may disturb khal bed, increase turbidity, destabilize banks, and affect local drainage.	Ensure excavation follows approved design and method statement.	Visual inspection, review of excavation sequence	Active excavation sections	Daily by contractor and PIU/MDSC	Contractor	PIU/MDSC
2.2	Spoil management	Poor spoil handling may obstruct khal flow, wash back into water, affect agricultural land, block access, or create nuisance.	Confirm implementation of Spoil Management Plan.	Visual inspection, spoil transport record, disposal location record	Excavation sites, stockpile areas, haul routes, disposal sites	Daily by contractor; and PIU/MDSC	Contractor	PIU/MDSC
2.3	Segmented excavation and flow continuity	Complete blockage or dewatering of the khal may interrupt drainage and affect aquatic organisms.	Ensure section-by-section work and maintenance of flow continuity as far as practicable.	Visual inspection, construction sequencing record, photographic documentation.	Active khal sections and water-retaining sections	During excavation	Contractor	PIU/MDSC
2.4	Surface water quality	Sediment runoff, bed disturbance, spoil washout, fuel leakage, and waste dumping may deteriorate khal water quality.	Evaluate effectiveness of water pollution control measures.	Visual inspection and water quality testing. Parameters may include: pH, Temperature, ORP, DO, Phosphate,	Khal water-retaining sections and outfall, where water is available	Once before construction and twice during construction and post-construction period	Contractor	PIU/MDSC

Ref. No.	Environmental Issues	Significant Impact	Purpose of the Monitoring	Monitoring Method			Responsibility	
				Method of Collecting and Reporting Data	Location	Duration and Frequency	Implementation	Supervision
				Alkalinity, Sulphate, Fe, EC, TDS, TSS, Nitrate, COD, and BOD				
2.5	Groundwater quality and sanitation	Poor sanitation or waste disposal from worker camp may contaminate groundwater.	Ensure drinking water safety and sanitation management.	Water quality test if tubewell/groundwater is used; inspection of sanitation and wastewater disposal. Parameters may include pH, EC, TDS, arsenic, iron, manganese, nitrate, total coliform and fecal coliform, where applicable.	Worker camp/worksite water source	Once before construction and twice during construction and post-construction period	Contractor	PIU/MDSC
2.6	Air quality and dust		Evaluate effectiveness of dust and emission control measures.	Visual inspection, consultation with local people, air quality testing. Parameters may include PM10, PM2.5, SOx, NOx, and CO.	Work sites, haul roads, and sensitive receptors near khal alignment	Once before construction and twice during construction and post-construction period	Contractor	PIU/MDSC
2.7	Noise and vibration	Excavators, trucks, compactors, and other equipment may create temporary noise and vibration.	Evaluate effectiveness of noise and vibration control measures	Visual inspection, consultation with local people, noise level measurement. Parameter: LAeq day and night, where required.	Work sites and sensitive receptors such as houses, schools, mosques, and shops	Once before construction and twice during construction and post-construction period	Contractor	PIU/MDSC

Ref. No.	Environmental Issues	Significant Impact	Purpose of the Monitoring	Monitoring Method			Responsibility	
				Method of Collecting and Reporting Data	Location	Duration and Frequency	Implementation	Supervision
2.8	Aquatic biodiversity	Re-excavation may disturb aquatic vegetation, small fish, frogs, snails, aquatic insects, and other common aquatic organisms.	Ensure aquatic habitat disturbance is minimized.	Visual inspection, check segmented excavation, flow continuity, weed disposal, turbidity control, and prohibition of fish catching.	Water-retaining khal sections and active work areas	Weekly during excavation	Contractor	PIU/MDSC
2.9	Bank stability and slope protection	Poor excavation or delayed protection may cause erosion, slope failure, and re-siltation.	Ensure slope protection and bank stabilization are implemented properly	Visual inspection of side slopes, grass turfing, CC block pitching, erosion, and damaged sections.	Khal banks and protected slopes	Weekly during construction	Contractor	PIU/MDSC
2.10	Solid waste and construction waste	Construction waste, domestic waste, packaging, removed vegetation, and debris may block khal or pollute surroundings.	Evaluate effectiveness of waste management measures.	Visual inspection, waste disposal record, consultation with workers and local people.	Work sites, worker camp, stockyard, khal banks, disposal sites	Daily by contractor; weekly by PIU/MDSC	Contractor	PIU/MDSC
2.11		Excavation, machinery, and spoil stockpiles may restrict access to houses, roads, agricultural plots, and local crossings.	Ensure safe and continuous community access.	Visual inspection, consultation with local people, grievance record review.	Access points, informal crossings, khal-side paths, roads near work sites	Daily by contractor; weekly by PIU/MDSC	Contractor	PIU/MDSC
2.12	Traffic management	Hauling of spoil/materials and movement of machinery may create congestion and accident risks.	Evaluate effectiveness of traffic and access management.	Visual inspection, traffic control record, accident record, number of construction vehicles, consultation with local people.	Haul routes, road crossings, work sites	During construction	Contractor	PIU/MDSC

Ref. No.	Environmental Issues	Significant Impact	Purpose of the Monitoring	Monitoring Method			Responsibility	
				Method of Collecting and Reporting Data	Location	Duration and Frequency	Implementation	Supervision
2.13	Community health and safety	Open excavation, machinery, unstable spoil heaps, unsafe crossings, and poor signage may create risks to pedestrians and children	Evaluate effectiveness of community safety measures.	Visual inspection, accident record, complaint record, consultation with local people.	Work sites, access points, crossings, nearby settlements	Daily by contractor; weekly by PIU/MDSC	Contractor	PIU/MDSC
2.14	Workers' health and safety	Workers may face risks from excavation, machinery, dust, noise, working near water, and manual handling	Evaluate effectiveness of occupational health and safety plan.	Visual inspection, PPE use check, toolbox talk record, accident record, consultation with workers.	Work sites and worker camp	Daily by contractor; weekly by PIU/MDSC	Contractor	PIU/MDSC
2.15	Grievance redress	Complaints may arise regarding dust, noise, access restriction, waste, safety, construction disturbance and resettlement issues	Ensure grievances are recorded and resolved promptly.	Review complaint register, corrective action record, consultation with complainants.	Contractor site office, PIU	Continuous; monthly review	Contractor	PIU/MDSC
2.16	Post-construction clean-up	Debris, spoil, temporary facilities, and waste may remain after works and cause khal blockage, nuisance or surrounding disturbance	Ensure site restoration and removal of construction wastes.	Visual inspection, consultation with local people	Work sites, stockpile areas, camp areas, khal bank	At completion of each section and end of construction	Contractor	PIU/MDSC
2.17	Submission of EMP implementation report	Poor reporting may result in weak compliance tracking.	Confirm EMP implementation status and corrective actions.	Review contractor's environmental compliance report and supporting records.	Contractor/PIU/MDSC office	Monthly and at end of construction	Contractor/MDSC	PIU/PMU
3.0 Operation Phase								
3.1	Surface/wastewater quality	Waste dumping, stagnant water and dry-weather wastewater may deteriorate water quality.	Monitor water quality and identify pollution or stagnation issues.	Visual inspection and water quality testing where required. Parameters may include pH, DO,	Representative khal locations and outfall	Periodically, especially during dry season and after complaints	Pourashava	Pourashava/PIU as applicable

Ref. No.	Environmental Issues	Significant Impact	Purpose of the Monitoring	Monitoring Method			Responsibility	
				Method of Collecting and Reporting Data	Location	Duration and Frequency	Implementation	Supervision
				BOD, COD, TDS, TSS/turbidity, and EC.				
3.2	Solid waste and floating debris	Household waste, plastics, market waste, and floating debris may block flow and create odour/mosquito breeding.	Ensure effective waste removal and prevention of dumping.	Visual inspection, consultation with local residents/shop owners.	Khal banks, drain outfalls, waste accumulation points	Monthly and after rainfall	Pourashava	Pourashava
3.3	Slope protection, turfing, and bank stability	Damaged slope protection or eroded banks may cause re-siltation and safety risks.	Ensure long-term stability of khal banks.	Visual inspection of CC block pitching, grass turfing, erosion, bank damage, and settlement.	Khal banks and protected slopes	Quarterly and after heavy rainfall/flooding	Pourashava	Pourashava
3.4	Biodiversity and bank-side vegetation	Poor maintenance may degrade limited aquatic habitat and bank-side vegetation.	Ensure maintenance activities do not unnecessarily disturb aquatic and bank-side habitat.	Visual inspection of vegetation removal, weed disposal, harmful fishing practices, and waste dumping.	Khal alignment and bank-side areas	During maintenance activities	Pourashava	Pourashava
3.5	Community health and safety	Blocked flow, unsafe crossings, damaged banks, or poor maintenance may create safety and health risks.	Ensure safe public use and reduce nuisance from stagnant water and waste.	Visual inspection, complaint record, accident record, consultation with local people.	Khal crossings, footpath, banks, public-use areas	Monthly and after complaints	Pourashava	Pourashava
3.6	O&M workers' health and safety	Workers involved in cleaning, desiltation, weed removal, and waste handling may face health and safety risks.	Ensure O&M workers use PPE and safe work procedures.	Visual inspection, PPE use check, worker consultation, accident record.	Maintenance sites	During maintenance activities	Pourashava	Pourashava
3.6	Grievance redress during operation	Community complaints on blockage, odour, waste dumping, access, or safety may remain unresolved.	Ensure complaints are recorded and corrective actions are taken	Review complaint register and corrective action records.	Pourashava office	Continuous; periodic review	Pourashava	Pourashava

8.4 Institutional Capacity Development Program

189. The MDSC environmental specialists are 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 waste water 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 9.3.

Table 8-3: Training Program for Environmental Management

Description	Contents	Schedule	Participants
Program 1 Orientation Workshop	Module 1 – Orientation ADB Safeguard Policy Statement Government of Bangladesh policy Module 2 – Social/Environmental Assessment and Resettlement Planning/IEE Process ADB policy and process, identification of impacts and mitigation measures, IEE, DDR and RP preparation, implementation, and monitoring requirements. Incorporation of safeguards into project design and contracts. Importance of robust GRM.	1 Day	LGED officials involved in project implementation PMU, PIUs, Pourashava officials
Program 2 Workshop for Contractors and Supervisory staff	IR/environmental issues during construction Implementation of IEE, DDR and RP Monitoring of IEE, DDR and RP implementation, Reporting Requirements, GRM	1 Day	PIUs, Contractors
Program 3 Experiences and Best Practices Sharing	Experiences on IEE, DDR and RP implementation, grievance redress – Issues and Challenges - Best Practices followed	1 Day (On a regular interval to be determined by PMU and MDSC)	PMU, PIUs MDSC, Contractors

8.5 Institutional Arrangement

190. The Local Government Engineering Department (LGED) 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 road and drain sub-projects financed by ADB & AFD are the executing agencies of the project. The participating Pourashavas are the implementing agencies.

8.6 Project Management Unit (PMU)

191. A PMU has been established for the overall management of the project. The PMU is headed by Project Director (PD) supported by officials including two project managers in charge of (i) municipal infrastructure and governance improvement and capacity development (ii) water supply and sanitation. The PMU will receive support from environmental specialist and resettlement specialist on the MDSC team. Key tasks and responsibilities of the Sr. Assistant Engineer, PMU Safeguard (Environment) officer are as follows:

- Confirm existing IEEs/EMPs are updated based on detailed designs, and that new IEEs/EMPs are prepared in accordance with the ESMF and sub-project selection criteria related to safeguards;
- Confirm whether IEEs/EMPs are included in bidding documents and civil works contracts;
- provide oversight on environmental management aspects of subprojects and ensure EMPs are implemented by project implementation unit (PIU) and contractors; Site specific EMP would be submitted by the contractor before start of the work” as a contract clause by PMU
- Establish a system to monitor environmental safeguards of the project, including

- monitoring the indicators set out in the monitoring plan of the EMP;
- 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;
- Supervise and provide guidance to the PIUs to properly carry out the environmental monitoring and assessments as per the ESMF;
- Review, monitor, and evaluate the effectiveness with which the EMPs are implemented and recommend necessary corrective actions to be taken as necessary;
- Consolidate monthly environmental monitoring reports from PIUs and submit semi-annual monitoring reports to ADB;
- Ensure timely disclosure of final IEEs/EMPs in locations and form accessible to the public; and
- Address any grievances brought about through the grievance redress mechanism in a timely manner.

8.7 Project Implementation Unit (PIU)

192. The participating Pourashavas have established PIUs within the Pourashava structure. The PIUs will (i) be responsible for land acquisition; (ii) take necessary action for obtaining the proposed land free from encroachments, squatters, mobile vendors and hawkers if any; (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 and will receive assistance from the assigned MDSC regional environmental specialist to:

- Update IEEs/EMPs during implementation stage and prepare new IEEs/EMPs in accordance with the ESMF;
- Conduct environmental compliance audit of existing facilities as per Item of ADB SPS, 2009;
- Include IEEs/EMPs in bidding documents and civil works contracts;
- Comply with all government rules and regulations;
- Take necessary action for obtaining the proposed land free from encroachments, squatters, mobile vendors and hawkers if any;
- Oversee implementation of EMPs including environmental monitoring by contractors;
- Take corrective actions when necessary to ensure no environmental impacts;
- Submit monthly environmental monitoring reports to PMU,
- Conduct continuous public consultation and awareness;
- Address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs; and
- 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.

8.8 Management Design and Supervision Consultants (MDSC)

193. MDSC has been engaged to work closely with and advise the PMU, to be involved in project supervision including monitoring during construction phase. The MDSC has one Environmental Specialist and four Jr. Environmental Specialists as well as one Resettlement Specialist and four Jr. Resettlement Specialists. The MDSC Environmental Specialist will, but not limited to:

- Work under the general supervision of the team leader;
- Review the environmental guidelines and requirement of the government of

Bangladesh and ADB SPS, 2009, environmental sub-project selection guidelines and ESMF;

- Guide the implementation of future sub-projects;
- Provide technical support to the PMU and PIUs including review and update of ESMF and guidelines for specific type of sub-projects and assist in preparing terms of reference for environmental assessment;
- Assist and guide the MDSC regional environmental specialists to provide support to environmental management functions including updating sub-project IEEs in respect to EMP;
- Assist in preparing IEEs and in monitoring impact and mitigation measures associated with subprojects;
- 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 sub-project specific guidance;
- Provide support and guidance to PIUs in undertaking environmental monitoring
- Support PMU in submitting semi-annual environmental monitoring reports to ADB;
- Facilitate in grievance redress and corrective actions;
- Train PIU officials regarding environmental requirement and issues; and
- Perform any other task assigned by the team leader, deputy team leader & the PD.

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

- Work under the supervision and guidance of the team leader and MDSC Environmental Specialist;
- Assist PIUs in preparing and updating IEEs including EMPs in accordance with the ESMF and assist in monitoring impact and mitigation measures associated with sub-projects including implementation of EMPs by contractors;
- Assist in preparation of IEEs and in the environmental review of sub-project consisting of screening at Pourashava level by PIU through a committee formed with municipal mayor as chairman & representatives from DoE, LGED & relevant district office as members;
- Assist PIUs in the steps for preparing EIA/IEE, capacity building and training, preparation of guidelines and procedure and sub-project specific guidance;
- Support PIU in environmental monitoring and submit monitoring reports to PMU as inputs into the semi-annual monitoring report submitted to ADB;
- Undertake mitigation measures and other specific measures in the construction contract;
- Facilitate in grievance redress and corrective actions;
- Follow sub-project selection guidelines and ESMF to ensure compliance with the environmental guidelines and requirement of the Government of Bangladesh and ADB SPS, 2009;
- Support PMU safeguard officer and MDSC environment specialist by providing data, information and all other requested assistance;
- Train PIU officials regarding environmental issues
- Perform any other task assigned by MDSC environment specialist, team leader and the project director.

Table 8-4: Institutional Roles and Responsibilities

PMU	PIU	ADB
Pre-Construction Stage		
Environmental Officer of the PMU, with assistance from the Environmental Specialist(s) of the MDSC to conduct Rapid Environmental Assessment (REA) for each subproject using checklists available on ADB's website. Based on the REA, categorize the project based on ADB's SPS. Submit all categorization forms to ADB.	MDSC will assist the PIU and update existing IEE for all Category B subprojects, which will include an EMP. PIU with assistance from the Environmental Officer of the PMU and the Environmental Specialist of the MDSC to update IEE and incorporate findings into project designs and IEE.	ADB to review the REA checklists and reconfirm the categorization.
PMU based on review, will approve the IEE and send to ADB for review and clearance before contract award. The IEE also made available on request. Ensure EMP is part of contract documents for category A and B projects. If the sub-component is of 'C' category, the MDSC to provide generic mitigation measures, if any, to be implemented. For Category C subprojects, no IEE/EIA is required, only a review of the environmental implications.	After the approval of IEE by PMU and clearance by ADB, PIU with the assistance of MDSC to disclose the IEE and EMP to public information as required by ADB's SPS. MDSC, on behalf of the PIU, to incorporate mitigation measures in project design, specified in IEE and incorporate environmental mitigation & monitoring measures that need to be incorporated into contract document.	ADB will review and grant clearance of IEE/EMPs for subprojects before award of contracts.
Environmental Officer of PMU to provide guidance to the PIU to ensure conformance of all subprojects to the regulatory compliance to the Government, with regard to environment. This shall include guidance in preparation of the documents as required under the ECR, submission of application forms, and liaison with agencies towards obtaining clearances from the DOE. Environmental officer of PMCU shall notify the ADB on the obtaining of clearances, including the conditions specified if any in the clearances, and integration of these into the contracts/EMP.	ECR stipulates that for (i) green, (ii) yellow, (iii) orange, and (iv) red category projects, obtaining of environmental clearance certificate from DOE is a prerequisite. The Environmental Support staff of the PIU with assistance from MDSC Environmental Specialists shall compile the necessary information required for submission of application forms for clearances, obtaining NOC from local authorities etc. Until the obtaining of clearance certificate from DOE, the Environmental Support Staff will interact with the DOE on a regular basis and provide necessary documentation/ clarifications as required.	ADB to ensure that the clearance requirements are included in the contract provisions/EMP.
Construction Stage		
PMU to review the PIU monthly monitoring reports to ensure that the all-mitigation measures are implemented. PMU to consolidate the monthly reports and submit quarterly reports to ADB for review. Corrective actions to be taken.	Contractors to conduct environmental monitoring and implement EMPs. PIU with support of the Environmental Specialist(s) of MDSC to (i) review and approve the contractors' implementation plan for the environmental provisions in the EMP, and (ii) monitor the implementation of mitigation measures by contractor. The MDSC with PIU to prepare monthly progress reports including a section on implementation of the mitigation measures and submit to PMU for review. PMCU to submit semi-annual monitoring report to ADB.	ADB to review the reports and provide necessary advice/guidance needed to the MDSC.
Operation Stage		
The executing and implementing agencies to conduct monitoring, as specified in the environmental monitoring plan of EMP. The DOE to monitor the performance, if required and as specified in monitoring plan of EMP.	Pourashava	Pourashava-

8.9 Contracts and Contractors documents

195. EMPs are to be included in bidding and contract documents and verified by the PIUs and PMU. 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 plans outlined in their contract Table 11.

8.10 Governance Improvement and Capacity Development Consultants (GICDC)

196. The PMU and PIUs will require support on a range of activities related to governance improvement and capacity development of Pourashavas. The GICDC will support PMU and PIUs in implementing urban government improvement action plan (UGIAP) by providing capacity development, community mobilization and other facilitation services. There are 4 GICDC regional officers working with the project and their posting place is in the LGED head office. There are 2 Local Capacity Development Associates (Community Mobilization and Municipal Finance) in each project Pourashava. The regional coordinators are assisting the Pourashavas and the LCDAs in the activities related to community participation and inclusive development. The community mobilizers have been posted at the Pourashava and (i) are working maintaining close liaison with the mayor, councilors, Pourashava staffs and communities, (ii) providing 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 also have a training specialist who is responsible for identifying and coordinating capacity building activities at Pourashava level Figure 10.

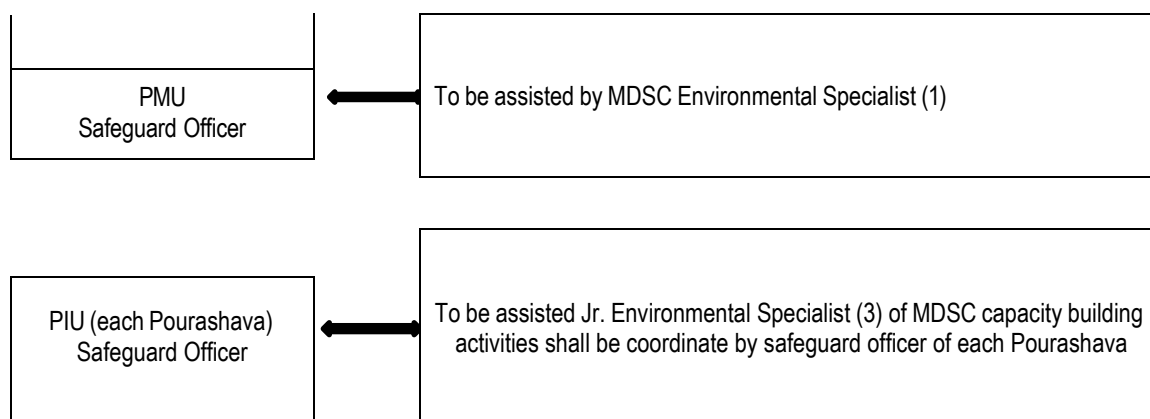


Figure 8-1: Safeguards Implementation Arrangement

197. 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.

198. 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 specialist assisted by the PMU environment officer (Sr. Assistant Engineer). Therefore, no separate budget required for MDSC environment management specialist.

199. The operation phase mitigation measures are again of good operating practices, which will be the responsibility of Bandarban Pourashava. All monitoring during the operation and maintenance phase will be conducted by LGED therefore, there are no additional costs.

8.11 Budget for EMP

200. Most of the mitigation measures require the contractors/project authority to adopt good site practice, which should be part of their normal procedures already, so there are unlikely to be major costs associated with compliance.

201. Mitigation that is the responsibility of PIU and contractors will be provided as part of their

management of the sub-project. The cost estimation for Environmental Mitigation Measures and Monitoring is given in the Table 16. The total mitigation and monitoring cost for the project is calculated as BDT 4,42,500.00 in addition to compliance to the LGED items code EMP-1.54(a-i) or 27, 28 and 29 of GCC of tender documents and IEE to the entire satisfaction of E-I-C.

Table 9.5: EMP in Bidding Document

1 EMP Task No.	Cost for Environmental Mitigation Measures				
	Mitigation Items	Unit	Cost/Unit (BDT)	Total Unit	Total Cost (BDT)
1.0	Pre-construction Period				
1.1	Obtaining required environmental clearance, permits, SCC/NOCs and relevant approvals	No.	Included in project preparation cost	-	-
1.2	Updating/finalization of EMP based on final design and site condition	No.	Included in project preparation cost	-	-
1.3	Existing Utilities (e.g., Coordinate with relevant utility service providers before construction, identify and protect existing utility lines, and relocate or immediately restore any utility services accidentally damaged during works if applicable only)	-	Included in engineering cost		-
1.4	Selection, approval and construction of construction of field office camp, stockyard, equipment parking area and temporary storage locations along with basic welfare, clean sanitation and drinking water, hygiene, waste management etc.	-	Included in engineering cost		-
1.5	Preparation of Spoil Management Plan, including reuse, stockpile, haul route and disposal arrangements	-	Included in engineering cost		-
1.6	Preparation of Traffic and Access Management Plan	-	Included in engineering cost		-
1.7	Preparation of Community Health and Safety Management Plan	-	Included in engineering cost		-
1.8	EMP implementation training/orientation for contractor, workers, PIU and Pourashava staff	No.	25,000	1	25,000
	Subtotal: Pre-construction Mitigation				25,000
2.0	Construction Period				
2.1	Reuse of suitable spoil in filling slope protection work of the khal		Included in engineering cost		
2.2	Transportation cost of spoil in temporary storage site up to 600m		Included in engineering cost		
2.3	Polythene sheet for temporary covering of stockpiled excavated spoil	m2	0	0	0
2.4	Temporary barricades, safety fencing, warning signs in Bangla and public safety arrangements along active work zones		Included in engineering cost		-
2.5	Temporary access and crossing arrangements for residents, pedestrians, farmers and local users		Included in engineering cost		-
2.6	Traffic control measures, flagmen, signage and haul route safety during transport of spoil/materials		Included in engineering cost		-
2.7	Dust suppression, water spraying, truck covering with tarpaulin and control of vehicle movement		Included in engineering cost		-

2.8	Cutting, removing and disposing of all materials such as aquatic weeds, bushes, shrubs, grass, floating waste and organic materials from khal sections	Included in engineering cost - -			-
2.9	Solid waste management at worksite and labor shed including separate bins for bio-degradable and organic waste, dry and recyclable waste, general waste	Lump sum	0		0
2.10	Labour Shed and Workers Health and Safety (Separate hygienic toilets, safe drinking water supply, bathing water supply, fire extinguishers, PPE, etc)	Lump sum	1,30,000	1	1,30,000
2.11	Community health and safety measures, including safety communication, complaint contact display and emergency response support (printing and erection of safety signage, emergency contact number)	Lump sum	50,000	1	50,000
2.12	Slope protection, grass turfing, CC block pitching and erosion control as per design	Included in engineering cost -			-
2.13	Khal-side tree/plantation or turfing maintenance during construction, if included in design	No.	550	50	27,500
	Subtotal:				232,500
3.0	Post-construction / Completion Stage				
3.1	Post-construction clean-up of work areas, khal banks, camp/stockyard areas and removal of remaining waste/debris	Lump sum	20,000	1	20,000
3.2	Restoration of temporary access routes, crossings, disturbed land and work areas	Included in engineering cost			
3.	Final inspection and correction of slope protection, turfing, bank stability and site restoration before handover		Included in civil works / defect liability obligations	-	-
3.5	Final EMP implementation report with photographs and corrective action records	No.	10,000	1	10,000
	Subtotal:				262,500
4.0	Operation and Maintenance Period				
4.1	Routine khal cleaning, desiltation, aquatic weed removal and floating waste removal		Pourashava O&M budget	-	-
4.2	Maintenance of slope protection, grass turfing, footpath, culvert and outfall structures		Included in Bandarban Pourashava O&M budget	-	-
4.3	Community awareness campaign on prevention of waste dumping into khal and connected drains		Included in Bandarban Pourashava O&M budget		
4.4	Periodic inspection of khal functionality, waste accumulation, siltation, aquatic weeds and bank stability		Included in Bandarban Pourashava O&M budget	-	-
	Subtotal: O&M Mitigation				
	Total EMP Mitigation Cost (A)				262,500
14B	Cost for Environmental Monitoring				
	Monitoring Items	Unit	Cost/Unit (BDT)	Total Unit	

EMP Task No.		Pre-construction	During Construction	After Construction			Total Cost (BDT)
1	Air quality monitoring at representative khal construction site/sensitive receptor: before construction, during construction, and after completion. Parameters: PM10, PM2.5, SOx, NOx, CO	02	02	02	20,000	3	60,000
2	Noise level monitoring at representative khal construction site/sensitive receptor: before construction, during construction, and after completion. Parameter: LAeq day and night	01	01	01	5,000	3	15,000
3	Groundwater quality test, if groundwater is used for worker camp or domestic/drinking purpose: before construction, during construction, and after completion. Parameters: pH, DO, Pb, Fe, EC, TDS, nitrate, As, TC, FC, Cl, Ca, Mn	02	02	02	10,000	3	30,000
4	Surface/wastewater quality test at khal/outfall location: before construction, during construction, and after completion. Parameters: pH, ORP, DO, phosphate, alkalinity, sulphate, Fe, EC, TDS, TSS, nitrate, COD, BOD	02	02	02	10,000	3	30,000
5	Soil/sediment quality test from representative excavation area of Khal, before construction, during construction, and after completion. Parameters: organic matter, Zn, sulphur, lead, nitrate	02	02	02	15,000	3	45,000
	Total Environmental Monitoring Cost (B)						262,500
	Total Cost (A+B)						442500

Note: Cost of the EMP items should be as fixed budget

8.12 Monitoring and Reporting

202.PMU 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 IEE for the sub-project components. In addition to recording information on the work and deviation of work components from original scope PMU, 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.

203.Contractors shall submit monthly Environmental Monitoring Report covering the mitigation measures listed in this EMP for all the sub-project components to the MDSC for approval.

204.MDSC will submit monthly monitoring and implementation reports to PMU, who will take follow-up actions, if necessary. PMU will submit semi-annual monitoring reports to ADB. The suggested monitoring report format is in ADB. Sub-project 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.

205.LGED 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.

206.ADB will review project performance against the commitments as agreed in the legal documents. The extent of ADB 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:

- conduct periodic site visits for projects with adverse environmental or social impacts;
- conduct supervision missions with detailed review by ADB safeguard specialists/officers or consultants for projects with significant adverse social or environmental impacts;
- review the periodic monitoring reports submitted by EAs to ensure that adverse impacts and risks are mitigated, as planned and as agreed with ADB;
- 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
- 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.
- The process described in this document has assessed the environmental impacts of all elements of Bandarban Pourashava Road & Drain sub-project. All potential impacts were identified in relation to design and location, construction, and operation phases.

9 CONCLUSION AND RECOMENDATIONS

207. The Initial Environmental Examination (IEE) of the proposed drainage subproject under the Improving Urban Governance and Infrastructure Program (IUGIP) in Bandarban Pourashava has been done in accordance with the requirements of the Asian Development Bank (ADB) Safeguard Policy Statement (SPS), 2009 and the Environmental Conservation Rules (ECR), 2023 of the Government of Bangladesh. The assessment has been based on field observations, stakeholder consultations, and analysis of baseline environmental conditions to determine the nature, extent, and significance of potential environmental impacts associated with the proposed re-excavation and improvement of the Khal.
208. The environmental assessment indicates that the subproject will not result in any significant adverse environmental impacts. The proposed works are confined to the rehabilitation of an existing drainage channel within an urban setting area, where natural habitats have already been substantially altered. The anticipated impacts are typical of small- to medium-scale drainage infrastructure projects and are limited to site-specific, short-term disturbances during the construction phase. These include temporary increases in dust and noise levels, localized impacts on surface water quality due to excavation and sediment disturbance, generation and handling of dredged materials, minor disruption to local access and movement, and occupational and community health and safety risks.
209. All identified adverse impacts are assessed to be of low to moderate significance and are reversible in nature. The IEE demonstrates that these impacts can be effectively avoided, minimized, or mitigated through the implementation of standard engineering practices and the prescribed Environmental Management Plan (EMP). No environmentally sensitive areas, protected habitats, or endangered species have been identified within the project influence area that would be adversely affected by the subproject.
210. The subproject is expected to generate substantial positive environmental and socioeconomic benefits. The re-excavation and restoration of the khal will significantly improve stormwater drainage capacity, thereby reducing the frequency and severity of waterlogging in the surrounding areas. This will lead to improved public health conditions by minimizing stagnant water and associated vector-borne diseases, as well as enhancing overall environmental quality. The intervention will also contribute to increased climate resilience by improving the capacity of the urban drainage system to manage extreme rainfall events and changing hydrological conditions.
211. Based on the findings of the IEE, the subproject has been classified as Category B under the ADB SPS, 2009, as the anticipated impacts are site-specific, largely reversible, and can be readily mitigated. In accordance with the national regulatory framework, the subproject falls under the “Orange” category as per ECR, 2023, which requires preparation of an IEE and Environmental Management Plan (EMP) prior to commencement of construction works. No further environmental impact assessment (EIA) is required.
212. The Environmental Management Plan (EMP) developed for the subproject provides a comprehensive set of mitigation measures, environmental monitoring requirements, institutional responsibilities, and reporting procedures to ensure effective environmental management throughout the project lifecycle. The EMP will be integrated into the bidding and contract documents and its implementation will be the responsibility of the contractors under the supervision of Project Management Unit (PMU), Project Implementation Unit (PIU) and the Management Design and Supervision Consultant (MDSC).
213. Public consultations conducted during the preparation of the IEE indicate broad community support for the subproject, particularly due to its anticipated benefits in reducing waterlogging and improving living conditions. A Grievance Redress Mechanism (GRM) has been established to address any concerns or complaints that may arise during project implementation, ensuring transparency, accountability and continued stakeholder engagement.
214. In conclusion, the proposed drainage subproject in Bandarban Pourashava is

environmentally sound and socially acceptable. The anticipated adverse impacts are minor, localized, and manageable, and will be effectively mitigated through the implementation of the EMP. The subproject is consistent with national environmental regulations and ADB safeguard requirements and will contribute to improved urban environmental conditions, reduced flood risk, and enhanced climate resilience. Therefore, the subproject can proceed to implementation without the need for further detailed environmental assessment, subject to compliance with all applicable environmental safeguards, regulatory requirements, and monitoring obligations.

10 APPENDICES

10.1 Appendix 1: Environmental Screening Checklist and Categorization Form

GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH
LOCAL GOVERNMENT ENGINEERING DEPARTMENT (LGED)
Improving Urban Governance and Infrastructure Project (IUGIP)

Field Visit Checklist for Proposed Khal Project

Pourashava: Bandarban Date of Field Visit: 11/5/2026

General Project Information

- Sub-Project Name: Re-excavation, beautification, and footpath of the existing khal for improvement drainage system in Bandarban PS
- Sub-project/Scheme Type: ☐ Khal excavation ☒ Re-excavation ☒ Drainage improvement
- Proposed activity / subproject classified under the Red Category per ECR 2023: ☐ Yes ☒ No
- Proposed activity / subproject includes components involving prohibited investment activities per ADB SPS: ☐ Yes ☒ No
- Site-specific IEE and relevant environmental safeguards documentation required before tender/procurement: ☒ Yes ☐ No
- Community consultation/FGD required for this scheme: ☒ Yes ☐ No

Sub-project/Scheme Location & Alignment

- Start point GPS: End point GPS:
- Length of khal (canal) (approx.): 3000 km
- Existing Width: 25-30 m
- Alignment passes through: ☐ Agricultural land ☒ Settlement ☐ Wetland/Beel ☒ Roadside ☒ Administrative Area ☐ Education Institute ☒ Market
- Alignment located near environmentally sensitive receptors: ☐ School ☒ Mosque ☒ Market ☒ Dense settlement ☐ None
- Encroachment/obstructions along Khal alignment observed: ☒ Yes ☐ No

Hydrological and Drainage Condition

- Source of water: ☒ Rain-fed ☐ River
- Seasonal Water Availability: ☐ Perennial (12 months flow) ☒ Semi-perennial (6-9 months) ☐ Seasonal (rainy season only)
- Connectivity with: ☒ River ☐ Existing khal ☐ Beel/haor
- Flow condition: ☐ Free ☒ Obstructed ☐ No flow
- Existing drainage flow to downstream areas currently maintained: ☒ Yes ☐ No
- Likely risk of worsening waterlogging/flooding in adjacent areas due to proposed works: ☐ Yes ☒ No

- Need for cross-drainage/hydraulic structures at any location: ☒ Yes ☐ No
- Existing waterlogging condition: ☒ Severe ☐ Moderate ☐ None
- Flooding history: ☐ Seasonal ☒ Frequent ☐ Rare
- Siltation level: ☒ High ☐ Medium ☐ Low
- Excavated soil/dredged material likely to be generated in significant quantity: ☒ Yes ☐ No
- Potential temporary storage/disposal location identified: ☒ Yes ☐ No
- Current Navigation (water transports)- ☐ Yes ☒ No: If yes, type- ☐ Manual (local) Boat ☐ Oil Driven Trawler ☐ Launch ☐ Other (Please mention the name if any others):
- If currently no water transports/navigation currently but how many years ago it was seen: _____ Years, what type of water transports: - ☐ Manual (local) Boat ☐ Oil Driven Trawler ☐ Launch ☐ Other (Please mention the name if any others):

Environmental Condition

- Proposed activity/subproject located in ecologically sensitive areas such as protected areas (national parks, wildlife sanctuaries), notified wetlands or wetlands of significant value, critical habitats, Mangrove, Wetland: ☐ Yes ☒ No
- Soil type: ☒ Clay ☒ Sandy ☐ Loamy
- Erosion present: ☒ Yes ☐ No
- Canal bank protection/erosion control required: ☒ Yes ☐ No
- Vegetation type: ☐ Crop land ☒ Natural Vegetation
- Tress along the Khal Alignment: ☒ Yes ☐ No
- Tree Species: *Kosai, Mahjani, Bamboo, Banana etc.*
- No. of Tree to be Cutting (Approx.): *30*
- Opportunity to retain existing trees/vegetation through design adjustment: ☒ Yes ☐ No
- Aquatic ecosystem present: ☒ Yes ☐ No
- Currently fishing: ☐ Yes ☒ No
- Previously fishing (10-15 years ago) : ☐ Yes ☒ No
- Fish culture (farming) activities: ☐ Yes ☒ No
- Solid waste dumping observed: ☒ Yes ☐ No
- Public space/open area design requires solid waste management arrangement: ☒ Yes ☐ No
- Domestic wastewater discharge: ☒ Yes ☐ No
- Canal/open water requires treatment or pollution control consideration based on observed pollution sources: ☒ Yes ☐ No
- Water quality visibly degraded: ☒ Severe ☐ Moderate ☐ Low ☐ Not evident
- Source of water pollution in canal/khal: ☐ Industry ☒ Household level sewerage line (toilet) ☐ Agriculture (pesticide/fertilizers) ☐ Other (Please mention name of others if any):

Land Use & Socio-economic Condition

- Land use along alignment: ☐ Agriculture ☒ Residential ☒ Commercial
- Population density: ☒ High ☐ Medium ☐ Low
- Community facilities affected: ☐ School ☐ Mosque ☒ Market ☒ Road
- Land ownership: ☐ Private ☒ Government (Khas)
- Structures affected: ☐ Houses ☒ Shops ☐ Others
- Livelihood impacts: ☐ Agriculture ☒ Business ☐ Fisheries
- Temporary construction disturbance likely during works: ☒ Dust ☒ Noise ☒
Traffic/access disruption ☐ None
- Potential impact on local water use/fisheries during construction: ☐ Yes ☒ No

☒ Stakeholder Consultation:

- ☒ Local People
- ☐ Farmers community
- ☐ Fisheries community
- ☒ Local Representative
- ☒ Women
- ☒ Shopkeepers/business owners
- ☐ Vulnerable/affected households
- ☐ Boat operators/waterway users

☒ Key Informant Interview (KII)

- ☒ Upazila Nirbahi Officer
- ☐ Upazila Fisheries Officer
- ☐ Upazila Agriculture Officer
- ☒ Upazila Forest Officer
- ☐ Pourashava Engineer
- ☒ Executive Engineer/Assistant Engineer concerned
- ☒ Department of Public Health and Engineering
- ☒ Local environmental/forest representative, if relevant

Climate and flood resilience considerations needed in design: ☒ Yes ☐ No

10.2 Appendix 2: Waste Management Plan (Construction Period)

GENERAL

Considerable quantities of wastes (general & construction) will be generated due to the 1-year construction of the sub-project components. Two types of wastes will be generated during construction:

- a. General Waste:
 - Organic waste (foods, fruits, tree leaves etc.); and
 - Inorganic (such as papers, plastic and glass bottles & containers, polythene etc.); and
- b. Construction Waste:
 - Construction wastes are: construction materials such as sand, piece of rocks, bricks, rods, bamboo, wood, geotextiles, remaining concrete & bentonite waste.

OBJECTIVES

The main objective of the WMP is to organize disposal of all wastes generated during construction in an environmentally acceptable manner specially consider the following:

- Health hazards of the project personnel as well as community people should not be occurred;
- Manage the wastes in such a way that environment (specially air, soil, water etc.,) will not be polluted;
- Odor means bad smell should not be generated;
- Always friendly environment at the construction sites and construction camps;
- Any waste should not be disposed into the river and any water bodies to avoid water pollution;
- Any waste should not be burnt; and
- Any waste should not be placed in earth holes/chambers.

POTENTIAL ENVIRONMENTAL IMPACTS

Major potential environmental impacts due to the lack of waste management are:

- All types of environmental pollutions such as air, soils, water (surface & ground) pollutions;
- Generation of odor;
- Increase of flies, mosquitoes, insects etc.,
- Health hazards; and
- Environmental nuisance at the project sites

STRATEGIES TO ADOPT

The following strategies need to be adopted for appropriate soil waste collection system to be functioned properly:

- c. Setting waste collection bins (not permanent structure, movable high-quality movable plastic bins; See Figure 1) in strategic points of the construction camp and work sites.
- d. Introduce solid waste bins for organic and non-organic waste.
- e. Coordinate with the municipalities waste collection system so that the waste can be collected at midnight when the road transports are minimum.
- f. Wash liquids needs to be drained out through the functioning drains. The liquid waste needs to be treated with bleaching power every evening before draining so that the waste water cannot create nuisance and local pollution.

g. The other strategies that might be adopted are explained in later paragraphs.



Figure 1: High quality plastic bins for solid waste collection

Table 1: Mitigation Measures for Sector-wise Waste

Aspect	Waste Type	Mitigation Measures	Proposed Reuse/Recycling/ Disposal
site clearing/disposal of debris	- Vegetation (logs, mulched timber, weeds) - Demolition of existing building	- Due care should be taken during site clearance and disposal of debris during demolition of existing building. - The waste should be stored at site ensuring that existing water bodies, road and drains within or adjacent to the site are kept safe and free and no blocking of drains - Prior clearance will be taken from concerned Govt. Authorities or landowner	Recycling/Disposal whereas applicable or where suitable and approved by PIU
Construction site waste	- Plastics, Concrete and - Timber/Steel formwork - Packaging Materials, papers - Empty containers and other drums - Metals and electrical cabling	- The waste should be stored at PIU suggested location ensuring that existing water bodies, road and drains within or adjacent to the site are kept safe and free and no blocking of drains - Construction waste will be connected to dispose in Pourashava existing/proposed waste management system	Recycling/Disposal/ Re-use
Construction camp	- Waste generated by food, papers, weir, wood, polythene and empty packets - Labor camp waste generated by workers	- It will be made mandatory for waste to be segregated right at the source of waste generation - The waste should be stored at construction camp in separate dustbin - labor camp waste will be connected to dispose in Pourashava existing/proposed waste management system	Re-use/ Recycling/Disposal whereas applicable

Aspect	Waste Type	Mitigation Measures	Proposed Reuse/Recycling/ Disposal
Traffic movement with waste	Waste generated from construction site/labor camp	- Ensure covered the waste during Traffic movement - Adequate traffic control signals and barriers should be used in case traffic is to be diverted during debris disposal. All efforts should be made to ensure avoidance of traffic jam, which otherwise results in air pollution, noise pollution and public unrest.	Recycling/Disposal whereas applicable or where suitable approved and supported by PIU

METHOD OF DISPOSAL OF WASTES

The Contractor will collect the general wastes in separate waste bin at sources (means organic waste in one bin & inorganic waste in another bin) and dumped at the designated waste disposal site. The contractor will construct concrete waste disposal site; means concrete floor and wall and covered by shed to avoid, air, bad smell, soil and ground water pollutions. Based on the quantity of general waste (organic & inorganic waste), the following two chambers (rooms) of the concrete disposal site will be constructed by Contractor:

Just after filling one chamber (say after 6 months) by organic waste through pocket gate, it should be covered by earth (soils) properly & keeps it for about 6 months for converting organic fertilizer for the agricultural lands. After filling 1st chamber by organic waste, disposing of waste will be started for 2nd chamber.

The inorganic waste will be collected in the waste collection bins. Just after filling, these inorganic wastes can be given to the vender free of cost.

The Contractor will collect construction waste as mentioned above separately and dump in to the designated room at the construction camp. Just after filling the room, Contractor will sale these waste to the vender for re-cyclic.

The Contractor will maintain log book for the measurement of quantity of the wastes (especially hazardous wastes) disposed every day.

INSTITUTIONAL ARRANGEMENT

Contractor is mainly responsible for design, construction, maintenance as well as environmental monitoring for the disposal of waste. Environmental Specialist of the MDSC is responsible for monitoring of the disposal. The PIU of the Municipality will setup a 'Waste Management Committee' with the representatives of the MDSC and contractor to effectively disposing the wastes and distribution of organic fertilizer to the farmers and inorganic wastes to the venders. The committee is also responsible for monitoring procedure for the collection and carrying of wastes without causing any environmental hazards.

10.3 Appendix 3: Site & Design Considerations to Meet ESMF Environmental Criteria

Sl. No.	Components	Environmental Selection Guidelines	Remarks
1.	Overall selection guideline	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
		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 Pourashava area.

Sl. No.	Components	Environmental Selection Guidelines	Remarks
		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.
		Avoid tree cutting where possible. Retain mature roadside trees that 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.
		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.
		Synchronize the road and associated works (to extent possible) to minimize disturbance and optimize use of resources (e.g., water pipes laid prior to road improvements).	Included in the design and EMP
2.	Road and Drain improvement/ Rehabilitation/ Maintenance	Ensure tree planting alongside roads to provide a natural barrier to noise and visual impacts, and include additional man-made barriers where suitable for public safety.	Included in the design and EMP
		ensure the provision of new or improved household, storm water drainage to remove the increased runoff caused by increasing the road surface area	Included in the design and EMP
		Ensure construction of road and drain will be on a Pourashava owned land or after completion of land acquisition if required.	Proposed existing network is located at the Pourashava owned land.
		Avoid eviction of any structures or commercial activities within the sub-project area, if required adopt appropriate procedure.	The proposed site is on developed previously non-agricultural low land. No structure was there.
		Avoid any ecological sensitive area and impact on wildlife, or rare and endangered species.	Proposed site is not situated near any ecological sensitive area and no impact on wildlife or rare and endangered species.

10.4 Appendix 4: Health Safety Manual of Construction Workers

Parameters/issues	Workplace Hazards	Suggested PPE
Eye and Face protection	Flying particles, molten metal, liquid fuel, gases or vapors, light radiation.	Safety glasses with side-shields, protective shades, etc.
Head Protection	Falling objects, inadequate height clearance, and overhead power cords.	Helmets with top and side impact protection.
Hearing protection	Noise, ultra-sound.	Hearing protectors (ear plugs of ear muffs.)
Foot Protection	Falling or rolling objects, pointed objects. Corrosive or hot liquids.	Safety shoes and boots for protection against moving & falling objects, liquids and fuels.
Hand Protection	Hazardous materials, cuts or lacerations, vibrations, extreme temperatures.	Gloves made of rubber or synthetic materials (Neoprene), leather, steel, insulating materials, etc.

Respiratory Protection	Dust, vapors.	Facemasks with appropriate filters for dust removal and air purification spray, mists, vapors and gases). Single or multi-gas personal monitors, if available.
	Oxygen deficiency	Portable or supplied air (fixed lines.) on site rescue equipment.
Body/leg Protection	Extreme temperatures, hazardous materials, biological agents, cutting and laceration.	Insulating clothing, body suits, aprons etc. of appropriate materials.

10.5 Appendix 5: Sample Traffic Management Plan

Principles

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:

- The safety of pedestrians, bicyclists, and motorists travelling through the Construction zone;
- Protection of work crews from hazards associated with moving traffic;
- Mitigation of the adverse impact on road capacity and delays to the road users;
- Maintenance of access to adjoining properties; and
- Addressing issues that may delay the project.

Operating Policies for TMP

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

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

Figure A2 to Figure A3 illustrates the operating policy for TMP for the construction of water pipes and the sewers along various types of roads.

Analyse the impact due to street closure

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

- Approval from the ULB/CMC/Public Works Department (PWD) to use the local streets as detours;
- 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;
- Determining of the maximum number of days allowed for road closure, and 3 incorporations 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.

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.

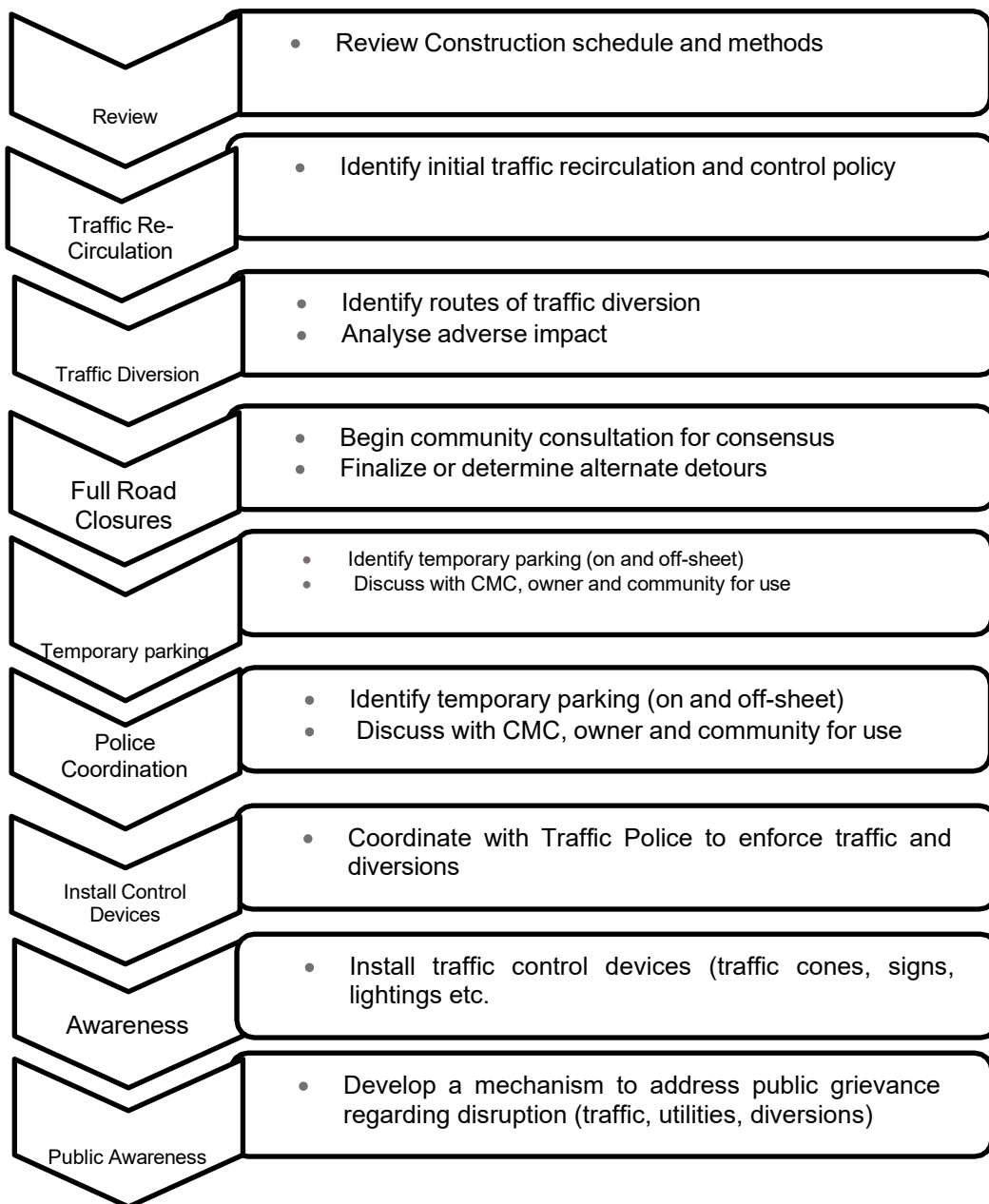


Figure A1: Policy Steps for the TMP

Public awareness and notifications

As per discussions in the previous sections, there will be travel delays during the constructions, as is the case with most construction projects, albeit on a reduced scale if

utilities and traffic management are properly coordinated. There are additional grounds for travel delays in the area, as most of the streets lack sufficient capacity to accommodate additional traffic from diverted traffic as a result of street closures to accommodate the works.

The awareness campaign and the prior notification for the public will be a continuous activity which the project will carry out to compensate for the above delays and minimize public claims as result of these problems. These activities will take place sufficiently in advance of the time when the road blocks 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 road blocks and traffic diversion through public notices ward level meetings and city level meeting with the elected representatives.

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

- (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.

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

The campaign will cater to all types of target groups i.e., children, adults, and drivers. Therefore, these campaigns will be conducted in schools and community centres. 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:

- (iv) Explain why the brochure was prepared, along with a brief description of the project;
- (v) Advise the public to expect the unexpected;
- (vi) Educate the public about the various traffic control devices and safety measures adopted at the work zones;
- (vii) Educate the public about the safe road user behaviour to emulate at the work zones;
- (viii) 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
- (ix) Indicate the office hours of relevant offices.

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

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

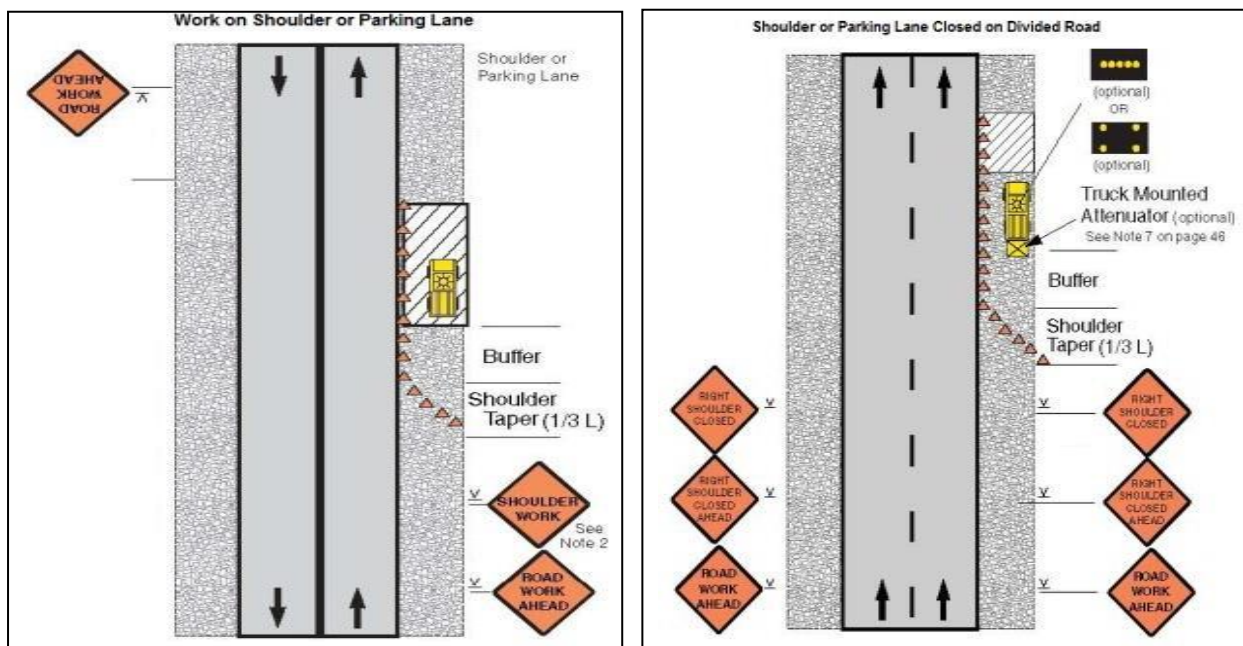
- Signs
- Pavement Markings
- Channelizing Devices
- Arrow Panels
- Warning Lights

Procedures for installing traffic control devices at any work zone vary, depending on road configuration, location of the work, construction activity, duration, traffic speed and volume, and pedestrian traffic. Work will take place along major roads, and the minor internal roads. As such, the traffic volume and road geometry vary. The main roads carry considerable traffic; internal roads in the new city areas are wide but in old city roads very narrow and carry

Figure A4 to Figure A5 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:

- 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.

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.



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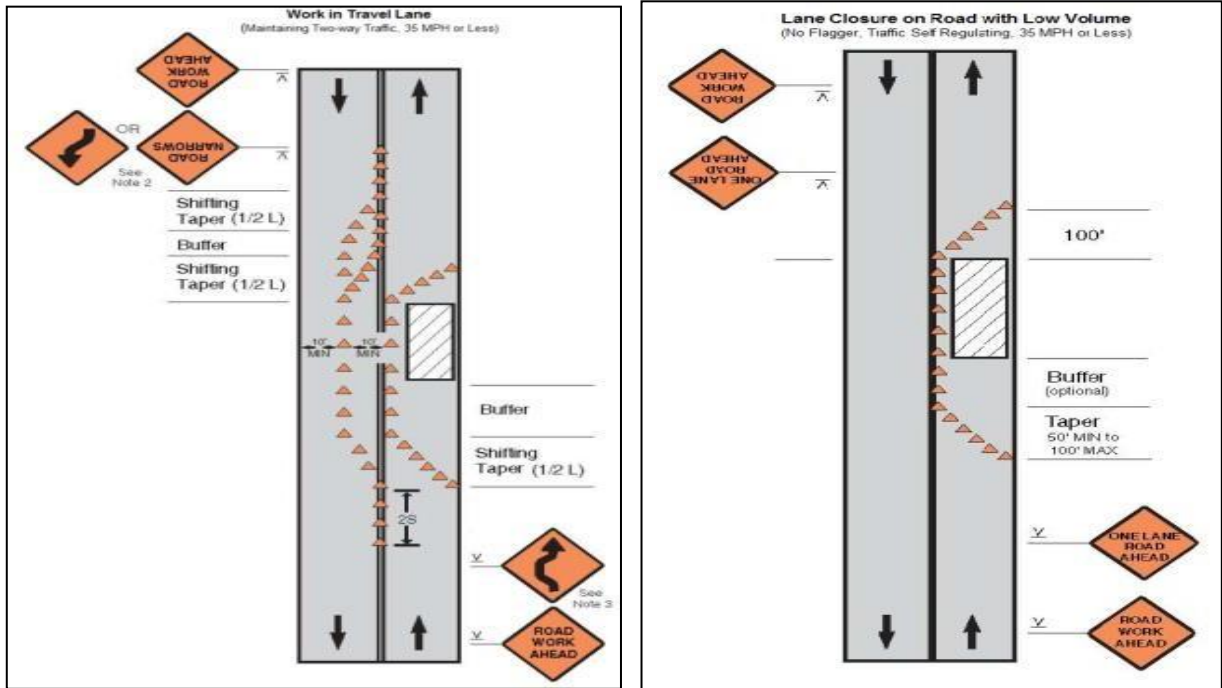


Figure A4 & A5: Work in Travel Lane & Lane closure on road with low volume

10.6 Appendix 6: Participants List of Consultation Meetings date and ward

LOCAL GOVERNMENT ENGINEERING DEPARTMENT
IMPROVING URBAN GOVERNANCE AND INFRASTRUCTURE PROGRAM (IUGIP)
PUBLIC CONSULTATION ATTENDANCE SHEET

Date: 10/15/2024

Package Number: 1UG4.P/BAND/DR/01/2023

Name of Scheme:

Place of Consultation: Hare Krishna Balaram Ward No. 06 Paurashava Bangalore

Sl.	Name of participant	Ward No.	Phone number	Profession	Sex (M/F)	Signature of Participants
0১.	অমরেন্দ্র নন্দ	০৮	০১৮৩১০২২৩৬২	কৃষক	✓	অমরেন্দ্র
০২.	অমিত কুমার দে	০৮	০	অফিস	✓	
০৩.	অরুণ	০৮	০১৪২১১৫৪৪৭	কৃষক	✓	অরুণ
০৪.	কুমার	০৮	০১৩১১২১৭২২	ফার্মার	✓	অরুণ
০৫.	ডাঃ. মনোজ	০৮	০১৬১০১০২০২৩	সামাজিক	✓	ডাঃ. মনোজ
০৬.	ডাঃ. সত্যজিৎ	০৮	০১৪৭৭১৪৬৭১৩	ফার্মার	✓	সত্যজিৎ
০৭.	ডাঃ. সত্যজিৎ (ফার্মার)	০৮	০১৪৫২২২০০৬১	ফার্মার	✓	সত্যজিৎ
০৮.	সুশীল কুমার	০৮	০	কৃষক	✓	সুশীল
০৯.	ডাঃ. সত্যজিৎ	০৮	০১৪২৪০২০০৭১	ফার্মার	✓	সত্যজিৎ
১০.	ডাঃ. অমরেন্দ্র নন্দ	০৮	০১৪২০৭০০২০৫	কৃষক	✓	অরুণ
১১.	অমরেন্দ্র নন্দ	০৮	০১৫০১৬২৭৭৬	ফার্মার	✓	সত্যজিৎ
১২.	ডাঃ. সত্যজিৎ	০৮	০১৪৫২১০১২২	ফার্মার	✓	সত্যজিৎ
১৩.	সত্যজিৎ	০৮	—	ফার্মার	✓	সত্যজিৎ
১৪.	সত্যজিৎ	০৮	—	ফার্মার	✓	সত্যজিৎ
১৫.	সত্যজিৎ	০৮	০১৫০১২৪১৫৫০	অফিস	✓	সত্যজিৎ
১৬.	সত্যজিৎ	০৮	—	ফার্মার	✓	সত্যজিৎ
১৭.	সত্যজিৎ	০৮	০১৪৪৪০৭৪০২	ফার্মার	✓	সত্যজিৎ
১৮.	সত্যজিৎ	০৮	০১৪১৭৭৪৪৬০৭	ফার্মার	✓	সত্যজিৎ
১৯.	সত্যজিৎ	০৮	০১৪৭৫২২৭৭২	ফার্মার	✓	সত্যজিৎ
২০.	সত্যজিৎ	০৮	—	ফার্মার	✓	সত্যজিৎ
২১.	সত্যজিৎ	০৮	—	ফার্মার	✓	সত্যজিৎ
২২.	সত্যজিৎ	০৮	০১৪০৭০৭৭৭২	ফার্মার	✓	সত্যজিৎ
২৩.	সত্যজিৎ	০৮	—	ফার্মার	✓	সত্যজিৎ
২৪.	সত্যজিৎ	০৮	০১৫১১২২৫২২	ফার্মার	✓	সত্যজিৎ
Total						

Name, Designation and Signature of Facilitators:

- Name, Designation and Signature of Facilitators:
 1. Mohammad Mynul Islam, Jr. Resettlement/ social Safeguard Specialist
 2. Syed Muktadirul Islam, Jr. Environmentalspecialist

10.7 Appendix 7: SOP for Oil & Chemical Handling

1. Aim and Scope

The objective of this SOP is to specify detailed rules, times and responsibilities related to the use, storage and handling of oils and chemicals (hereunder referred to as “chemicals”) within working areas by the Contractor.

This document is to be given by the PIU Responsible person to the Contractor when the contract becomes effective. The Responsible Engineer shall ensure that the Contractor has clearly understood these good practices for chemical handling and shall abide by them.

2. Responsibilities

- Contractor personnel responsible for the task
- Coordinate and ensures that the Contractor is working in accordance with this SOP
- Ensures that personnel assigned to handle and transport chemicals are properly trained and equipped to handle chemicals safely, and prepared to contain and clean accidental spills
- Ensures that chemicals are labelled and placed in designated location according to this SOP
- Provides Safety Data Sheet of the chemicals to be used to the responsible person
- Carry out handling of chemicals from one location to another
- Responsible for regular checks required in the implementation of this SOP

3. Operative Rules

The responsible person of Contractor is to ensure that the SOP is following as per the requirement. This procedure also defines the training requirements, handling methods and precautions to be taken during transportation of chemicals from one site to another, in order to minimize any hazards these chemicals might pose to human beings as well as to the environment.

4. Chemicals handling planning

- The person planning the transfer of chemicals must be informed of quantities to be transferred, the type of packaging and the scheduled locations when assessing the methods and means necessary for the handling.
- The person in charge of the transfer and/or handling of chemicals must:
 - Clearly identify the chemical and be aware of the hazards involved.
 - Ensure that the chemicals being sanctioned for transfer are stored and stacked in a correct and safe manner as detailed in the subsequent clauses of this SOP to avoid accidental spills and possible injuries.
- The Contractor must provide his personnel with the Personal Protective Equipment (PPE), adequate means of transportation and spill control materials.

5. General safety requirements

When a hazardous chemical is handled, the following recommendations should be observed:

- The Contractor must ensure that his personnel are trained in chemical handling and spill management.
- The Contractor must ensure that adequate manpower is assigned to the task in order to carry out the job safely.
- The Contractor has to ensure that the competent personnel are provided with the appropriate PPE.
- Adequate materials should be readily available for spill management and the action to be taken in case of Oil and/or Chemical Spills should include:
 - Use of appropriate PPE
 - Ensure that the necessary spill kit material is handy and used Isolate source
 - Inform responsible person so he can inform the required personnel so that the spill can be contained with minor consequences.

- Contain spill as far as possible, especially if it can go into the road or drains
- Inform the responsible person if the spill is in the road and can cause a hazard to traffic such that he can place warning signs and advise Police to assist controlling traffic, if necessary
- Recover spill using suitable means:
 - (i) Bucket & shovel / dustpan work well on smooth floors
 - (ii) Absorbent pads which can each absorb (approx.) 1 litre
 - (iii) Sand or other oil absorbing particulates
- Recovered chemical and absorbent material is to be dealt with as “hazardous waste”.

6. Chemicals Usage

When using chemicals on work premises, the Contractor has to ensure that the following rules/recommendations apply:

7. Wherever possible, chemicals and their compounds used shall be free from Mercury, Chromium and Zinc.
8. Use CFC and HCFC-free sprays and products.
9. All chemicals used are to be accompanied by the “Safety Data Sheet (SDS)”.
10. Wherever possible, the use of toxic and very toxic substances as well as carcinogenic substances shall be avoided.
11. The Contractor should ensure that any chemicals used within work premises are not stored in a damaged container/drum and that they are labelled properly.

7. Labelling and identifying chemicals

The Contractor should ensure that:

12. In case the container or packaging needs to be changed or substances are to be transferred to a smaller container for safer handling, the Contractor must fix a label to the new container. It must be ensured that the label is firmly affixed to the container or alternatively, the name of the hazardous chemical, as indicated in the original label, is to be clearly written directly onto the new container. Apart from the chemical name, the common name of the chemical is also to be written on the container to ensure that the container's content is easily understood by the personnel who will be using it. Moreover, each container should depict pictograms to indicate constituent chemical properties.
13. When reusing a container, it must be ensured that the original label on the old container is removed to eliminate any possibility of incorrect use of the chemical.
14. When identifying containers, cans, etc. of chemicals, it must be ensured that a permanent marker is used and text is written clearly (preferably in block letters) and in an adequate font size to allow for easy identification.

8. Handling chemicals

All Contractor personnel handling chemicals should adhere to the following rules and recommendations:

1. Handler/end user should be trained in chemical handling prior any handling
2. Use of PPE is mandatory
3. The specific SDS of the chemicals are always to be consulted prior to the handling of a chemical
4. Chemical SDSs for each chemical being used, and safety and environmental information shall be available on site where the chemicals are being used
5. Mixing or pouring of chemicals should be performed on waterproof surfaces to prevent soil contamination
6. Handling of hazardous chemicals (transportation, change of containers, etc.) should always be kept to a minimum
7. Chemical containers are not to be left open and are always to be kept closed when not in use

8. Mixing of hazardous chemicals should be avoided since mixing of incompatible chemicals can induce emissions of toxic gases and other dangerous reactions
9. The right amount of product is to be used (check product instructions to dilute chemicals)
10. Hazardous chemicals are never to be left unattended

9. Storage of chemicals

If any chemicals are to be stored on work premises for the duration of works, the Contractor must ensure that the following rules are put into practice:

1. It should be verified that all legal limits related to chemical storage are being met.
2. Storage areas for the chemicals are to be defined.
3. All dangerous chemicals must be located in the appropriate storage area unless currently in use.
4. Storage areas should always be bunded and covered to avoid leaching of pollutants through rainwater.
5. The capacity of the chemical storage basin or containment should always be the greater
6. Any spill occurring within the bunded storage area shall be isolated from the drainage and sewage systems.
7. It must be ensured that the capacity and characteristics of storage areas, shelves and any other device used to store chemicals are adequate for the specific operation.
8. Good housekeeping must be ensured in storage areas
9. Chemicals cannot be stored and/or located in areas such as passageways, vehicles, and so on.
10. It must be ensured that incompatible chemicals are segregated within the storage areas.
11. Chemical products must be stored according to their compatibility. Acids are to be stored away from bases (such as Alkalis). Flammable products are to be stored away from all other products and especially away from potential fire hazards.
12. Storage areas for explosives shall be designed in such a way as to prevent hits, falls or any other potential cause of explosion and to protect the surroundings against explosions.
13. Chemicals should ideally not be stored under direct sunlight, in warm areas or near heat sources.
14. When storing chemicals, the label and SDS are to be consulted for correct storage of each substance.
15. Certain chemicals or substances have to be stored in well-ventilated areas or at a specific humidity and temperature.
16. It must be ensured that all containers such as drums and their lids are in good condition, are safe to use and there is no possibility for spills or leakages.

10. Control and monitoring activities

The Contractor has the responsibility to:

1. Check periodically for correct identification, handling, use and storage of process chemicals at point-of-use;
2. Check periodically that all waterproof areas where chemicals are located are in good
3. condition and that there are no surface irregularities or cracks. This is especially important for storage of large containers;
4. Check periodically for spills and leaks;
5. Check periodically on the correct use of products by his personnel and give adequate training if deemed necessary.
6. Visual checks shall suffice.

11. Abnormal conditions and emergency situations

In case of an accident or emergency such as spills, dangerous chemical reactions, etc., the Contractor shall ensure that the following recommendations are followed:

1. Necessary safety protection devices (gloves, glasses, etc.) are to be worn
2. The hazardous chemical causing the problem is to be identified
3. If the level of risk is acceptable, all valves are to be isolated and taps turned off in order to stop the spill from spreading further out in the accident area as well as to contain the spill as much as possible and stop it from reaching unprotected areas, such as areas which are not waterproof, sewage discharges, etc.;
4. The Responsible Person is to be informed so as to intervene;
5. The accident area is to be cordoned off;
6. Given that the danger level is acceptable, appropriate materials are to be used to clean up the spill. Rags, sawdust or other combustible materials are not to be used to collect combustible agents or flammable chemicals;
7. Access to the area is only to be allowed when the spill has been contained, cleaned and the area is risk free.
8. In case of damage to a container, this is to be replaced and it must be ensured that the container is clearly and correctly identifiable and disposed of in the appropriate manner.
9. Proper absorbent materials should always be readily available for use close to all chemical storage and handling areas.

10.8 Appendix 8: Spoil Management Plan

A. Introduction

Spoil is defined as any earthen material that is surplus to requirements or unsuitable for reuse in fill and embankments (such as unsuitable rock and soil material) or material that is contaminated. The proposed khal re-excavation or re-sectioning works will generate a significant quantity of dredged sediments and excavated materials. These sediments are typically heterogeneous in nature and are expected to contain silty clay, sandy silt, and a significant proportion of organic sludge, polyethylene waste, microplastics originating from household wastewater connections and urban discharge sources. If not properly managed, the excavation, handling, and disposal of such spoil may result in secondary environmental impacts, including contamination of surface water bodies, odor nuisance, public health risks, and degradation of surrounding land. So, proper management of this spoil is critical to ensure that construction activities do not adversely affect the hydraulic performance of the khal, surrounding land use, or the local environment.

In this context, the present Spoil Management Plan (SMP) has been prepared as a part of the Initial Environmental Examination (IEE) and Environmental and Social Management Plan (ESMP). The SMP establishes a structured and enforceable framework for the classification, handling, reuse, transport, and disposal of spoil materials in compliance with the Safeguard Policy Statement (2009) of the Asian Development Bank and the applicable environmental regulations of the Department of Environment.

B. Characteristics and Classification of Spoil

The spoil expected to be generated from canal excavation in Bandarban Pourashava will primarily consist of fine-grained sediments such as silty clay and sandy silt, along with organic sludge characterized by high moisture content and anaerobic conditions. The main types of spoil anticipated include:

- **Bed sediments:** Typically comprising silty clay, clayey silt, and fine sand deposited due to reduced flow velocity over time.
- **Bank materials:** Including cohesive clay and sandy clay obtained from re-sectioning of canal slopes.
- **Organic deposits:** Such as decomposed vegetation and humus-rich material, especially in stagnant reaches.
- **Potentially contaminated sediments:** Particularly domestic wastewater discharge, local bazar waste, agricultural chemicals etc.

Prior to large-scale excavation, representative sediment samples will be collected and analyzed in a recognized laboratory. The testing program will include analysis of sediments such as PH, Organic Matter, Zn, Sulfur, Lead and Nitrate. Based on the results, spoil will be categorized into non-contaminated material suitable for reuse, marginal material with limited engineering value, and

contaminated material requiring controlled handling and disposal. No spoil will be reused without prior classification and approval by the supervising engineer.

C. Spoil Generating Activities

Spoil will primarily be generated from excavation and dredging activities associated with khal improvement works. These activities will be carried out using mechanical equipment (e.g., excavators) or, in some cases, manual methods. Key spoil-generating activities include:

- Clearing of aquatic vegetation, debris, and obstructions from the khal
- Stripping and preservation of topsoil from canal banks
- Dredging/desiltation of accumulated sediments from the khal bed
- Excavation for widening and re-sectioning of canal cross-sections
- Formation and trimming of side slopes
- Handling, transportation, and temporary stockpiling of excavated materials

D. Spoil Management Approaches

1. General Approach and Management Principles

The management of spoil generated from khal excavation will be undertaken in a systematic and environmentally sound manner to minimize adverse impacts on water quality, land use, and surrounding communities. The approach follows the mitigation hierarchy recommended by the Asian Development Bank Safeguard Policy Statement (2009), emphasizing avoidance, minimization, reuse, and controlled disposal. The key principles guiding spoil management are:

- **Avoidance and minimization:** Excavation will be limited strictly to the designed cross-section and depth to prevent unnecessary generation of spoil. Over-dredging and side slope over-cutting will be avoided through proper setting out and supervision.
- **Segregation of materials:** Different types of spoil (e.g., topsoil, suitable fill, organic material) will be identified and handled separately to maximize reuse potential and prevent contamination.
- **Maximization of reuse:** Priority will be given to on-site reuse of spoil for embankment improvement, land development, and slope stabilization.
- **Environmental protection:** Measures will be implemented to prevent spoil from entering water bodies, blocking drainage, or causing erosion and sedimentation.
- **Community safety and acceptance:** Spoil handling and placement will consider local land use, access, and community concerns, ensuring minimal disturbance.

2. Pre-Construction Phase Measures

Prior to commencement of excavation works, the Contractor, under the supervision of Pourashava/ MDSC, will undertake detailed planning to ensure effective spoil management. This will include:

- **Spoil balance estimation:** Preparation of a spoil quantity estimate (cut vs. fill) to identify surplus or deficit material along different reaches of the khal.
- **Identification of reuse areas:** Suitable locations for on-site reuse will be identified including canal embankment raising zones, Low-lying public or privately consented lands, Maintenance Road alignments.
- **Selection of temporary stockpile sites:** Stockpile locations will be selected based on:
 - Minimum 3–5 m setback from khal edge
 - Non-flood-prone areas
 - Avoidance of agriculture and household land
- **Approval of disposal sites:** In case of excess spoil, designated disposal sites will be identified and approved by Pourashava authorities.
- **Access and haul route planning:** Transportation routes will be selected to minimize impacts on local traffic, settlements, and sensitive receptors.

3. Excavation and Dredging Phase Measures

During excavation and dredging operations, appropriate control measures will be implemented to minimize environmental impacts.

3.1 Control of Sediment Disturbance

- Excavation will be conducted in a controlled and phased manner to limit re-suspension of fine sediments.
- Machinery will be operated carefully to avoid unnecessary disturbance of the khal bed.

- Dredging activities will, where feasible, be scheduled during low-flow conditions.

3.2 Management of Stockpiles

Temporary stockpiles will be managed as follows:

Stockpile Management:

- Spoil heaps will be formed with stable side slopes to prevent collapse
- Height of stockpiles will be controlled to ensure stability
- Compaction will be applied where necessary to minimize erosion

Erosion and Runoff Control:

- Temporary drainage channels will be provided around stockpiles
- Sandbags or small bunds will be used to contain runoff
- Stockpiles will be protected during heavy rainfall through covering or stabilization

3.3 Segregation and Topsoil Management

- Topsoil (typically 100–150 mm) will be stripped prior to excavation and stored separately
- Topsoil stockpiles will be clearly marked and protected from mixing with subsoil
- Stored topsoil will be reused for slope vegetation, landscaping, and site restoration
- Any contaminated material identified will be isolated, labeled, and handled separately

3.4 Protection of Water Quality

- Under no circumstances will spoil be dumped into the khal or any flowing water body
- Refueling and maintenance of equipment will be carried out away from water bodies to prevent contamination

3.5 Transportation of Spoil

Transportation activities will be managed to minimize environmental and social impacts:

- **Vehicle Management:**
 - Trucks will be properly maintained and operated within safe loading limits
 - Vehicles carrying fine materials will be covered with tarpaulin
- **Dust Control:**
 - Water spraying will be conducted on haul roads during dry conditions
 - Vehicle speeds will be controlled to reduce dust generation
- **Traffic Management:**
 - Designated haul routes will be used
 - Transport activities will be scheduled to avoid peak traffic periods where feasible
 - Traffic signs and flagmen will be deployed in congested areas
- **Community Safety:**
 - Access to local roads, bazar and residential areas will be maintained
 - Additional precautions will be taken near schools and sensitive locations

E. Reuse of Spoil

Beneficial reuse of spoil will be prioritized to the maximum extent feasible.

1. On-site Reuse

Spoil will be utilized within the project area for the following purposes:

- Raising and strengthening canal embankments for improved flood protection
- Filling adjacent low-lying areas to reduce waterlogging (subject to consent)
- Slope shaping, trimming, and stabilization
- Landscaping and greenbelt development

All reused material will be placed in controlled layers (typically 150–200 mm thickness) and compacted to achieve required stability. Topsoil will be applied over finished surfaces to facilitate vegetation growth.

2. Off-site Reuse

Where surplus spoil is generated, it may be reused in nearby development or infrastructure projects, subject to appropriate agreements and environmental safeguards.

Disposal of Spoil

All excavated spoil material shall be managed in strict adherence to environmental safeguarding protocols to prevent ecological degradation. Under no circumstances shall spoil be disposed of into the khal, existing drainage networks or any flowing or stagnant water bodies.

To promote sustainable resource management, a mandatory post-construction soil and sediment quality assessment shall be conducted on the surplus spoil stockpiled at the temporary storage sites

upon completion of the excavation works. The contractor, under the supervision of the MDSC, must test the remaining spoil.

If the laboratory test results confirm the absence of toxic or hazardous substances, and the parameters fall within acceptable environmental thresholds, the Bandarban Pourashava authority will reuse the remaining spoil. This spoil will be further utilized for landfilling purposes, site elevation, or other Pourashava development projects. Conversely, should the results indicate the presence of notorious or toxic substances, the material must be promptly removed and safely disposed of at a designated hazardous waste facility approved by the supervision consultant and local authorities.

F. Monitoring and Reporting

The implementation of the SMP will be subject to regular monitoring by the contractor and supervision consultant. The contractor will maintain daily records of spoil generation, reuse, and disposal, while the consultant will conduct periodic inspections to verify compliance with the SMP. All monitoring and spoil management records will be included in the monthly environmental monitoring reports submitted to LGED. Any non-compliance issues identified during monitoring will be addressed promptly through corrective actions.

G. Institutional Responsibilities

The contractor will be responsible for the day-to-day implementation of the SMP, including spoil handling, transport, and record-keeping. The supervision consultant will oversee compliance, review spoil classification results, and provide guidance on corrective measures where necessary. LGED, in coordination with the Pourashava, will provide overall oversight, approve disposal sites, and ensure that the project complies with national regulations and ADB safeguard requirements.

10.9 Appendix 9: Approved DoE Letter for IUGIP

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
পরিবেশ অধিদপ্তর
পরিবেশ ভবন, ই/১৬ আগারগাঁও
শেরে বাংলা নগর, ঢাকা-১২০৭।
www.doe.gov.bd

স্মারক নং-২২.০২.০০০০.০১৮.৭২.০২৯.২৩.৩৭৭

তারিখ: ২০/০৬/১৪৩০ বঙ্গাব্দ
২৫/০৬/২০২৩ খ্রিস্টাব্দ

বিষয়: Improving Urban Governance and Infrastructure Program (IUGIP) শীর্ষক কর্মসূচীর অনুকূলে
পরিবেশগত ছাড়পত্র প্রদান প্রসঙ্গে।

সূত্র: আপনার ০৬/০৬/২০২৩ ইং তারিখের আবেদন।

উপর্যুক্ত বিষয় ও সূত্রের পরিপ্রেক্ষিতে নির্দেশক্রমে জানানো যাচ্ছে যে, পরিবেশ অধিদপ্তর, সদর দপ্তরের পরিবেশগত
ছাড়পত্র বিষয়ক কমিটির ৪৯৯ তম সভায় Improving Urban Governance and Infrastructure Program
(IUGIP) এর অনুকূলে দাখিলকৃত আইইই প্রতিবেদন ও অন্যান্য কাগজপত্র সভায় পর্যালোচনা করা হয়। পর্যালোচনাত্তে,
আলোচ্য কর্মসূচীর অন্তর্গত প্রকল্পসমূহ পরিবেশ সংরক্ষণ বিধিমালা, ২০২৩-এর তফসিল-১-এ উল্লিখিত প্রকল্পসমূহের চেয়ে ক্ষুদ্র
হওয়ায় বিধি মোতাবেক ছাড়পত্র প্রদানের অবকাশ নেই মর্মে সিদ্ধান্ত গৃহীত হয়।

মাসুদ ইকবাল মোঃ শামীম
পরিচালক (পরিবেশগত ছাড়পত্র)
ফোন: ০২-২২২২১৮৩৪২

প্রধান প্রকৌশলী
স্থানীয় সরকার প্রকৌশল অধিদপ্তর
আগারগাঁও, শেরে বাংলা নগর, ঢাকা।

অনুলিপিঃ

১। সহকারী পরিচালক, মহাপরিচালক মহোদয়ের শাখা, পরিবেশ অধিদপ্তর, সদর দপ্তর, ঢাকা।
২। প্রকল্প পরিচালক, UGHP-III, লেভেল-১২, এলজিইডি ভবন, আগারগাঁও, শেরে বাংলা নগর, ঢাকা।