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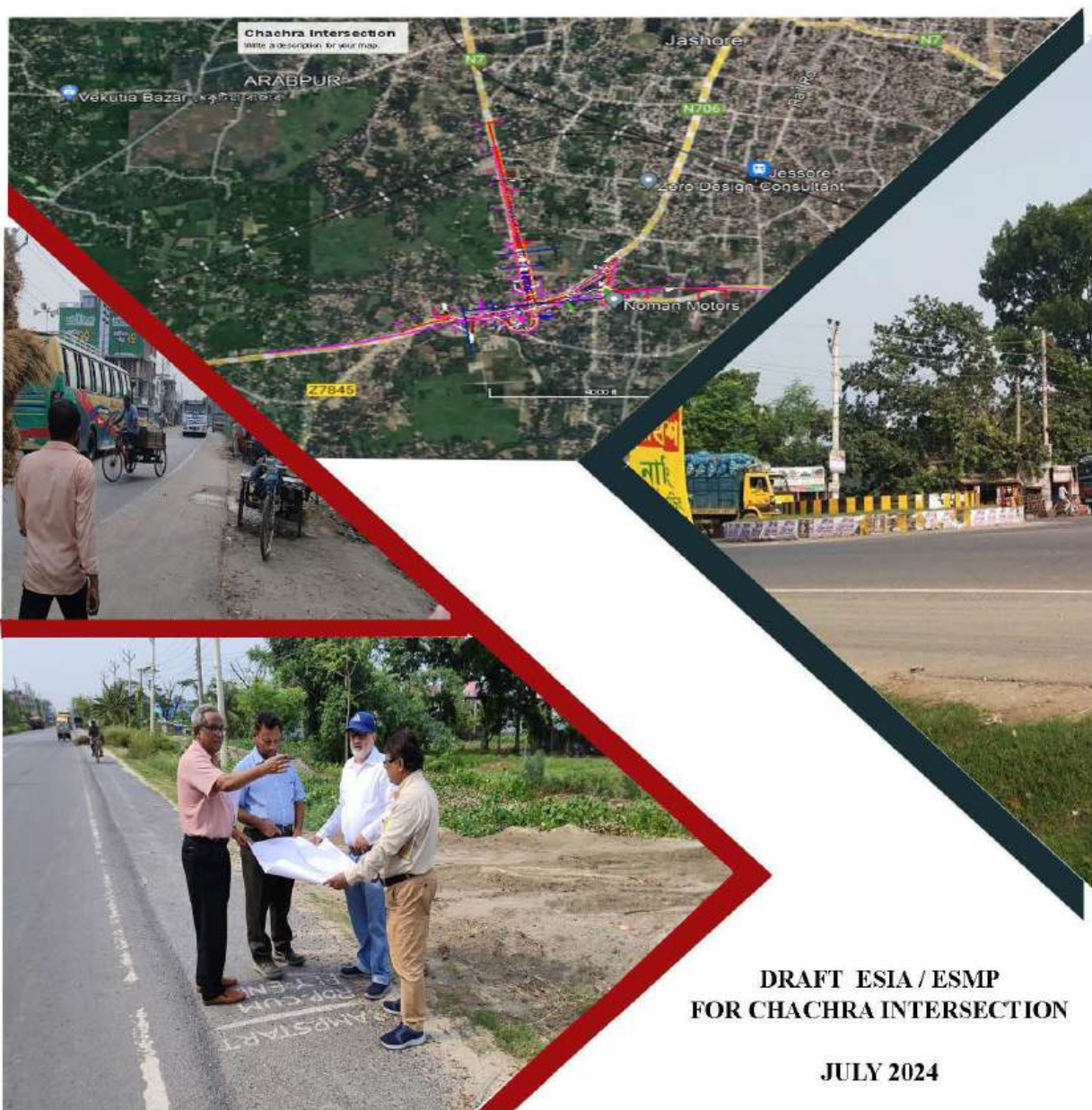


GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH
MINISTRY OF ROAD TRANSPORT AND BRIDGES



ROADS AND HIGHWAYS DEPARTMENT

**Environment and Social Assessment & Management Plans and Resettlement Actions Plan
for Chachra Intersection Improvement under Package (SP-06) (RHD)
As an Additional Works
Western Economic Corridor and Regional Enhancement (WeCARE) Program**



**DRAFT ESIA / ESMF
FOR CHACHRA INTERSECTION**

JULY 2024

JOINT VENTURE OF



STUP CONSULTANTS PVT. LIMITED (STUP), INDIA



BCL ASSOCIATES LIMITED (BCL), BANGLADESH

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AASHTO		American Association of State Highway and Transportation Officials
ADB		Asian Development Bank
AMAN		Rice (grown in wet season)
APHA		American Public Health Association
ARIPA		Acquisition and Requisition of Immoveable Property Act
As	mg/	Arsenic
BD		Bangladesh
BIWTA		Bangladesh Inland Water Transport Authority
BNBC		Bangladesh National Building Code
BOQ		Bill of Quantities
Boro		Rice (grown in dry season)
BRTA		Bangladesh Road Transport Authority
BTCL		Bangladesh Telecommunication Company Limited
BWDB		Bangladesh Water Development Board
C-ESMP		Construction Environment and Social Management Plan
CCL		Cash Compensation under Law
C&D		Construction and demolition
CITES		Convention on Trade in Endangered Species
CO	mg/l	Carbon Monoxide
CoI		Corridor of Impact
COVID		Coronavirus Disease
CPRs		Community Property Resources
CSC		Construction Supervision Consultant
DMMP		Dredged Material Management Plan
DC		Deputy Commissioner
DO	mg/l	Dissolved Oxygen
DoE		Department of Environment
DoF		Department of Forest
EA		Executive Agency
ECA		Environmental Conservation Act
ECR		Environmental Conservation Rules
EIA		Environmental Impact Assessment
ESMP		Environmental and Social Management Plan
EMoP		Environmental Monitoring Plan
Engineer		The construction supervision consultant/ engineer
EPAS		Environmental Parameter Air Sampler
EPC		Engineering Procurement and Construction
EQS		Environmental Quality Standards
ESMP		Environmental and Social Management Plan
ESSU		Environmental and Social Safeguards Unit
FC		Faecal Coliform
FGD		Focus Group Discussion
FOB		Foot Over Bridge
FSCD		Fire Services & Civil Defense
GBV		Gender Based Violence
GHG		Greenhouse Gases
GoB		Government of Bangladesh
GPS		Global Positioning System
GRC		Grievance Redress Committee
GRM		Grievance Redress Mechanism
ha		Hectare
ICTPs		International Conventions, Treaties and Protocols
IEC		Individual Environmental Consultant
INGO		Implementing Non Government Organization
IoL		Inventory of Losses
IFC		International Finance Corporation
IRC		Indian Roads Congress
IUCN		International Union for Conservation and Nature
JPBS		Jashore Palli Biddut Samity
LGED		Local Government Engineering Department
km		Kilometre

km/h		kilometre per hour
KML		Keyhole Markup Language zipped Google Earth
NM		Noise Measurement
NO	mg/l	Nitric Oxide
NO ₂	mg/l	Nitrogen Dioxide
MoEFCC		Ministry of Environment, Forestry and Climate Change
MoRTB		Ministry of Road and Bridges
O ₃	mg/l	Ozone
OHS		Occupational Health and safety
PAP		Project Affected Person
PDPs		Project Displaced Persons
PIU		Project Implementing Unit
PM ₁₀	mg/l	Particulate Matter (less than or equal to 10 microns)
PM _{2.5}	mg/l	Particulate Matter (less than or equal to 2.5 microns)
POP		Pedestrian Overpass
PPE		Personal Protective Equipment
PPV	mm/s	Peak Particle Velocity
PWD		Public Works Department
RAP		Resettlement Action Plan
RoW		Right of Way
SO _x	mg/l	Sulfur Dioxide
RHD		Roads and Highways Department
TC		Total coliform
TDS	mg/l	Total Dissolved Solid
TOC	mg/l	Total Organic Carbon
TSS	mg/l	Total Suspended Solid
TPP		Tree Plantation Plan
VOP		Vehicle Overpass
WHO		World Health Organization
WMM Plant		Wet Mix Macadam Plant

Executive Summary

INTRODUCTION

ES 1) The Government of Bangladesh (GoB), with the financing of multilateral funding agencies – the World Bank (WB) and Asian Infrastructure Investment Bank (AIIB) – has initiated the Western Economic Corridor & Regional Enhancement (WeCare) program to provide efficient, safe, and resilient connectivity along a section of a regional transport corridor in the western region of the country and strengthen road sector management

ES 2) Chachra More Junction is in Jashore City and is the endpoint of the Phase-1 Road. NH 7 and NH 706 intersect each other at this point and form an essential intersection of the Jhenaidah Jashore Khulna (N-7) Highway and the Bhanga—Narail—Jashore—Benapole Project Alignment. To ensure uninterrupted Traffic Movement toward Khulna and Benapole, a comprehensive solution is required at this “T” Junction Intersection (Chachra More). As the implementation of the proposed Bhanga—Narail—Jashore—Benapole Project is being delayed due to unavoidable circumstances, it was discussed with the WB mission between 14 and 23 February 2023 to include the improvement of this intersection as an Extension of Phase-1 implementation.

ES 3) An Environmental and Social Impact Assessment (ESIA) for the Jashore—Jhenaidah section of the corridor was updated in 2022, and an environmental clearance certificate from the Department of Environment (DOE) has been accorded, including this Chachra intersection. It is agreed to carry out an ESIA/ESMP study to meet the Environmental and Social Framework (ESF) requirement for this intersection improvement as an addendum to the consultant's original contract, considering the project has been categorized as high-risk.

POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

ES 4) Relevant environmental and social policies, laws, regulations, and rules of the country, the international treaties as well as the WB's Environmental and Social Standards (ESS) have been reviewed along with their applicability and gaps.

ES 5) As per the Environmental categorization by GoB, the road sector projects including bridge construction have been categorized as both orange and red categories based on its length. As per the categorization, the project falls under Red Category, Item 39: Bridge/flyover construction (more than 500m) and therefore requires the preparation of an Environmental Impact Assessment (EIA). A Terms of Reference (ToR) for EIA is needed to be prepared according to ECR, 2023 and has to be approved from Department of Environment (DoE).

ES 6) The current project involves upgrading the Chachra Intersection, the endpoint of the Jhenaidah – Jashore National Highway (Phase 1), for which the RHD has already obtained and renewed environmental clearance from the regulatory authority (DOE). As such separate environmental clearance for Chachra Intersection will not be needed.

DESCRIPTION OF PROJECT

ES 7) Phase 1 (Jhenaidah-Jashore Road Section) is an important Western link which connects the Bonpara-Jhenaidah Road on the Northern Side and the Bhanga-Benapole Road Section on the Eastern Side. As an extension to the Phase 1 Study, the Chachra More Intersection Study has been commissioned and this study therefore constitutes the Chachra More Intersection Improvement Study. Chachra More Junction is located in Jashore City of Bangladesh. It is endpoint of the project road. Two National Highway, N7 and N706, are intersecting at this point to form a major intersection. Jashore Intersection/Chachra Circle Junction is end point of Jhenaidah-Jashore Section.

ES 8) The current project will involve upgradation of Chachra More Intersection including Trumpet arrangement, construction of flyovers/ bridges, pedestrian crossing facilities such as POP, FOB's and Pedestrian subways.

DESCRIPTION OF THE BASELINE ENVIRONMENTAL AND SOCIAL BASELINE

ES 9) The Chachra intersection is in Jashore Sadar Upazila, Jashore district, in the country's southwestern region. The topography of the project area is a flat plain. The study area mainly covers the Ganges deltaic deposits of the Late Holocene to the recent age. The south of Bangladesh is a seismically severe zone represented by Zone II with a Bask coefficient of 0.05. So, considering Bangladesh's seismic zoning, the project area is less vulnerable to earthquakes. Soil profiles of the area characteristically have textural classification ranging from silt loam to silty clay loam in most of the horizons.

ES 10) The predominant land use pattern within the affected area is Vegetation area (30.77%), followed by buildup area (28.78%), agricultural land (20.94%), Low land (8.61%), Road (4.91%), Ponds and water bodies (3.86%), Railway (0.78%), River (0.72%), Hatchery (0.41%) and Canal (0.21%).

ES 11) Jessore district has a humid subtropical climate with large variations between summer and winter temperatures. The annual average temperature is 31.3 C, with a maximum of 31.3 C and a minimum of about 16° C. In the study area, annual average rainfall is 1,651 mm. Humidity during the monsoon season is high, with a maximum average relative humidity of 93.9% in August and a minimum of 55.4% in March. The south-westerly monsoon begins in the middle of March and ends around the end of September. From March to October, monsoon winds blow from the south with sustained force; in January, winds blow from the north and northeast. February is a quiet month, with foggy mornings.

ES 12) Primary field investigation covering ambient air quality at three (03) locations, noise and vibration level at three (03), Surface water at three (03) locations, and groundwater quality at two (02) locations monitoring has been carried out along Project Road. According to monitoring results, dust particles (particulate matter) e.g., PM_{2.5}, PM₁₀, SPM, and gaseous pollutants such as NO₂, SO₂, CO, CO₂, O₃, etc. have been monitored. Air quality results are within national standard for PM_{2.5}, NO₂, CO and O₃ but higher for SO₂ and at one location for PM₁₀. Noise levels are within standards in one location, and exceeding standards in the other two locations. The average vibration level is from 0.58 to 1.06 mm/s on the existing highway.

ES 13) The results from surface water analysis show that all the measured parameters are well within the National Standards. In ground water samples, coliforms and Arsenic were observed in all locations. pH was lower in one location and apart from that, all other measured parameters are well within the National Standards.

ES 14) A total of 195 species, including herbs, shrubs, trees, and climbers, have been recorded from both terrestrial and aquatic habitats of the study area. About 88 tree individuals are likely to be affected by the improvement of the Chanchra intersection, which are present from Chanchra towards Benapole Road. The following trees belong to the Road and Highway Department (RHD)/Zila Parishad. According to the Forest Department, social forestry was not practiced in this part of the road.

ES 15) 237 households will likely be affected in Chachra and Mondolgati mouza due to land acquisition for proposed project. Average household size in the project area is 4.25 per person. Sex ratio is 1.133. Population pattern of the affected households shows that the total affected population is 1007. There are no indigenous people/ethnic in the project-affected area.

ANALYSIS OF ALTERNATIVE ALIGNMENTS

ES 16) Five alternative alignment options have been considered in the design of Chachra Intersection in order to ensure smoother flow in traffic and improved geometry. It was studied considering the social impacts, environmental impacts and the costs involved. After thorough analysis, option 3 was revised and considered as the most feasible alignment option.

ES 17) “With the project” and “Without Project” options have also been studied by working on CO₂ emissions for both. It is found that there will be a reduction in the “With the Project” option. Thus, recommended for implementation.

CONSULTATIONS, PUBLIC PARTICIPATION, AND INFORMATION DISCLOSURE

ES 18) Total of Fifteen (15) events, comprising two (2) stakeholder consultations, five (5) focus group discussions (FGDs), and eight (8) key informant interviews (KIIs), were conducted in April and May 2024. Focus groups and stakeholder consultation meetings for Chachra Intersection were attended by 226 individuals, comprising 150 men and 76 women, excluding the KII participants.

ES 19) Throughout the consultation process, the following topics were discussed with the relevant parties: Project objectives and benefits, Land acquisition (LA) and involuntary resettlement for proposed development, as well as the LA process, compensation process, issues of gender-based violence, human trafficking, and the need for skill development under the Livelihood Restoration Program for poor and vulnerable households. Influx of workers during construction, removal of trees to make way for road sections, impact on pedestrian safety, pollution and drainage due to movement of construction vehicles and equipment.

ES 20) Though people agreed with proposed development but with some demand which have been addressed/considered in design as well as in updated ESMP and RAP for project such as, effective drainage system and necessary bridge over the pool and culvert, provision for underpass or foot over bridge and pedestrian over pass, realignment of channel connecting Mukteshwary River, inclusion of toilet blocks, extension of present roadway, widening of RoW, Provision of adequate lighting system, noise barriers and retaining walls.

ENVIRONMENTAL AND SOCIAL IMPACTS, RISKS, AND MITIGATION MEASURES

ES 21) Environmental risks have been studied in this section of the updated ESIA based on the collected data. According to IoL about 942 are likely to be removed out of which 195 are large trees, 346 are medium trees, 308 are small trees and 93 are saplings. Of these, about 500 trees that fall along the corridor that will need to be cut has been considered for compensatory plantation. In RHD, three saplings will be planted for each tree that will be cut; accordingly 1500 trees are proposed to be replanted as compensation. For the remaining trees (mostly private), compensation will be paid by DC to titleholders and RHD will disburse to the non-titleholders as per RAP.

ES 22) The dust emission/ air pollutant emissions due to movement of construction vehicles/plants during construction and the gaseous air pollutant emission from vehicular exhaust during operation phase will have impact on the existing air quality within the project area. Construction activities that contribute to air pollution include land clearing, operation of diesel engines, demolition, loading and unloading of construction materials, movement of material transporting vehicles, and operation of hot mix plant. A safe distance of 500m away in downwind of from the residential areas has been recommended for establishing the HMP. Construction phase environmental impacts on air pollution will be short term and localized. It can be mitigated with proper maintenance of vehicles, equipment's, plants and also by following dust suppression methods.

ES 23) Operation of equipment/machinery or other activities such as piling, excavation etc. at construction site/camp will be main source of increased sound levels in and around the area. The construction equipment is expected to produce noise levels in the range of 74 - 101 dB (A) at construction site. With point source of a strength of 95 dB (A) at a reference distance of 2m, the noise produced will not exceed 45 dB (A) beyond 250 m from the boundary of construction yard. Noise barriers to control the impacts at the source like silencers, mufflers etc. and at the receptor end like usage of ear plugs significantly reduce the impacts.

ES 24) Soil of the haulage roads and construction camp area may be compacted due to movement of construction vehicles, machineries and equipment, and due to siting of construction camps and workshops. Soil may get contaminated due to inappropriate disposal of liquid waste, like lubricant and fuel spills; washing effluent from vehicles and equipment) and solid waste (fuel filters, oily rags) likely to be generated from repair and maintenance of transport vehicles, construction equipment and machinery and due to inappropriate disposal of domestic solid waste and sewage from construction camps. Mitigation measures include proper storage and limiting movement to identified routes.

ES 25) To reduce the impacts on the socioeconomic environment, a separate Resettlement Action Plan (RAP) has been prepared. The mitigation measures include Payment of Cash Compensation, Payment of Top-up, compensation for the loss of pond and private trees, social and economic development support to restore the livelihoods of women and vulnerable groups, Grievance Redress Mechanism (GRM), etc.

ES 26) Mitigation measures are suggested to ensure Community Health and Safety, barricading excavated areas and to prevent trespassing from construction sites/construction camps/labor camps, provision of warningsign boards, prevention of water logging at the construction sites to prevent community exposure to water- borne, vector-borne diseases, and communicable and non-communicable diseases.

ES 27) Measures to prevent impacts on gender, SEA/SH, the contractor will take the mitigation measures including the installation of Close circuit cameras at prominent locations such as contractor's facilities/office/camps/canteen, etc.; necessary arrangements and systems for effective and timely patrolling to ensure the safety of the women and girls; implementation of a SEA/SH-free work environment at the project site in; measures for preventing gender-based discrimination and violation; Any type of sexual harassment shall be dealt strictly with as per local law of the country; Code of conduct (CoC) will be rolled out which need to be signed by the worker; Staff shall be encouraged to report suspected or actual GBV or SEA/SH incidences; Grievance redress mechanism is suggested to be established at the site to address the issues immediately.

LABOR MANAGEMENT PROCEDURE

DRAFT ESIA REPORT Joint Venture of



STUP Consultant Pvt. Ltd.
On July 1st, 2021, STUP was acquired by Assystem and rebranded as Assystem STUP.



BCL Associates Limited, Bangladesh

ES 28) The Labor-Management Procedure (LMP) has been prepared to ensure that the project complies with the Bangladesh Labor Act of 2006, as well as the World Bank's Environmental and Social Framework (ESF), and Environmental and Social Standard (ESS). The whole process of hiring and recruitment will be conducted considering the standard procedure of relevant rules and regulations (national and international) as well as rolling out of code of conduct for workers.

ES 29) The contractor will follow the CoC/LMP for employment, remuneration, leaves, holidays, housekeeping, facilities e.g., lodging, drinking water supply, sanitation, and waste disposal, supply of fuel/cooking gas, firefighting, medical services, etc.

EMERGENCY RESPONSE AND DISASTER MANAGEMENT PLAN

ES 30) To prevent untoward incidents/accidents due to construction activities, an Emergency Response and Disaster Management Plan is presented to manage emergency and crises arising from construction activities. ESMP will be included in the contractor bidding document to implement the mitigation measures as a mandatory requirement to comply by the contractor.

ES 31) It is suggested in the ESMP, that the contractor will engage a Safety specialist. The contractor must formulate a Site Emergency Response Team (SERT) wherein senior management of the level of Project Management and Deputy Project Management besides others will be there to deal with the emergency depending upon the severity.

ES 32) Any emergency must be reported immediately to CSC and PIU to address the situation at the district level or national level if required. It is also advised that the contractor must maintain up-to-date information on local authorities, nursing homes/clinics or hospitals or ambulances.

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

ES 33) An updated environmental and social management plan (ESMP) is devised for the sustainable development of the project. It is prepared for Design/preconstruction, Construction, and Operation/Post-construction phases.

ES 34) A matrix suggesting mitigation measures for different construction activities along with the implementation agency and responsible agency has been presented in the ESMP. It includes institutional agreement, capacity building measures; tree and shrubs plantation; environmental checklists for environmental monitoring; reporting procedures, and budgetary cost estimates.

ES 35) Environmental monitoring of vital environmental pollutants such as ambient air quality, ambient air concerning noise, soils, and sediments, and vibration has been suggested in the updated ESMP. In addition to this, a provision is made that the contractor will purchase portable environmental monitoring equipment for each contract as an obligatory requirement of ESMP for random monitoring by PIU and CSC. This equipment will keep at PIU.

ES 36) The budgetary cost estimates for implementation of construction and operation phase EMP for the Intersection of Chachra More, Jashore is One Crore Four Lacs Thirty-Seven Thousand Nine Hundred Taka only (BDT 1,04,37,900 inclusive of 10 % Contingency).

1 INTRODUCTION

1.1 PROJECT BACKGROUND

1. Bangladesh is one of the most populous and densely populated countries¹ in the world, with an estimated population of 167 million in 2019 and a geographical area of about 144,415 km². The country is vulnerable to floods and tropical cyclones. Its per capita income is reportedly well above the middle-income country threshold, which it crossed in the financial year (FY) 2014.

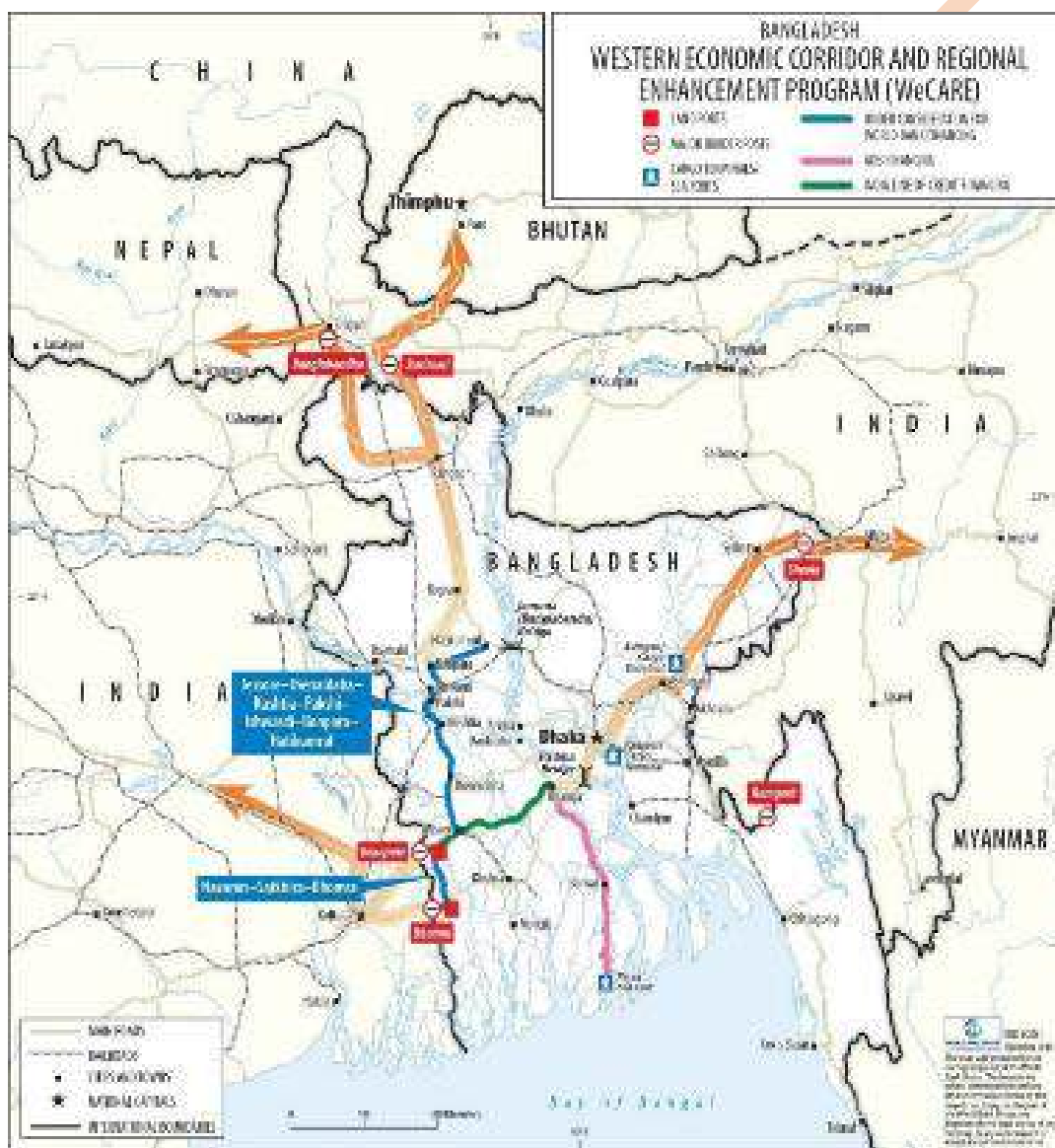


Figure 1-1: WeCARE Program Road Network

2. Road transport is the prevalent mode of transport in the country and has also greatly developed an extensive transport system, particularly road transport. About 70% of passenger traffic and 60% of freight are on road transport. The total road network size of the country is roughly 375,000 km (road density of roughly 250 km per 100 km²). The primary road network² is congested and in poor condition. The average speed on the primary network is less than 30 km/hour.² The existing road network is operating at or near maximum

1 Project Information Document (PID), Concept Stage | Date Prepared/Updated: 06-Jun-2019 | Report No: PIDC26456
 2 Project Appraisal Document, WeCARE, PAD3635, The World Bank

capacity and cannot keep up with rapidly increasing demand. This is one of the reasons for the high logistic costs and constraining the country to play a more active role in regional integration through its strategic geographical location.

3. However, the country has made tremendous progress in improving connectivity, particularly at the subnational levels, but it still needs considerable investment in improving, upgrading, and maintaining the current road network.

4. Accordingly, the Government of Bangladesh (GoB), with the financing of multilateral funding agencies – the World Bank (WB) and Asian Infrastructure Investment Bank (AIIB) – has initiated the Western Economic Corridor & Regional Enhancement (WeCare) program to provide efficient, safe, and resilient connectivity along a section of a regional transport corridor in the western region of the county and strengthen road sector management, as shown in Figure 1-1. This program is a ten (10) year initiative with four phases that will cover ten (10) districts. It has the following five (5) components.

- ▶ Upgrading National Highway Corridor and Enhancing Digital Connectivity
- ▶ Upgrading Rural Roads and Enhancing
- ▶ Digital Connectivity Developing Complementary Logistics Infrastructure and Services
- ▶ Improving Road Sector Management and Institutional Capacity
- ▶ Contingent Emergency Response

5. The RHD is upgrading about 260 km of national highways as Western Corridor, which will be undertaken in this program. The Western Corridor comprises the Hatikumrul to Jhenaidah (150Km), the Jhenaida – Jashore Road Section (48.7Km), and the Navaron – Satkhira – Bhomra Road (62Km). Out of this, the WB is financing the Jhenaidh to Jashore section in Phase -1, Navaron – Satkhira – Bhomra in Phase 3 is being financed by the World Bank, and the Hatikumrul to Jhenaidah section is being paralleling financed by the AIIB. The World Bank is also financing LGED, which aims to improve high-volume Upazila Roads and Union Roads, predominantly used by commercial vehicles and connected to the main transport arteries. Besides this, other rural infrastructure, such as rural markets, will be improved to promote inclusive growth by expanding economic opportunities to the poorer rural communities.

6. M/s STUP Consultants Pvt. Limited, India, in JV with BCL Associates Limited of Bangladesh, has been appointed by the RHD as an Environmental and Social Consultant for the Consultancy Services for Environmental and Social Management of Jhenaidah-Jashore Road Section (Phase-1) and Navaron-Satkhira-Bhomra Road Section (Phase-3) (Contract No: SP-06). Per the Contract Agreement, the Consultant has completed Phase 1 and submitted the updated reports, which the World Bank has now accorded.

1.2 NEED FOR THE CHACHRA INTERSECTION IMPROVEMENT

7. The Jhenaidah—Jashore Road Section is an important Western link that will greatly enhance the economic development along the Western Corridor, connecting the Bonpara—Jhenaidah Road on the North Side and the Bhanga—Benapole Road Section on the East Side. Currently, the Jhenaidah—Jashore Road Section of Phase-1, approximately 48.7 km, is under construction with the World Bank financing in Phase 1. This road connects the Natore, Pabna, and Kushtia districts to the Jashore, Khulna, and Satkhira districts. Chachra More Junction is in Jashore City and is the endpoint of the Phase-1 Road. NH 7 and NH 706 intersect each other at this point and form a major intersection, as shown in Figure 1-2³. This busiest intersection carries major traffic movements from the following road section.³

³ Final Design Report of Roads & Bridges, RHD



Figure 1-2: Chachra Intersection, Jashore

- Khulna to Benapole
- Benapole to Khulna
- Jhenaidah to Benapole (Right Turning Traffic)
- Khulna to Jhenaidah (Right Turning Traffic)
- Traffic Entering and Exiting from N706

8. It is an essential intersection of the Jhenaidah Jashore Khulna (N-7) Highway and the Bhanga—Narail—Jashore—Benapole Project Alignment. To ensure uninterrupted Traffic Movement toward Khulna and Benapole, a comprehensive solution is required at this “T” Junction Intersection (Chachra More). As the implementation of the proposed Bhanga—Narail—Jashore—Benapole Project is being delayed due to unavoidable circumstances, it was discussed with the WB mission between 14 and 23 February 2023 to include the improvement of this intersection as an Extension of Phase-1 implementation. The project steering committee (PSC) also recommended conducting the feasibility study on the Chachra Intersection on 27 March 2023. After this, the Chief Engineer, RHD, gave prior approval vide Memo no. 35.01.0000.001.32.003,23-1558 dated 25 July 2023 for preparing the Variation Order (Addendum-01) for the Consultancy Services and including the extra scope of service for the Chachra intersection.

1.3 OBJECTIVE AND SCOPE OF THE STUDY

9. The project is likely to cause adverse environmental and social risks and impacts, such as the loss of mature trees along the Right of Way (RoW), the health and safety of workers and communities, the acquisition of private lands and related utilities, and partial or full impacts on structures such as houses, mosques, temples, graves, and madrasas to improve this intersection.

10. An Environmental and Social Impact Assessment (ESIA) for the Jashore—Jhenaidah section of the corridor was updated in 2022, and an environmental clearance certificate from the Department of Environment (DOE) has been accorded, including this Chachra intersection. It is agreed to carry out an ESIA/ESMP study to meet the

Environmental and Social Framework (ESF) requirement for this intersection improvement as an addendum to the consultant's original contract, considering the project has been categorized as high-risk.

11. The objective and the scope of work are as follows⁴:

- ▶ Task-1: Preparation of an ESIA/ESMP for Chachra Intersection Improvement as additional works
- ▶ Task 2: Preparation of a Resettlement Action Plan (RAP) for Chachra Intersection Improvement

1.3.1 THE PROJECT PROPONENT

12. The Road and Highways Department (RHD) of the Ministry of Roads, Highways, and Bridges is responsible for constructing and maintaining major road networks, including national highways, regional highways, and district roads. As an implementing agency of the WeCARE, RHD is responsible for the environmental and social assessments (ESAs) and formulating and implementing the environmental and social management plan (ESMP) for this intersection. The address of the project proponent is as follows:

- ▶ Project Director, WeCARE, Roads and Highways Department (RHD), Allen Bari, Tejgaon, Dhaka-1215.

1.4 STRUCTURE OF THE REPORT

13. The ESIA includes:

- ▶ Section 1: Introduction
- ▶ Section 2: Regulatory Framework, Standards, and Guidelines
- ▶ Section 3: Project Description
- ▶ Section 4: Analysis of Alternatives
- ▶ Section 5: Environmental and Social Baseline
- ▶ Section 6: Stakeholder Engagement and Information Disclosure
- ▶ Section 7: Environmental and Social Impacts and Risks
- ▶ Section 8: Labor Management Procedure During Construction
- ▶ Section 9: Emergency Response and Disaster Management Plan
- ▶ Section 10: Environmental and Social Management Plan

⁴ Terms of Reference for carrying out preparing ESIA/ESMP and RAP of 'Chavchra Intersection', (Additional Scope of Services) RHD, 2023

2 REGULATORY FRAMEWORK, STANDARDS AND GUIDELINES

2.1 INTRODUCTION

14. This section reviews the policies, laws, and administrative frameworks applicable to the Chachra Intersection extension of the Jhenaidah and Jashore Phase-1 Road project. It presents the World Bank's relevant environmental and social safeguards (ESS) policies.
15. The World Bank's Environmental and Social Framework (ESF) is a set of policies, directives, and standards that guide the Bank's support to its client countries in achieving sustainable development.
16. A comparison of the national legislations and the ESSs is made to identify the gaps and opportunities for enhancing the environmental and social performance of the projects supported by the Bank in the country. Some of the areas where the national legislation may not fully align with the banks' ESSs are discussed in this section.

2.2 EXISTING NATIONAL LEGISLATIVE FRAMEWORK AND REGULATION

17. Bangladesh adopted its Constitution in 1972. The Constitution's third part ensures basic human rights, such as the Right to life, which the courts interpreted to cover the Right to Environment in 1997. The Constitution of Bangladesh has recently been amended, and provisions on environment and natural resource management have been added. This amendment underscores the State's crucial role in protecting and enhancing the environment and conserving and securing natural resources, biodiversity, wetlands, forests, and wildlife for current and future citizens. However, it's worth noting that this provision is now placed in part two of the Constitution under the Fundamental Principles of State Policy.
18. Bangladesh's national environmental protection and natural resource management legislative framework comprises various acts, rules, policies, and strategies, which are summarized in **Table 2-1**.

Table 2-1: Existing Policy/Acts/Rules			
Sl. No.	Policy/Acts/Rules	Key Provisions and Purpose	Applicability to Project Road
1.	National Environmental Policy, 1992 (Amendment 2018)	This policy has been formulated based on the National Environmental Policy 1992 aimed at achieving Sustainable Development Goals (SDGs). The main consideration of this policy is to ensure sustainable development, reducing the dependency of humans on natural resources. A total of 19 sectors have been considered in this policy, including environment, water, agriculture, water resources dev	Regarding the transport sector, environmental policy aims to prevent pollution and degradation of resources caused by roads and inland waterways transport.
2.	National Environmental Management Action Plan (NEMAP), 1995	The NEMAP was developed with the following objectives: to identify key environmental issues affecting Bangladesh, to identify actions to halt or reduce the rate of environmental degradation, to improve the management of the natural environment, to conserve and protect habitats and biodiversity, to promote sustainable development, and to improve the quality of life.	The plan proposes developing and applying guidelines to avoid environmental pollution due to transport and communication systems. It particularly emphasizes different environmental pollution, hamper of natural drainage patterns, and agricultural land acquisition due to the development of transport systems.
3.	Environmental Conservation Act (ECA), 2023	The main objectives of ECA are the conservation and improvement of the environment and the control and mitigation of environmental pollution. The main focuses of the Act can be summarized as a Declaration of ecologically critical areas and restriction on the operations and processes that can or cannot be carried out/ initiated in the ecologically critical areas (ECA); Regulations for vehicles emitting harmful pollutants to the environment. Environmental clearance. Regulation of industries and other development activities' discharge permits. Promulgating air, water, noise, and soil quality standards for different areas. Promulgation of a standard limit for discharging and emitting waste and Formulation and declaration of environmental guidelines.	According to this law, no industrial unit or project shall be established or undertaken without obtaining an Environmental Clearance Certificate from the Director General, in the manner prescribed by rules.
4.	The Water Act, 2013	The Act recognizes the significance of managing all water resources in the context of the natural flow of surface water and groundwater recharging. Per the Act, private landowners can use the surface water inside their property for all purposes. No individuals or organizations can extract, distribute, use, develop, protect, and conserve water resources. They will not be allowed to build any structure that would impede the natural flow of rivers and creeks.	To regulate the water quality during the construction phase.
5.	Environment Conservation Rules, 2023	ECR 2023 is promulgated under the ECA 1995, superseding earlier ECR 1997 and amendments. Based on actual and anticipated pollution load, industries, development projects, and other activities are categorized into green, yellow, orange, and red categories. The rules set (i) the National Environmental Quality Standard for Surface Water, Groundwater, Drinking Water, Industrial effluents, Emissions, and Vehicular Exhaust. (ii) It also outlines the procedure for obtaining environmental clearance, (iii) Requirements for undertaking IEE and EIA study as well as formulating EMPs according to categories of industries/development projects/activities, (iv) procedures for damage claim by persons affected or likely to be affected due to polluting activities or activities causing hindrance to	Per ECR 2023, the Project is classified as Red Category item No 39, requiring an approved Terms of Reference (ToR) from the DOE to carry out the EIA study.

Table 2-1: Existing Policy/Acts/Rules

Sl. No.	Policy/Acts/Rules	Key Provisions and Purpose	Applicability to Project Road
		normal civic life. The rules authorize the Director General of the Department of Environment (DoE) to grant the project “Environmental Clearance” with stipulated conditions to comply. Per ECR 2023, the road sector projects, including bridge construction, have been categorized as orange and red based on their length, as shown below: Orange Item 21: Road construction/expansion (5km to 10 km) Orange Item 22: Bridge construction (100m to 500m) Red Item 38: Road construction/expansion (more than 10km); Red Item 39: Bridge/flyover construction (more than 500m);	
6.	Environmental Courts Act, 2000	This act sets out a policy for effective prosecution and completion of legal proceedings related to environmental crimes. Under this Act, the Director General of the DoE has the power to impose heavy penalties on industrial polluters who dump untreated wastewater into the environment or do not operate their legally mandated ETPs.	According to this act, the government can take legal action if any environmental violations due to project interventions.
7.	National Land Transport Policy	This policy aims to introduce long-term network planning and maintain the road network at a level that protects the value of the investment. It also aims to secure a sustainable means of funding road maintenance, improve traffic management, manage road-side activities, develop an integrated planning approach in road construction, involve the private sector more in infrastructure, services, and maintenance, and protect the environment from road construction programs.	According to the policy, all new roads and major improvements, tolled or otherwise, are subject to an Environmental and Social Impact Assessment (ESIA).
8.	RHD’s Road Master Plan	The objectives of RHD’s road master plan are: Protecting the value of RHD’s road and bridge assets, Improving the connectivity of the road network, Enhancing and developing the strategic road network to meet economic and traffic growth targets, Improving the Zila road network to enhance connectivity; Improving road safety to reduce road accidents; Providing environmental and social protection; and outlining the institution improvements required for RHD.	According to the plan, the physical and social environment must be protected from the adverse effects of road construction.
9.	Water Reservoir Conservation Act 2000	It signifies the preservation of natural water bodies. Section 1 of this Act suggests that it has application to the water bodies of the cities, divisional and district towns, and municipalities. The water bodies in the rural areas are outside the jurisdiction of this Act.	As per this, water bodies shall be conserved during the construction and operation phase of the project.
10.	The Forest Act (1927) and the Forest (Amendment) Act (2000)	It is the main legislative context for forestry protection and management in Bangladesh. It was enacted to control trespass and illegal resource extraction from forests and to provide a framework for the forestry revenue collection system	The act is relevant to the project as the road construction will require cutting trees belonging to government agencies.
11.	National Forest Policy (amendment), 1994	The policy is designed to conserve the existing forest areas, bring about 20% of the country's land area under the Forestation Program, and increase reserve forests by 10 percent per year to 2015.	The Act is relevant because trees will be removed for the project. Trees shall be planted in place of the tree removed for the construction of the road.
12.	The Private Forests Ordinance, 1959	An Ordinance to provide for the conservation of private forests and the afforestation in certain cases of wastelands in Bangladesh.	According to section 61 of this ordinance, if any land is required, such land shall be deemed

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Table 2-1: Existing Policy/Acts/Rules

Sl. No.	Policy/Acts/Rules	Key Provisions and Purpose	Applicability to Project Road
			needed for a public purpose.
13.	Bangladesh Wildlife (Conservation & Security) Act, 2012 (previously known as Bangladesh Wildlife (Preservation) Order, 1973; amended as Bangladesh wildlife (Preservation) Act 1974)	This Act protects 1,307 species of plants and animals under four schedules that mandates imprisonment and fines for wildlife poaching, capturing, trapping, and trading.	This Act is relevant to the project as intervention may affect wildlife habitation, obstruct movement.
14.	National Water Policy, 1999	The policy emphasizes efficient and equitable management of water resources, proper harnessing and development of surface and ground water, availability of water to all concerned and institutional capacity building for water resource management.	Measures must be taken to minimize disruption to the natural aquatic environment in streams and water channels (Clause 4.9b).
15.	National Fisheries Policy, 1998	The National Fisheries Policy focuses on aquaculture and marine fisheries development. The policy suggests, among other things, that biodiversity will be maintained in all natural water bodies and the marine environment, and control measures will be taken against activities that negatively impact fisheries and resources and vice versa.	Proper mitigation measures shall be adopted in the project during the construction and operation phase to prevent an impact on biodiversity in natural water bodies and the aquatic environment.
16.	Protection and Conservation of Fish Act 1950 (Amended 1982)	This is framework legislation with rule-making powers. Among others, some of these rules may prohibit the destruction of, or any attempt to destroy, fish by the poisoning of water or the depletion of fisheries by pollution, industrial effluent, or otherwise.	Proper mitigation measures shall be adopted during the construction and operation phase of the project to prevent an impact on biodiversity in natural water bodies and the aquatic/marine environment.
17.	National Agriculture Policy, 1999	This policy aims to make the nation self-sufficient in food by increasing the production of all crops, including cereals, and ensuring a dependable and secure food system.	Adequate measures should be taken to prevent waterlogging or affecting the irrigation systems due to the construction of the project road.
18.	National Road Design Standard	A comprehensive National Transport Policy (NTP) needs to be formulated to integrate different modes of transport for the most efficient performance considering intermodal interactions, to develop a communications network without damaging the physical environment, and to allocate resources according to conservation and environmental considerations and priorities of economic development.	This will specify the proper design required for the project road to avoid maximum damage.
19.	National Land Use Policy, 2001	The main contents of this policy are: Stopping the high conversion rate of agricultural land to nonagricultural purposes. Utilizing agroecological zones to determine maximum land use efficiency and adopting measures to discourage the conversion of agricultural land for urban development. Improving the environmental sustainability of land-use practices.	The proposed project must adhere to this policy to ensure land-use practices' environmental sustainability.
20.	The Embankment and Drainage Act, 1952	It provides for constructing, maintaining, managing, removing, and controlling embankments and water courses to improve land drainage.	There will be no dredging activities conducted during the construction period.
21.	Bangladesh Climate Change	This is a comprehensive strategy to address climate change challenges in Bangladesh.	Relevant as the project road is vulnerable to

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	Strategy and Action Plan (BCCSAP) 2009	Bangladesh Climate Change Strategy and Action Plan built on and expanded the NAPA.	climate change effect
22.	Constitution of the People's Republic of Bangladesh, 04 November 1972	Bangladesh's Constitution defines the rights of every citizen irrespective of their ethnicity and religion, where the State is responsible for the provision of Basic Necessities for the citizens	This is applicable to ensure laborers' and project-related persons' health and safety.
23.	The Acquisition and Requisition of Immovable Property Act 2017 (ARIPA)	The Act is the main law for acquiring land in Bangladesh. The Act requires compensation for (i) land and assets that are permanently acquired (including crops, trees, and buildings) and (ii) any other damage from such acquisition. The Act also lets the government acquire the properties of religious groups like mosques, temples, pagodas, and graveyards if it is in the public interest. The Ministry of Land (MoL) oversees the land acquisition process. The MoL gives some of its power over land acquisition to the Commissioner at the Divisional level and the Deputy Commissioner at the District level. The Deputy Commissioner (DC) can acquire the land under the Act and compensate the legal owners.	The nature of the civil works related to the project will entail land acquisition and subsequent economic and physical displacement. ARIPA 2017 defines the land acquisition process and contains pertinent information related to titleholder compensation payments.
24.	Khas Land Policy 1997	In 1997, the Khas Land Settlement Policy was promulgated, allowing the distribution of Khas land for a 99-year lease (or for a one-year temporary lease). Khas land means government-owned fallow land, where nobody has property rights. The land is owned by the government and available for allocation according to government priorities.	This is applicable to confirm the acquisition of Khas land along the RoW. The compensation will be handed over to the government authority as per policy.
25.	Vested Property (Repeal) Act. 2013	The Vested Property Act—2013 in Bangladesh amends the previous laws regarding the management and return of properties confiscated by the state government through the erstwhile “Enemy Property Act.” The 2013 amendment aimed to rectify these issues by providing a legal framework for returning vested properties to their rightful owners or heirs. It also sought to streamline the process of identifying and releasing such properties, though it is a challenging task.	It is to be noted that no such or disputed property was found within the proposed ROW during the consultant's census and Inventory of Loss (IOL) survey. Thus, the Vested Property Act does not apply to the project.
26.	Labor Related Laws (Labor Act 2006; Bangladesh Labor Rules 2015; and Occupational Health and Safety Policies 2013)	Labor Act 2006: This act updates and combines the laws about labor employment, relations, wages, compensation, unions, disputes, and workers' health, safety, welfare, working conditions, and apprenticeship. ^{5, 6, 7, 8} Bangladesh Labor Rules 2015: ^{9, 10, 11, 12} These rules explain the Labor Act 2006 more, giving specific regulations on working terms, worker	To carry out the civil works, a significant amount of labor will be required to be hired. Therefore, to safeguard the interest of the labor, host community, project authorities,

⁵ <https://www.doulah.net/bdlaws/Bangladesh%20Labor%20Act,%202006.pdf>.

⁶ <https://betterwork.org/reports-and-publications/bangladesh-labour-act-2006/>.

⁷ <https://www.askbd.org/ask/wp-content/uploads/2013/07/Analysis.-Labour-Law-Amendment-2006.pdf>

⁸ <https://compliancebangladesh.com/bangladesh-labour-law-2006-english-version/>

⁹ <https://dol.gov.bd/>

¹⁰ <https://compliancebangladesh.com/bangladesh-labor-rules-2015-english-version/>

¹¹ <https://compliancebangladesh.com/bangladesh-labour-rules-2015/>

¹² <https://archive.org/details/bangladesh-labour-rules-2015-amendment-2022-included>

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		types, leave rules, pay, and more. It also has rules for health and safety at work. Occupational Health and Safety Policies 2013: ^{13, 14, 15} The National Occupational Health and Safety (OSH) Policy of 2013 requires using personal safety gear, having health centers in big companies, forming safety committees, keeping standard OSH protection, and planning for workplace safety.	contractors, and other project stakeholders, these laws will be triggered. The project will ensure that the stipulations of the law are duly followed when it comes to labor-related activities
27.	Community Health and Safety-Related Laws	The management of community health and safety of development projects is covered under ECA and ECR. Typically, OHS measures extend to the public at construction sites. There are two components of CHS. One is the physical safety of project communities that are exposed to the project activities during construction and operation, including risks of accidents and risks of violence due to the increase in crimes and cultural conflict between locals and the migrant population. The other pertains to the community's exposure and/or increased risks of diseases due to the influx of people during construction and operation and the changes in the project area, including pollution and ecological change. The physical safety aspects are partly addressed by the OHS provisions of the Labor Act. Traffic road accidents are a severe issue in Bangladesh, and road safety issues have been incorporated into the projects.	Land acquisition and upgradation of roads are likely to cause negative impacts, especially on those communities living nearby.
28.	Cultural Heritage	The Antiques Law of 1968 consolidates all laws relating to the preservation and protection of antiquities under the auspices of the Department of Archaeology. The law empowers the Director of the Department of Archaeology to take steps necessary for the custody, preservation, and protection of antiquity.	Project activities may lead to the unearthing of antiques or may impact cultural heritage by chance. Therefore, laws related to cultural heritage and antiques aim to protect these finds.
29.	Stakeholder Engagement and Information Disclosure.	The DoE guidelines for IEE/EIA preparation instruct the implementing agency to conduct public consultations of orange-B and red category projects. Implementing agencies usually conduct public consultations during EIA studies and present the outcome in the IEE/EIA reports, which they submit to the DoE for clearance. However, opportunities for the public to review the final/completed IEE/EIA report are at the discretion of the DoE's Director-General. The DoE does not officially disclose EIA report findings publicly on its website.	Stakeholder engagement is an important instrument of public policy, and these regulations/laws aim to make the development project inclusive by giving the communities a voice. The anticipated civil work makes it necessary to implement stakeholder engagement.
30.	Electricity Act 2018	It relates to the supply and use of electrical energy and allows any person to secure a license to supply energy and to put down or place electrical supply lines for the transmission of energy. The Act provides that the licensee, in the exercise of any of the powers conferred by or under this Act, will cause as little damage, detriment, and inconvenience as may be and will make full compensation for any damage, detriment, or inconvenience caused by the	This Act applies to the project when electricity is used for construction camps, accommodation, machinery, vehicles, workshops, maintenance, road construction, etc.

¹³ https://dife.portal.gov.bd/sites/default/files/files/dife.portal.gov.bd/page/a51db80d_ca8e_4cae_9579_5f6f089d5754/2021-09-15-05-58-20b6eeb7481056b939b691d2d26a401a.pdf

¹⁴ http://www.bilsbd.org/wp-content/uploads/2016/03/BILS-ILO-Study_OSH-Profile_Final-Report_29-June-2015.pdf

¹⁵ <https://www.biomedcentral.com/articles/10.1186/s12995-022-00366-y>

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Sl. No.	Policy/Acts/Rules	Key Provisions and Purpose	Applicability to Project Road
		licensee or by anyone employed by the licensee.	
31.	Electricity Rules 2020 (Amendment 2022)	Electricity Rules were published by the ministry in November 2020 based on Clause 59 of the Electricity Act 2018 (SRO 297 of Act/2020). The main observation is to provide compensation for the installation of transmission line towers to the landowners as per the applicable laws and policy	This rule applies to the rearrangement, installation, and shifting of the transmission line, tower, poles, etc., along the project road.
32.	Solid Waste Management Regulations 2021	The Solid Waste Management Regulations 2021 were published in Bangladesh on December 23, 2021, under the Bangladesh Environmental Protection Act, 1995. The Regulations define the responsibilities of businesses involved in solid waste management and impose collection, recycling, and disposal obligations according to Extended Producer Responsibility (EPR) on manufacturers of non-biodegradable products such as glass, plastic, and bottles. The Regulations also include provisions for treating solid waste, such as composting and energy recovery. The main provisions of the Regulations are as follows- When recovering resources from waste, the principles of management that consider the waste hierarchy, such as the 3Rs, segregation, and reduction, must be followed at all stages, from waste generation to final disposal. Responsibilities of waste generators, consumers, and users: Dispose of waste per authorities' regulations, including local government. Dispose of waste separately; do not dump, store, or burn waste outdoors. Responsibilities of manufacturers (*not defined) and importers of products- Collect non-biodegradable products such as glass, plastic, polyethylene, multi-layered packaging, bottles, and cans from consumers and recycle or dispose of them if appropriate; Determine work plans and implementation procedures for recycling and disposal; Ensure that EPR is properly implemented; Submit an annual report to the Department of Environment (DOE) on the amount of plastic recycled; Raise public awareness of proper waste management.	This is applicable to the project road to ensure the whole project area with zero waste pollution and also comprehensive practices for waste management as well as sourcing, separation, dumping, reuse etc. A vast number of solid wastes will be generated from the project activities and this regulation is applicable to proper management of the induced wastes.
33.	E-Waste Management Rules 2021	Under the Bangladesh Environmental Protection Act of 1995, Bangladesh's Department of Environment (DoE) announced the Hazardous Waste (e-waste) Management Rules, 2021, on June 10, 2021. The E-waste regulation imposes duties on the producers, assemblers, collectors, marketers, and users of the items mentioned in the Schedule (home appliances, monitoring and control equipment, medical equipment, automated machines, IT and communication equipment). Additionally, the regulation establishes restrictions on using the 10 compounds covered by the EU RoHS Directive. Following publication, this legislation became enforceable.	The proposed project must comply with this rule for managing the electronic waste from the road project's construction.

Source: Adopted from Environmental and Social Impact Assessment (ESIA) Report for Jashore-Jhenaidah Road Corridor, 2019, RHD

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2.3 WORLD BANK GUIDELINES

19. The World Bank has defined ten specific Environmental and Social Standards (ESSs) designed to avoid, minimize, reduce, or mitigate the adverse environmental and social risks and impacts of projects. These are as follows:

- ▶ ESS 1: Assessment and Management of Environmental and Social Risks and Impacts.
- ▶ ESS 2: Labor and Working Conditions.
- ▶ ESS 3: Resource Efficiency and Pollution Prevention and Management.
- ▶ ESS 4: Community Health and Safety.
- ▶ ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement.
- ▶ ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources.
- ▶ ESS 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities.
- ▶ ESS 8: Cultural Heritage.
- ▶ ESS 9: Financial Intermediaries; and
- ▶ ESS 10: Stakeholder Engagement and Information Disclosure.

20. Since the proposed project is financed by the WB, the ESIA and ESMP must follow the environmental and social safeguard standards. These environmental social safeguards standards and the gap between WB's ESS and relevant national laws and policies are listed in **Table 2-2**.

Table 2-2: The World Bank's Environmental and Social Standard, Related National Laws and their Gaps on WeCARE Phase 1			
World Bank ESS Standards	Objectives	Requirements	Applicability
ESS-1: Assessment and Management of Environmental and Social Risks and Impacts	- Identify, assess, evaluate, and manage environmental and social risks and impacts in a manner consistent with the ESF. - Adopt differentiated measures so that adverse impacts do not fall disproportionately on the disadvantaged or vulnerable people.	The types of E&S risk and impacts should be considered in the environmental and social assessment. The environmental and social framework should be used and strengthened to assess, develop, and implement World Bank-financed projects where appropriate. Relevant GoB Laws/Regulation - ECR 2023 Gaps: - The EIA screening and scoping study may not comprehensively cover all the WB's ESS in their analysis. - Stakeholder engagement is carried out during the EIA. However, the scope of the engagement is limited. The EIA report is also not publicly disclosed as required in ESS. - The EIA framework doesn't require the analysis of alternatives.	The ESS1 applies to all associated facilities.¹⁶
ESS-2: Labor-and-Working-Conditions	- Promote safety and health at work. - Promote fair treatment, non-discrimination, and equal opportunity for project workers. - Protect project workers, with particular emphasis on vulnerable workers. Prevent the use of all forms of forced labor and	Labor management procedures (LMP) covering terms and conditions of work, non-discrimination, equal opportunity, workers' organizations, and provisions to protect child/forced labor, Occupational health and safety requirements per the World Bank Group's Environmental, Health, and Safety Guidelines (EHSG) shall be prepared for the projects for direct, contracted,	Project will be hiring the following types of workers: Direct workers will include the project managers and supervisors, who are employees of RHD; ii) All the workforce deployed by the Contractors and the Project Management Consultant (for all contracts) under the RHD will be deemed to be contracted workers. The Contractor(s) might further engage multiple subcontractors; iii) Influx of migrant labor from other districts for construction works is a norm in this district and is likely to continue in this project;

¹⁶ Note: Associated Facilities will meet the requirements of the ESSs, to the extent that the Borrower has control or influence over such Associated Facilities.

Table 2-2: The World Bank's Environmental and Social Standard, Related National Laws and their Gaps on WeCARE Phase 1

World Bank ESS Standards	Objectives	Requirements	Applicability
	child labor. - Support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law. - Provide project workers with accessible means to raise workplace concerns.	community, primary supply workers, and government civil servants. Relevant GoB Laws/Regulation - Labor Act 2006 (Amendment 2013) - Occupational Health and Safety Policy 2013 - Public Procurement Rule 2008 Gaps: - The Labor Act does not require project interventions regarding labor and working conditions, including OHS, to be assessed and reviewed before approval. - The Labor Act does not require development projects to prepare labor management plans/procedures or OHS Plans.	A labor management procedure will be prepared to regulate working conditions and the management of workers' relations, including worker-specific GRM, terms and conditions of employment, non-discrimination, equal opportunity, GBV, protection of workforce, the prohibition of child /forced labor, and provision of OHS.
ESS-3: Resource-Efficiency-and-Pollution-Prevention-and-Management	Promote the sustainable use of resources, including energy, water, and raw materials. Avoid or minimize adverse impacts on human health and the environment caused by pollution from project activities. Avoid or minimize project-related emissions of short and long-lived climate pollutants. Avoid or minimize the generation of hazardous and non-hazardous waste. Minimize and manage the risks and impacts associated with pesticide use. Requires technically	Requires an estimate of gross greenhouse gas emissions resulting from the project (unless minor), where technically and financially feasible. Requirements on the management of wastes, chemicals, and hazardous materials, and contains provisions to address historical pollution. ESS-3 refers to national law and Good International Industry Practice, in the first instance the World Bank Groups' EHSsGs. Gaps: - ESS-3 requirements are addressed by existing regulations and indirectly for resource efficiency and climate change. - Existing energy and water conservation policies, laws, and regulations do not require development projects to assess resource efficiency issues and incorporate resource	Concerning Resource Efficiency, the project preparation and the ESIA process will identify feasible measures for: (a) energy use; (b) water usage and management to minimize water usage during construction, conservation measures to offset total construction water demand and maintain balance for water resource demand; and (c) raw materials use by exploring the use of local materials, recycled aggregates, and innovative technology to minimize the project's footprints on finite natural resources. Concerning Pollution Management, based on past road project experiences, the project will develop, as part of the ESIA process, prevention and management

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World Bank ESS Standards	Objectives	Requirements	Applicability
	and financially feasible measures to improve efficient energy, water, and raw materials consumption, and introduces specific water efficiency requirements where a project has high water demand.	efficiency measures in their ES risk management plans	measures to offset risks and impacts of pollution from potential sources such as dust and emission from the operation of hot-mix and batching plants, crushers, construction and haulage vehicles, material and spoil stockpile; effluents and wastewater from labor camps, construction camp; spillage or leakage during handling of chemical admixtures, hazardous materials like bitumen, high strength diesel, used oil, battery wastes etc.; and disposal of non-hazardous wastes (municipal wastes) generated during project implementation period.
ESS-4: Community-Health-and-Safety	Anticipate or avoid adverse impacts on the health and safety of project-affected communities during the project lifecycle from routine and non-routine circumstances. Promote quality, safety, and climate change considerations in infrastructure design and construction, including dams. Avoid or minimize community exposure to project-related traffic and road safety risks, diseases, and hazardous materials. Effective measures should be put in place to address emergency	Requirements on infrastructure, considering safety and climate change, and applying the concept of universal access, where technically and financially feasible. Requirements on traffic and road safety, including road safety assessments and monitoring. Addresses risks arising from impacts on provisioning and regulating ecosystem service. Measures to avoid or minimize the risk of water-related, communicable, and non-communicable diseases. Requirements to assess risks associated with security personnel and review and report unlawful and abusive acts to relevant authorities. GoB Laws and Regulation ▶ National Road Transport Act ▶ ECR 2023	In the project corridor there is likely to be, road excavation, use of vibratory equipment, construction debris handling and disposal etc. during construction; ii) high likelihood of direct exposure to increased construction related traffic and equipment especially at road sections traversing settlement area with limited carriageway/roadway width, and sensitive receptors such as schools, religious place, health center/hospitals; iii) high dust levels from earthworks, high noise and emission level from traffic congestion and idling of vehicles; and iv) influx of migrant workers could potentially cause local discomfort or potential conflicts with local people. The gaps between GoB regulations and ESS-4 will be addressed through suitable provisions in the ESMP and

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World Bank ESS Standards	Objectives	Requirements	Applicability
	events. Ensure that personnel and property are safeguarded in a manner that avoids or minimizes risks to the project-affected communities.	▶ BLA 2006 ▶ Public Procurement Rule, 2008 ▶ Water Act 2013 Gaps: 1. While other acts cover all ESS-4 requirements, gaps exist for Community exposure to health issues. 2. Covered under ESIA, the systems do not provide clear requirements for the development project and implementation.	the contractor's obligation as part of the Contractor's ESMP for CHS. This should also include an OHS plan, an influx management plan, a workers' camp management plan, and a traffic and road safety management plan.
ESS-5: Land-Acquisition- Restrictions-on- Land-Use- and- Involuntary- Resettlement	Avoid or minimize involuntary resettlement by exploring project design alternatives. Avoid forced eviction. Mitigate unavoidable adverse impacts from land acquisition or restrictions on land use by providing compensation at replacement cost and assisting displaced persons in their efforts to improve, or at least restore, livelihoods and living standards to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher. Improve living conditions of poor or vulnerable persons who are physically displaced, through provision of adequate housing, access to services and facilities, and security of tenure. Conceive and execute resettlement activities as sustainable development programs.	Applies to permanent or temporary physical and economic displacement resulting from different types of land acquisition and restrictions on access. Does not apply to voluntary market transactions, except where these affect third parties. Provides criteria for "voluntary" land donations, sale of community land, and parties obtaining income from illegal rentals. Prohibits forced eviction (removal against the will of affected people, without legal and other protection including all applicable procedures and principles in ESS5). Requires that acquisition of land and assets is initiated only after payment of compensation and resettlement has occurred. Requires community engagement and consultation, disclosure of information and a grievance mechanism. GoB Laws and regulation Acquisition and Requisition of Immovable Property Act, 2017	Land will be required for widening, upgradation works in identified corridors and possibly for rehabilitation corridor works, curve/geometric improvements, blind spots, etc. Hence impacts on land, private and community owned assets including structures, trees and crops within existing and proposed ROW is likely. Physical and economic displacement too is very likely. I) Important gaps (between ESS and GoB policy) exist in terms of determination of compensation, identification of non- titleholders, cut-off dates for non- title holders and valuation of structures with depreciation. These gaps, along with other short- and long-term measures will be included in the RAP.

Table 2-2: The World Bank's Environmental and Social Standard, Related National Laws and their Gaps on WeCARE Phase 1

World Bank ESS Standards	Objectives	Requirements	Applicability
		Gaps: - Preparation of SIA and RAP is not required. - Compensation or assistance is not provided to non-title holders. - ARIPA does not include provisions for transitional allowances to restore livelihoods for informal settlers, which may be viewed as a short-term strategy. It does not include sustainable or inclusive developmental objectives. - No special provisions for specific groups, such as the vulnerable population groups. - Valuation of lost assets is not based on the replacement cost principle.	
ESS-6: Biodiversity-Conservation and Sustainable Management of Living Natural Resources	Protect and conserve biodiversity and habitats. Apply the mitigation hierarchy and the precautionary approach in designing and implementing projects that could impact biodiversity. To promote the sustainable management of living natural resources.	Requirements for projects affecting areas that are legally protected, designated for protection, or regionally/internationally recognized to be of high biodiversity value. Requirements on sustainable management of living natural resources, including primary production and harvesting, distinguishing between small-scale and commercial activities. Requirements relating to primary suppliers, where a project is purchasing natural resource commodities, including food, timber, and fiber. Gaps: No equivalent requirements on: - the application of the hierarchy of measures. - the preparation of the Biodiversity Management	Site clearance activities for road construction will involve removal of road side vegetation and felling of trees. The biodiversity studies have indicated that entire corridor along the project road is rich in biodiversity, interspersed with invasive species. Other than the clearance of road side vegetation, road construction will also require felling of trees.

Table 2-2: The World Bank's Environmental and Social Standard, Related National Laws and their Gaps on WeCARE Phase 1

World Bank ESS Standards	Objectives	Requirements	Applicability
		Plan. 3. differentiated measures on types of habitats. 4. conduct of due diligence on primary suppliers.	
ESS-7: Indigenous-Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	To ensure that the development process considers full respect for affected parties' human rights, dignity, aspirations, identity, culture, and natural resource-based livelihoods. Promote sustainable development benefits and opportunities in a manner that is accessible, culturally appropriate, and inclusive. Improve project design and promote local support by establishing and maintaining an ongoing relationship based on meaningful consultation with affected parties. Obtain the Free, Prior, and Informed Consent	This applies when the Indigenous Peoples are present or have a collective attachment to the land, whether they are affected positively or negatively and regardless of economic, political, or social vulnerability. The option to use different terminologies for groups that meet the criteria set out in the Standard. The use of national screening processes, providing these meet World Bank criteria and requirements. Coverage of forest dwellers, hunter-gatherers, pastoralists, and other nomadic groups. Requirements for meaningful consultation tailored to affected parties and a grievance mechanism. Requirements for a process of free, prior and informed consent in three circumstances. Gaps: No equivalent requirements on: 1. coverage of IP impacts in the ESIA; 2. special treatment or differentiated approach to IPs and vulnerable groups. 3. conduct of FPIC. 4. development of IP Plan.	This ESS will identify measures to minimize the disruption of livelihoods caused by the project development. There is no Indigenous People in the project areas.
ESS-8: Cultural-Heritage	Protect cultural heritage from the adverse impacts of project activities and support its preservation. Address cultural heritage as an integral aspect of sustainable development. Promote	Requires a chance finds procedure to be established, to ensure peoples' continued access to culturally important sites, as well as the need for confidentiality when revealing information about cultural heritage assets that	The alignment of the project road does not have any ancient monuments and/or archaeological site(s), protected.

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Table 2-2: The World Bank's Environmental and Social Standard, Related National Laws and their Gaps on WeCARE Phase 1

World Bank ESS Standards	Objectives	Requirements	Applicability
	meaningful consultation with stakeholders regarding cultural heritage. Promote the equitable sharing of benefits from the use of cultural heritage.	would compromise or jeopardize their safety or integrity. Requirement for fair and equitable sharing of benefits from commercial use of cultural resources. Provisions of archaeological sites and material. Gaps: No equivalent requirements on: 1. the application of hierarchy of measures. 2. the development of Cultural Heritage Management Plan; 3. the development and adoption of project-specific Change Find Procedures; and 4. the engagement of cultural heritage experts.	i) If an of them (antiques/cultural heritage) are found, they need to be relocated, and provisions must be made in the RAP.
ESS-9: Financial-Intermediaries	Sets out how Financial Intermediaries (FI) will assess and manage environmental and social risks and impacts associated with the subprojects it finances.	Financial Intermediaries (FIs) to have an Environmental and Social Management System (ESMS) - a system for identifying, assessing, managing, and monitoring the environmental and social risks and impacts of FI subprojects on an ongoing basis Gaps: Not applicable to the country system. Project proponents are subject to the same country's laws regardless of funders.	Not applicable
ESS-10: Stakeholder-Engagement-and-Information-Disclosure	To identify stakeholders and maintain a constructive relationship with them. Assess stakeholder interest and support for the project and enable stakeholders' views to be considered in project design. Promote and	It requires identifying the stakeholders, both project-affected and other interested parties and clarifying how effective engagement occurs. It requires stakeholder engagement throughout the project life cycle and the	This is relevant to the project, and RHD has prepared a stakeholder engagement plan. The project will ensure:

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Table 2-2: The World Bank's Environmental and Social Standard, Related National Laws and their Gaps on WeCARE Phase 1

World Bank ESS Standards	Objectives	Requirements	Applicability
	provide means for effective and inclusive engagement with project-affected parties throughout the project life cycle. Ensure that appropriate project information is disclosed to stakeholders in a timely, understandable, accessible, and appropriate manner.	preparation and implementation of a Stakeholder Engagement Plan (SEP). . GoB Laws/Regulation No Specific Policy or Legislation identified Gaps: 1. The ECA/ECR does not specifically require consultation, but the ESIA guidelines issued by the DoE and other agencies recommend public consultations during scoping and preparing the ESIA. 2. There is also no provision for stakeholder engagements during project implementation.	1. Stakeholders have been/are to be consulted on the Stakeholder's engagement plan. 2. The updated SEP will be followed during the project implementation. 3. Ensure stakeholders are well informed and have access to the project documentation, which is expected to be publicly disclosed as and when available and in publicly accessible places in local languages to the people. 4. Stakeholder engagement is to be conducted in a manner proportionate to the project's nature, scale, risks, and impacts and appropriate to stakeholders' interests
Gender-Based Violence	GBV are considered a cross-cutting theme across all the World Bank's ESS and are especially relevant for Major Infrastructure Projects.		Adequate measures to address gender issues and GBV, including GRM have been addressed in this ESA

Source: Adopted from Environmental and Social Impact Assessment (ESIA) Report for Jashore-Jhenaidah Road Corridor, 2019, RHD

2.4 CLEARANCES/PERMISSIONS REQUIRED FOR THE PROJECT ROAD

21. As listed in **Table 2-3**, for the proposed project's development, the following clearances/approvals must be obtained during the preconstruction and construction stages.

Table 2-3: List of Clearances/Approvals Required				
Sl. No.	Clearances/Permissions Required	Competent Authority to Accord Clearances	Responsibility to Obtain Clearance	Remarks
A. Pre-construction Stage				
A-1	Clearances for the project	MoEFCC, Bangladesh	RHD	The proposed Chachra Intersection project is part of Jhenaidah-Jashore Road (Phase-1), for which the RHD obtained EC in 2021. Further, the ESIA report has been prepared as per the requirement of the World Bank (ESS-1).
A-2	Permission for Tree felling	Divisional Forest Officer, Department of Forests	RHD	RHD will request the Forest Department and Zilla Parishad to remove the trees.
B. Construction Stage				
B-1	Establishment and Operation of construction campsites, crusher units, hot mix plants, concrete batch mix plants, WMM plants, workforce camps	Department of Environment (DoE)	Contractor	The contractor must follow the ECC requirement and ESMP requirements.
B-2	Water for construction activities (Surface Water)	Bangladesh Water Development Board	Contractor	The contractor must follow the ECC requirement, national rules/regulations and ESMP requirement.
B-3	Permission to Establish Construction camps	District Commissioner & Local Panchayat (s), landowners in case of private land	Contractor	The contractor must follow the ECC requirement, national rules/regulations, and ESMP requirement.
B-4	Extraction of Groundwater	BWDB//Directorate of Public Health Engineering	Contractor	The contractor must follow the ECC requirement, national rules/regulations, and ESMP requirement
B-5	Labor License	District Labor commissioner	Contractor	The contractor must follow ECC, Labor Act 2006, Bangladesh Labor Rules 2015, Occupational Health and Safety Policies 2013, Khas Land Policy 1997, and Vested Properties (Repeal) Act 1974 requirement, national rules/regulations and ESMP requirement
Source: Adopted from Environmental and Social Impact Assessment (ESIA) Report for Jashore-Jhenaidah Road Corridor, 2019, RHD				

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2.5 NATIONAL STANDARDS

2.5.1 AMBIENT AIR QUALITY

22. To maintain the quality of the ambient environment, the Department of Environment, Bangladesh has standardized the ambient air quality standard in ECR, 2023, in Schedule-1. The air quality standard is presented in **Table 2-5**.

Table 2-4: Air Quality Standard (Subsequent Amendment in 2005)			
Sl. No.	Air Pollutants	Concentration ECR, 2023	Average Time
1.	Carbon monoxide (CO)	05 mg/m ³	8 hr.
		20 mg/m ³	1 hr.
2.	Lead (Pb)	0.25 µg/m ³	Annual
		0.50 µg/m ³	24 hr.
3.	Nitrogen dioxide (NO ₂)	40 µg/m ³	Annual
		80 µg/m ³	24 hr.
4.	Particulate Matters (PM ₁₀)	50 µg/m ³	Annual
		150 µg/m ³	24 hr.
5.	Particulate Matters (PM _{2.5})	35 µg/m ³	Annual
		65 µg/m ³	24 hr.
6.	Ozone (O ₃)	180 µg/m ³	1 hr.
		100 µg/m ³	8 hr.
7.	Sulfur dioxide (SO ₂)	250 µg/m ³	Annual
		80 µg/m ³	24 hr.
8.	Ammonia (NH ₃)	100 µg/m ³	Annual
		400 µg/m ³	24 hr.

2.5.2 GROUNDWATER QUALITY

23. According to Rule 12, Schedule-3 (B), ECR 2023, the standard for drinking water has been depicted in **Table 2-7**.

Table 2-5: Bangladesh Standards for Ground Water			
Sl No.	Parameters	Unit	Standard
1.	Fecal Coliform	CFU/100ml	0.05
2.	Total Coliform	CFU/100ml	0
3.	Free Residual Chlorine	mg/l	0.2
4.	NO ₃ -	mg/l	0.05
5.	As	mg/l	0.05
6.	Turbidity	NTU	2
7.	Al	mg/l	0.1
8.	NH ₃	mg/l	1.5
9.	Ba	mg/l	0.7
10.	C ₆ H ₆	mg/l	0.01
11.	B	mg/l	1
12.	Cd	mg/l	0.003
13.	Ca	mg/l	75
14.	Chloride	mg/l	250*
15.	CCl ₄	mg/l	0.005
16.	1,1 C ₂ H ₄ Cl ₂	mg/l	0.03
17.	1,2 C ₂ H ₄ Cl ₂	mg/l	0.03
18.	C ₂ H ₂ Cl ₄	mg/l	0.04
19.	C ₂ H ₃ Cl ₃	mg/l	0.02
20.	Pentachlorophenol	mg/l	0.009

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Table 2-5: Bangladesh Standards for Ground Water

Sl No.	Parameters	Unit	Standard
21.	2,4,6 Trichlorophenol	mg/l	0.20
22.	CHCl ₃	mg/l	0.09
23.	Total Cr	mg/l	0.05
24.	Color	Hazen	15
25.	Cu	mg/l	1.5
26.	CN	mg/l	0.05
27.	Fluoride	mg/l	1
28.	Hardness as CaCO ₃	mg/l	500
29.	Fe	mg/l	0.3-0.1
30.	Total Kjeldahl Nitrogen	mg/l	1
31.	Pb	mg/l	0.01
32.	Mg	mg/l	30-35
33.	Mn	mg/l	0.4
34.	Hg	mg/l	0.001
35.	Ni	mg/l	0.05
36.	NO ₂ -	mg/l	1
37.	Odor	-	Odorless
38.	Oil & Grease	mg/l	0.01
39.	pH	-	6.5-8.5
40.	Phenols	mg/l	0.002
41.	K	mg/l	12
42.	Alpha radiation of the Radioactive Materials	bq/l	0.1
43.	Bitaradiation	bq/l	1.0
44.	Se	mg/l	0.01
45.	Ag	mg/l	0.02
46.	Na	mg/l	200
47.	Suspended Solids	mg/l	10
48.	Sulfide as H ₂ S	mg/l	0.05
49.	SO ₄ -2	mg/l	250
50.	TDS	mg/l	1000
51.	Temperature	0Centigrade	20-30
52.	Sn	mg/l	2
53.	Zn	mg/l	5
54.	Aldrin/ Dieldrin	ug/l	0.03
55.	Anionic detergents	mg/l	0.2

*For the coastal area, the limit will be 1000 mg/l

Source: ECR 2023, Bangladesh

2.5.3 SURFACE WATER QUALITY

24. According to Rule 12, Schedule-3 (A), ECR 1997, the standard for surface water has been depicted in Table 2-6¹⁷.

¹⁷ Source: Rule 12, Schedule-3; Environmental Conservation Rules, 1997; DO = Dissolve Oxygen, BOD = Biological Oxygen Demand, mg/l = Milligram per Liter, pH = Negative decimal logarithm of the hydrogen ion activity in a solution; Notes: In water used for pisciculture, maximum limit of

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Table 2-6: Bangladesh Standard for Inland Surface Water

Sl. No.	Best Practice-Based Classification	Parameter			
		pH	BOD (mg/l)	DO (mg/l)	Total Coliform (N/100 ml)
1.	Source of drinking water for supply only after disinfecting	6.5-8.5	2 or less	6 or above	50 or less
2.	Water usable for recreational activity	6.5-8.5	3 or less	5 or more	200 or less
3.	Source of drinking water for supply after conventional treatment	6.5-8.5	6 or less	6 or more	5000 or less
4.	Water usable by fisheries	6.5-8.5	6 or less	5 or more	-
5.	Water usable by various process and cooling industries	6.5-8.5	10 or less	5 or more	5000 or less
6.	Water usable for irrigation	6.5-8.5	10 or less	5 or more	1000 or less

25. Inland Surface water quality standards as per Draft ECR is presented in Table 2-7.

Table 2-7: Bangladesh Standard for Inland Surface Water

Sl. No.	Type of Use	Standard											
		pH	Do mg/l	BOD mg/l	NO ₃ -N mg/l	NH ₄ -N mg/l	PO ₄ -P mg/l	Total Cr mg/l	Pb mg/l	Hg mg/l	Total Coliform (CFU/100 ml)	TDS mg/l	COD mg/l
1	Source of drinking water for supply only after disinfecting:	6.5 – 8.5	≤6	≠2	7.0	0.1	0.1	0.02	0.03	0.001	≠100	1000	10
2	Water usable for recreational activity:	6.5 – 8.5	≤5	≠3	7.0	0.3	0.5	0.2	0.05	0.001	≠50	1000	10
3	Source of drinking water for supply after conventional treatment:	6-9	≤5	≠3	7.0	0.3	0.5	0.02	0.03	0.001	≠5000	1000	25
4	Water usable by fisheries:	6-9	≤5	≠6	7.0	0.3	0.5	0.05	0.1	0.004	≠5000	1000	50
5	Water usable by various process and cooling industries:	6.5 – 8.5	≤1	12	-	2.7	-	0.1	0.1	0.05	-	1000	100
6	Water usable for irrigation:	6.5 – 8.5	-	≠12	5.0	1.5	2.0	0.1	0.1	0.002	≠50,000	1000	100

Note: 1. Electrical conductivity for irrigation water – 2250 μmhos/cm (at a temperature of 25°C); Sodium less than 26%; boron less than 0.2%

26. The national standards for sewage discharge is presented in Table 2-8.

Table 2-8: Bangladesh Standards for Sewage Discharge (ECR, 2023)

Sl. No.	Parameters	Unit	Maximum Limit Except pH
(1)	Temperature	°Centigrade	30
(2)	pH	-	6-9
(3)	BOD ₅ at 200C	mg/l	30

ammonia presence as Nitrogen is 1.2 mg/l.; Electrical conductivity for irrigation water – 2250 μmhos/cm (at a temperature of 25°C); Sodium less than 26%; boron less than 0.2%.

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(4)	COD	mg/l	125
(5)	Suspended Solids	mg/l	100
(6)	Oil & Grease	mg/l	10
(7)	NO ₃	mg/l	50
(8)	PO ₄ -3	mg/l	15
(9)	Total Coliform	CFU/100 ml	1000

Condition :

- ▶ This standard applies to surface water discharge.
- ▶ The treated water must be purified with chlorine before final discharge. Residual chlorine shouldn't exceed 0.2 mg/l.

27. Effluent guidelines of IFC are presented in Table 2-9.

Table 2-9: Effluent Guideline (IFC, 2008)		
Sl. No.	Parameter	Unit (mg/L) (Except pH and Temperature)
1.	pH	6-9
2.	TSS	50
3.	Oil and grease	10
4.	Total residual chlorine	0.2
5.	Chromium -Total (Cr)	0.5
6.	Copper (Cu)	0.5
7.	Iron (Fe)	1.0
8.	Zinc (Zn)	1.0
9.	Lead (Pb)	0.5
10.	Cadmium (Cd)	0.1
11.	Mercury (Hg)	0.005
12.	Arsenic (As)	0.5
13.	Temperature increases by thermal discharge from the cooling system.	Elevated temperature areas due to the discharge of once-through cooling water (i.e., maximum 30oC above ambient water temperature) should be minimized in the mixing zone (i.e., 100 m) by adjusting outfall design or by the project-specific EA depending on the sensitive aquatic ecosystems around the discharge point.

28. Standard for Treated Sanitary Sewage Discharge is given Table 2-10.

Table 2-10: Standard for Treated Sanitary Sewage Discharge (IFC, 2008)			
Sl. No.	Pollutants	Units	Guideline Value
1.	pH	--	6-9
2.	BOD ₅	mg/l	30
3.	COD	mg/l	125
4.	Total nitrogen	mg/l	10
5.	Total phosphorus	mg/l	2
6.	Oil and Grease	mg/l	10
7.	Total suspended solids	mg/l	50
8.	Total coliform bacteria	N/100ml	400*

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*Note: *Not applicable to centralized, municipal wastewater treatment systems included in EHS Guidelines for Water and Sanitation.*

2.5.4 AMBIENT NOISE LEVEL

29. The ambient noise level standard has been modified in the amendment of ECR 2006. The level of noise from multiple sources will be limited to the following Table 2-11. Standard depending on the temporal and spatial sensitivity.

Table 2-11: Noise Level Standard (ECR, 2006)			
Sl. No.	Zone Categorization	Standard dB(A) Leq	
		Day (6:00 AM - 9:00 PM)	Night (9:00 PM - 6:00 AM)
1.	Silent Zone	50	40
2.	Residential Zone	55	45
3.	Mixed Zone	60	50
4.	Commercial Zone	70	60
5.	Industrial Zone	75	70

30. The noise level standard of the IFC guideline is given in Table 2-12.

Table 2-12: Noise Level Guideline (IFC, 2008)			
Sl. No.	Receptors	One Hour Leq (dBA)	
		Daytime (7:00-22:00)	Nighttime (22:00-7:00)
1.	Residential, Institutional, Educational	55	45
2.	Industrial, Commercial	70	70

3 DESCRIPTION OF PROJECT

3.1 PROJECT LOCATION

31. Phase 1 (Jhenaidah-Jashore Road Section) is an important Western link that connects the Bonpara-Jhenaidah Road on the Northern Side and the Bhanga-Benapole Road Section on the Eastern Side. The improvement of the Project Road will significantly enhance economic development along the Western Corridor and be a part of the important Western link. Jhenaidah-Jashore Road Section (Phase-1) is under construction. As an extension to the Phase 1 Study, the Chachra More Intersection Study has been commissioned, constituting the Chachra Intersection Improvement Study.
32. Chachra Intersection is in Jashore City, Bangladesh. It is the endpoint of the project road. Two National Highway, N7 and N706, intersect at this point to form a major intersection, as shown in **Figure 3-1**. Jashore Intersection/Chachra Circle Junction is the end point of the Jhenaidah-Jashore Section.
33. Chachra More Intersection is a busy intersection; its major traffic movements are as indicated below:
 - a) Khulna to Benapole
 - b) Benapole to Khulna
 - c) Jhenaidah to Benapole (Right Turning Traffic)
 - d) Khulna to Jhenaidah (Right Turning Traffic)
 - e) Traffic Entering and Exiting from N706

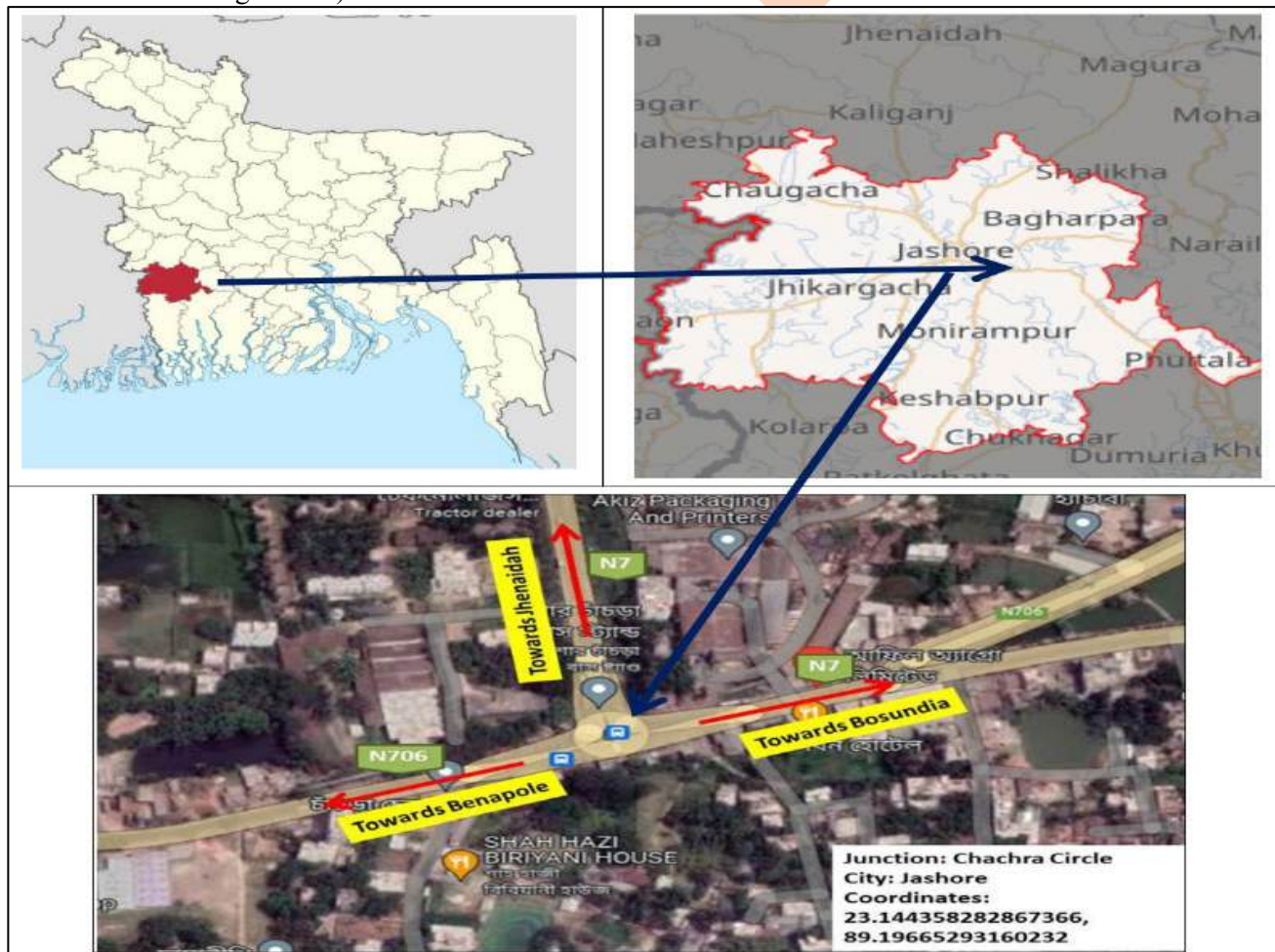


Figure 3-1: Location of Jashore Intersection (Chachra Circle Junction)

34. N706 is the spur road of N7, which starts from Jashore City Centre, passes through the Chachra Circle, forms a junction with the project road, and ends at Benepole Port Land. The section between Chachra Circle and Benepole Land Port is the busiest section of the road, and hence, **Chachra Circle is the most critical junction.**
35. The N7 is a national highway connecting the Daulatdia Ferry Terminal on the south bank of the Padma River near the Bangladeshi capital Dhaka, with the Port of Mongla in Bagerhat District. It serves some of southwestern Bangladesh's largest cities and towns, including Faridpur, Magura, Jhenaidah, Jessore, and Khulna. The highway is known along various stretches as the Dhaka–Kulna Highway, the Jessore-Khulna Highway, and the Khulna-Mongla Highway. Southwestern Bangladesh is laced with numerous rivers and streams, which results in N7 having the most bridges and culverts of any highway in the national system. It is limited to two lanes of traffic for most of its length. The segment between Jhenaidah and Jessore is the Junction Intersection, locally named “Chachra More”. This “Chachra More” is situated at the Jhenaidah-Jashore-Khulna (N-7) Highway intersection and the proposed Bhanga-Narail-Jashore-Benapole Project Alignment. To ensure uninterrupted Traffic Movement toward Khulna and Benapole, a comprehensive solution is required at this “T” Junction Intersection (Chachra More).

3.2 PROJECT CATEGORY

36. The current project involves upgrading the Chachra Intersection, the Jhenaidah—Jashore National Highway (Phase 1) endpoint, and the remaining part of this road section. The RHD has already obtained and renewed environmental clearance from the regulatory authority (DOE). Further, environmental clearance is not required for the remaining part of the Phase -1 road section.

3.3 EXISTING ROAD PROFILE

37. Chachra More Intersection is the Junction of N7 and N706. It is the endpoint of the Phase-1 Jhenaidah – Jashore road section. The Jhenaidah-Jashore road section is a 2-lane asphalt road at present. The Alignment of the Jhenaidah-Jashore Road Section is broadly straight, and the road geometry is good. The Bhanga-Benapole Road section is also a 2-lane asphalt road. The Alignment of the Bhanga-Benapole Road Section has sharp horizontal curves, which need to be improved as per the standards.
38. Road N7 and N706 buildings are on both sides near the Chachra More Intersection. These buildings include Hospitals, Religious buildings, Government offices, major factories, and private residential buildings.
39. Furthermore, at Chachra Junction, service roads have been provided at the proposed intersection to accommodate the traffic due to the high number of two-wheelers, three-wheelers, and non-motorized vehicles. Additionally, two-wheelers and non-motorized vehicles should be restricted from using the main carriageway to minimize their interaction with heavy vehicles.
40. The Bangladesh Design Manual mentions the warrant and intervention required at the junction. The IRC Manual was used for the analysis since Bangladesh has heterogeneous traffic conditions and problems similar to those in India. As per the traffic flow conditions, a grade-separated structure should be provided instead of an at-grade junction to cater to future traffic demands and ensure smooth flow.
41. The alignment does not intersect with any major water bodies. There are nine existing box culverts (Table 3-1) falling in the proposed alignment (Refer Exhibit 3-1). No natural wetland, forest, sensitive area, or archaeological sites were noticed. There are no protected forests, wetlands, mangroves, or estuaries in or near the alignment of the proposed project road.

Table 3-1: Inventory of Existing Box Culverts

Sl. No.	Road Name	Approx. Project Chainage (Km)	Type of Culverts (Pipe, Slab, Box)	Span Arrangement (No. * Length) (m)	Remarks/ Recommendations
1	Jhenaidah-Jashore	46+616	Box	1x1.9x1.95	The existing culvert is to be replaced

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Table 3-1: Inventory of Existing Box Culverts

Sl. No.	Road Name	Approx. Project Chainage (Km)	Type of Culverts (Pipe, Slab, Box)	Span Arrangement (No. * Length) (m)	Remarks/ Recommendations
	Road				by new culvert.
2	Jhenaidah-Jashore Road	47+470	Box	1x3.00x3.30	The existing culvert is to be replaced by new culvert.
3	Jhenaidah-Jashore Road	47+500	Pipe	NA	The existing culvert is to be replaced by new culvert.
4	Banga- Benapole Road	98+100	Box	1x1.00x1.00	The existing culvert is to be replaced by new culvert.
5	Banga- Benapole Road	98+200	Box	1x3.00x3.00	The existing culvert is to be replaced by new culvert.
6	Local Link Road from Banga-Benapole Road near Main	0+400	Box	1x3.00x1.50	The existing culvert is to be replaced by new culvert.
7	Local Link Road from Banga-Benapole Road near Main	0+550	Box	1x3.00x2.50	The existing culvert is to be replaced by new culvert.
8	Jashore City Bypass Road from Banga-Venapole Road	0+215 (RA-L)	Box	1x3.00x2.00	The existing culvert is in good condition but hydrologically not adequate, may be replaced by new culvert.
9	Jashore City Bypass Road from Banga-Venapole Road	0+035 (RA-R)	Box	1x1.50x1.00	The existing culvert is to be replaced by new culvert.

42. There are five Culverts along the existing Road whose salient details are pictorially represented in Exhibit 3-1.





Exhibit 3-1: Existing Culverts along the Project Corridor

43. The new structures on the project corridor comprise an Elevated Flyover of the Chachra intersection along with Ramps, POP, Subway, FOBs, and Culverts (**Table 3-2**). The consultants have made efforts to design and construct highway structures, providing detailed designs representative of the most economical solutions for carrying the new carriageway over waterways and roadways and for providing access through service roads for slow-moving vehicles.

Table 3-2: New Structures Proposed along Project Corridor

Sl. No.	Type of Structures	Number of Structures proposed
1	Elevated Flyover along with Ramps	1
2	Pedestrian Overpasses (POP)	1
3	Pedestrian Subway	1
4	Foot Over Bridges (FOBs)	2
5	Drainage Culverts	8

3.4 PROPOSED IMPROVEMENT AT CHACHRA INTERSECTION

44. The key considerations for the improvement/upgradation of the Chachra Intersection involve the following:

► The Design Speed has been made compatible with the terrain. While considering land acquisition and resettlement, the design speed for the loop and ramps was selected as 40 km/h. The design speed for the

Jhenaidah-Jashore road section (N7) and Bhanga-Benapole Road (N706) has been adopted as 80 km/h.

- ▶ A trumpet arrangement is proposed for the interchange at the Chachra More Intersection between roads N7 and N706 to accommodate two grade-separated movements. The trumpet loop is placed towards the Benapole side.
- ▶ Jhenaidah-Jashore road is at Level-1 with a Flyover, and Bhanga-Benapole road section has been designed as access controlled at grade road.
- ▶ ROP cum Flyover of Jhenaidah-Jashore road, proposed in Lot-3 Section of Phase 1 (Jhenaidah-Jashore road) Study has been continued up to the Junction.
- ▶ Both the Ramps (Ramp-1 and Ramp-2) will have uninterrupted one-directional traffic movement.
- ▶ Alignment/ Centre Line, as Proposed in Bhanga Benapole LOC Corridor Project, is slightly adjusted to save important buildings like Government Buildings, Religious places, Major Factories, etc. near Chachra More.
- ▶ The Proposed Section of Bhanga – Benapole Road in the Chachra Intersection Improvement is part of the Bhanga Benapole Project LOC Corridor Project. The alignment of the Bhanga Benapole Project LOC Corridor Project will have to match the alignment of the Proposed Section of Bhanga Benapole in the Chachra Improvement Project before executing the Bhanga Benapole LOC Project in Jashore.
- ▶ A flyover with two spans covering the Roundabout at Chachra Bazaar/RBK road may be proposed under the Bhanga Benapole LOC Project. The Roundabout proposed at this location in this project will remain functional even after the completion of the structure in the future. RE wall approach will end before the Flyover of the Trumpet proposed in the Chachra COS study. The slip road provided here is mainly because of the future provision of VOP/Flyover at the Chachra Bazar location/RBK road junction. Once VOP is ready, this slip road will be used by local traffic to go to Jhenaidah or Benapole while using the main loop of the trumpet.
- ▶ Pedestrian crossing Facilities such as POP, FOB, and Pedestrian subways are adequately provided.
- ▶ Chachra COS is extended up to the gate of Medical College on the Benapole side, Roundabout at Chachra Bazar/ RBK road on the Bhanga/Khulna side, and Flyover on Jhenaidah-Jashore starts after the Pier of Railway overpass.
- ▶ Extra widening as per the Geometrical Design Manual of Bangladesh 2005 (Revised) is provided on the Main Loop (Loop-1 & Loop-2) of Trumpet and Ramp1 and Ramp-2, but it could not be provided on the Service Road on both sides because of important buildings on both sides. If we provide extra widening on the service road, we will have to shift our alignment of the flyover on Jhenaidah-Jashore Road towards one side so that only one building will be impacted. Technically, it should be provided; therefore, extra widening of the carriageway of the service road is recommended.

3.4.1 ROAD DESIGN

45. The road design speed is reduced where restrictive site conditions (intersections, bridge approaches, curves, built-up sections, educational and other sensitive receptors, forest and potential wildlife crossing sections, etc.) and adequate land width are not available. In built-up sections, it is generally restricted to 20 km/h. Gradual changes will be introduced by providing successive sections of increasing/decreasing design speeds so that road users become progressively conditioned to such changes. Road safety, Speed limit, and Warning signs have been proposed at intersections, bazar, and commercial areas. The adopted geometric design criteria for the project road are shown in **Table 3-3**.

Table 3-3: Proposed Road Engineering Design

S. No.	Description		Value
1.	Speed Control	Design Speed (Km/h)	Main Carriageway – 80 Service Road/ Ramps/ Loops - 40
2.	Sight Distance	Stopping Sight Distance (SSD) in meter	Main Carriageway – 120 Service Road/ Ramps/ Loops - 45
3.	Horizontal Controls (For Main Road)	Minimum Curve Radius (m)	500 for Main Road (45m for Ramp-1 & Ramp-2 and 66 for Loop-1 and Loop-2)
		Maximum Super Elevation	5% MCW & 7% Loop, Ramp, Service road
		Minimum Transition Curve (m)	35
4.	Vertical Controls	Maximum Gradients	3% for MCW (Max 3.5% for Loop-1 & Loop-2 and Ramps)
		Minimum K value	8-35
		Vertical Clearance for Major Road (m)	5.7
		Vertical Clearance for Pedestrian overpass (m)	4.5
		Vertical Clearance at Pedestrian Subway (m)	3.5
		Vertical Clearance for Rail Track (m)	9.05
5.	Cross Section Elements for Highway	Carriageway width for dual carriageway (m)	7.3
		Traffic lane width (m)	3.65
		Normal Cross-fall	3%
		Inner marginal shoulder (m)	0.3/0.6
		Raised central median width (m)	1.2
6.	Cross-Section Elements for Service Road/ Ramps/ Loops	Service Lane (m)	7.3
		Carriageway Cross fall	3%
		Vertical Clearance for underpass (m)	4.5
		Embankment slope	2H : 1V

Source: Inception Report & Design Report for Roads and Bridges (2024)

46. **Road Cross-Section:** Various Typical Cross Sections for the Project Road Sections are given in Table 3-4. Some of the proposed cross-sections along the Chachra Intersection are shown in Figure 3-2.

Table 3-4: Typical Road Cross Sections along Project Corridor

Name	Description
TCS-1	Typical Cross Section for Urban Section at Bhanga Benapole Road in Jashore with Both Side Service Road
TCS-2	Typical Cross Section for Urban Section at Bhanga-Benapole Road in Jashore with Both Side Service Road and Slip Road on Left Side.
TCS-3	Typical Cross Section for Flyover section at Jhenaidah-Jashore Road with Service Road
TCS-3A	Typical Cross Section for Flyover section at Jhenaidah-Jashore Road
TCS-4	Typical Cross Section for Main Loop with RE Wall and Left side Service road
TCS-4A	Typical Cross Section for Loop-1 with RE Wall
TCS-4B	Typical Cross Section for Loop-2 with RE Wall with Left Side Service road
TCS-4C	Typical Cross Section for Loop-2 with Left Side Service road
TCS-5	Typical Cross Section for Ramp-1 and Ramp-2 with Service Road on Left Side

Joint Venture of



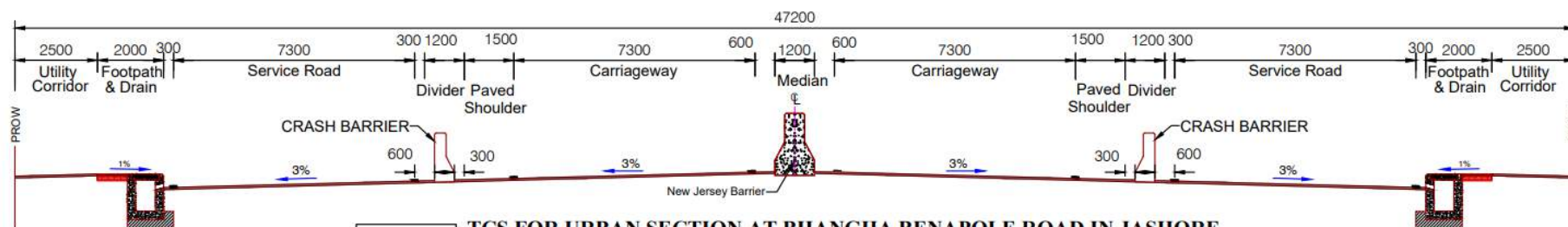
STUP Consultant Pvt. Ltd.
On July 1st, 2021, STUP was acquired by Assystem and rebranded as Assystem STUP.



BCL Associates Limited, Bangladesh

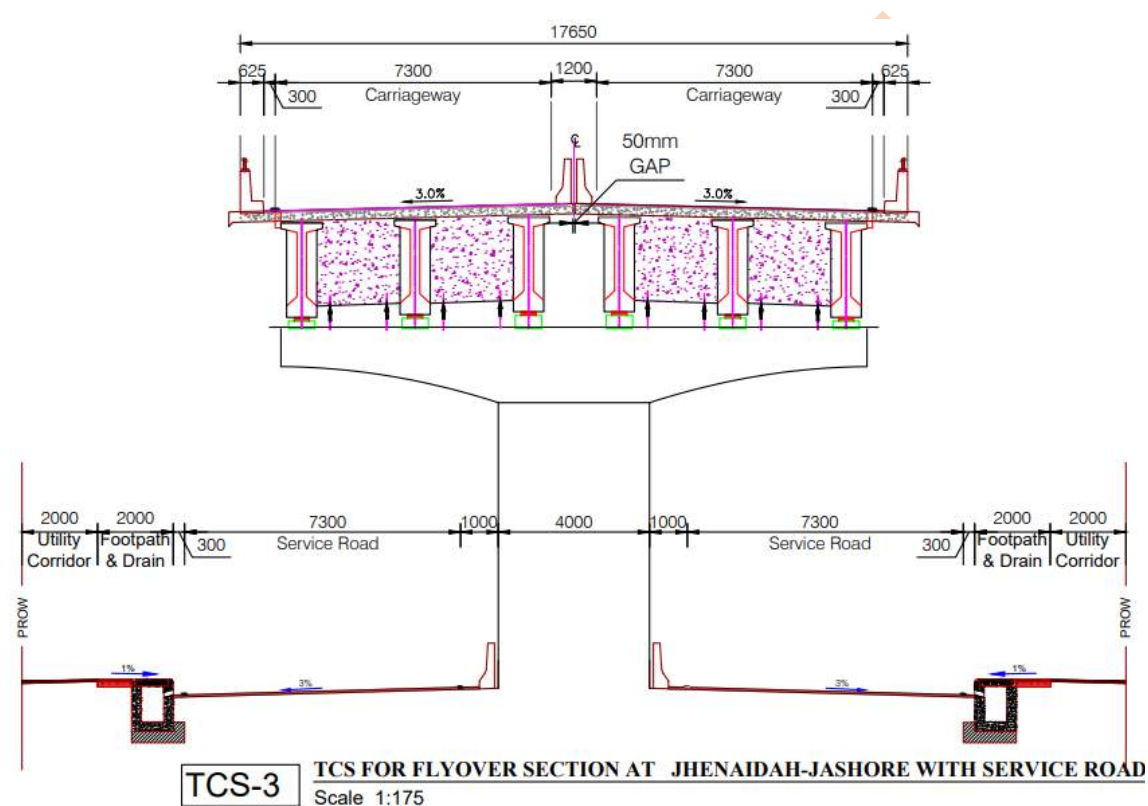
Table 3-4: Typical Road Cross Sections along Project Corridor

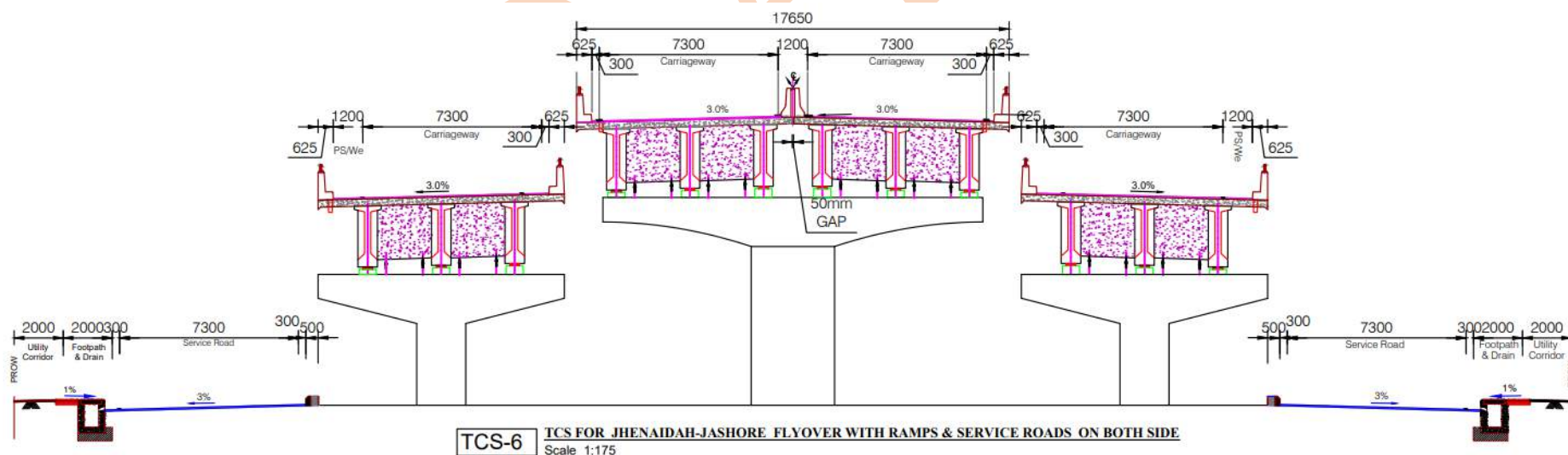
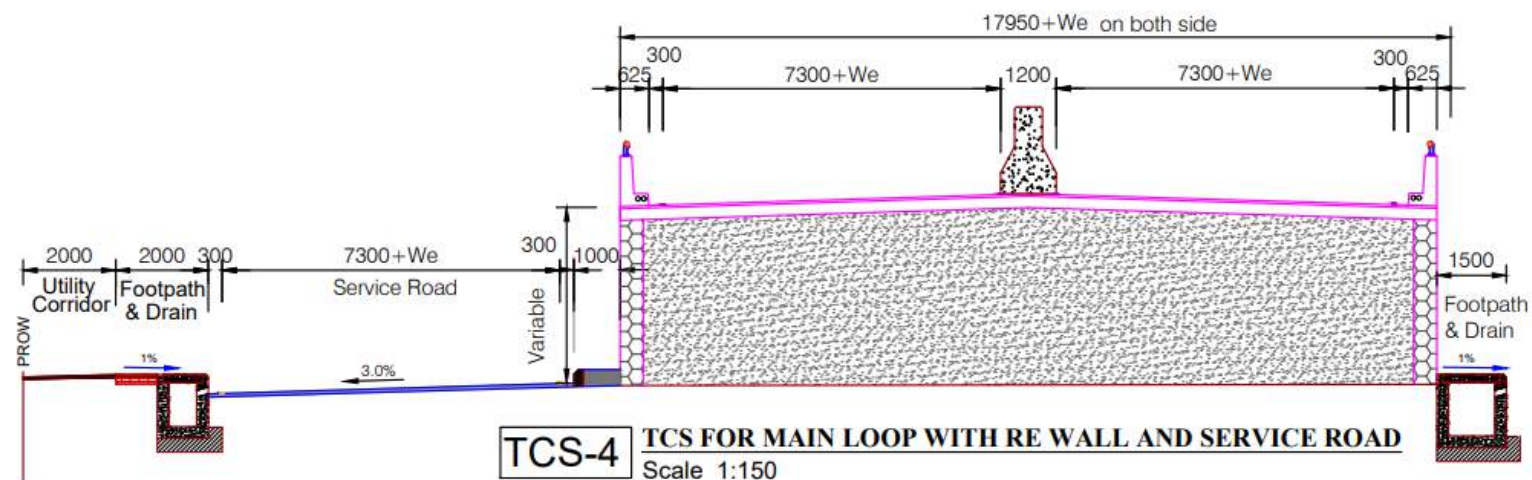
Name	Description
TCS-5A	Typical Cross Section for RE Wall Approaches of Ramp-1 and Ramp-2 with Service Road on Left Side
TCS-6	Typical Cross Section for Jhenaidah-Jashore Road Flyover with Ramps and Service Roads on both sides
TCS-6A	Typical Cross Section for Jhenaidah-Jashore Road Flyover with RE Wall Ramps and Service Ramps on both sides.
TCS-7	TCS for Widening of Existing 2 Lane Road to 4 Lane Road
TCS-8	TCS for Overlay on 4 Lane Divided Carriageway



TCS-1 **TCS FOR URBAN SECTION AT BHANGHA BENAPOLE ROAD IN JASHORE**
WITH SERVICE ROAD ON BOTH SIDES

Scale 1:150





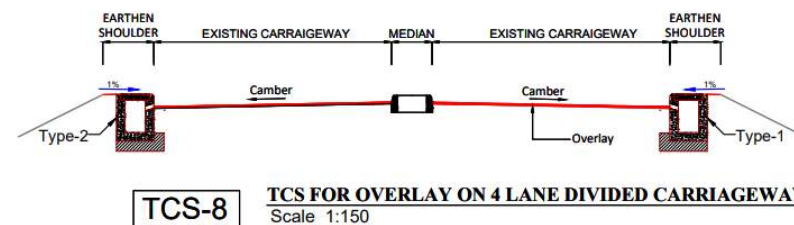
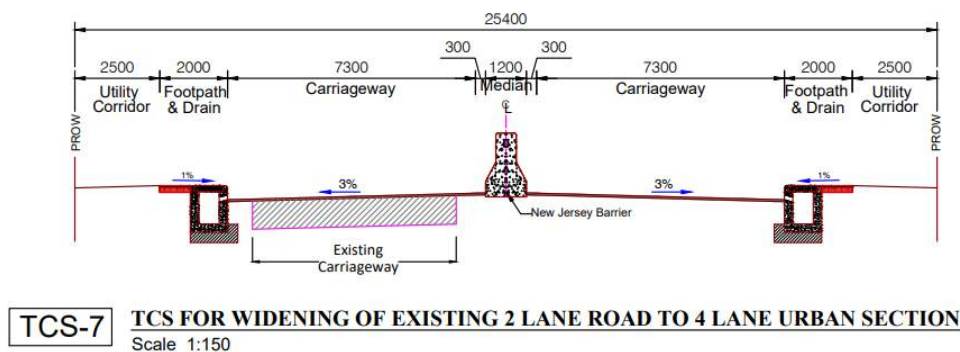
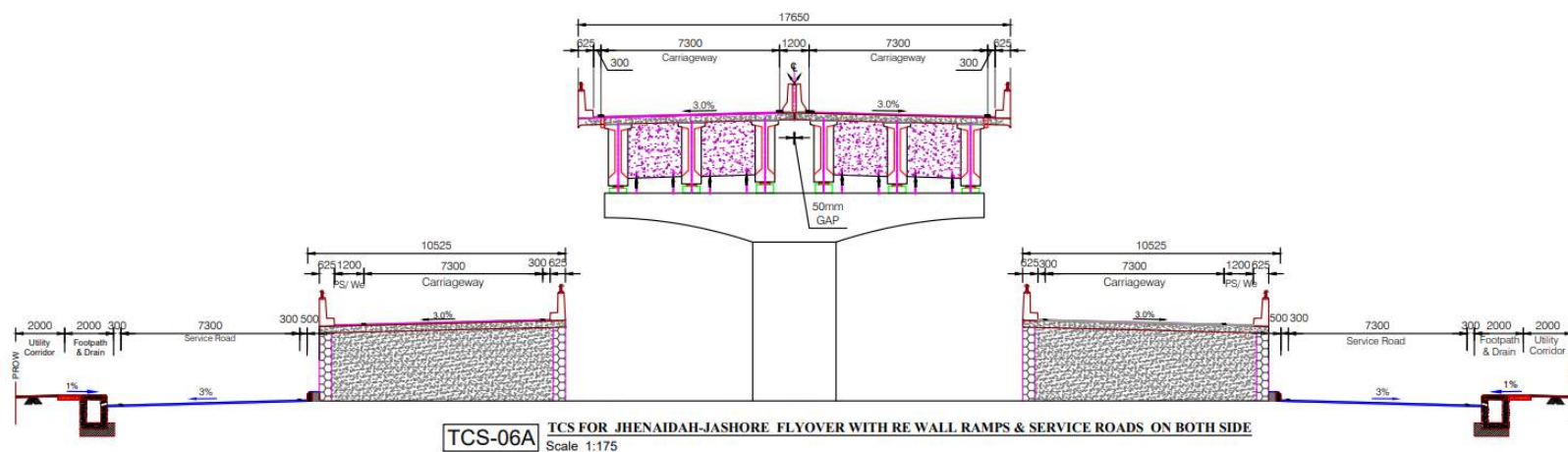


Figure 3-2: Typical Cross Sections along Project Corridor

47. **Elevated Flyover:** The details of proposed Elevated Flyovers along with ramps on the Project Corridor are given in **Table 3-5**.

Table 3-5: Proposed Elevated Flyover along with Ramps on Project Corridor				
Flyover/ Ramp	Chainage (Km)	Span Arrangement (m)	Total Length (m)	Overall Deck Width (m)
Flyover	46+483.157 to 47+609.157	25x41.5+1x47+1x41.5	1126.025	1x17.65
Ramp R1	0+013.281 to 0+345.579	8x41.5	332.025	Vary from 5.000 to 10.050
Ramp R2	0+428.234 to 0+760.001	8x41.5	332.025	Vary from 10.050 to 5.000

48. **Pedestrian Overpass:** The details of Pedestrian Overpass (POP) on the project corridor are given in **Table 3-6**.

Table 3-6: Proposed POP along Project Corridor					
Chainage (Km)	Clear Span Arrangement (m)	Total Length (m)	Overall Deck Width (m)	Type of Superstructure	Type of Foundation
0+321	1x6x4.5	7.0	1 x 20.036	RCC Box	Raft

13. **Pedestrian Subway:** The details of Pedestrian Subway on the project corridor are given in **Table 3-7**.

Table 3-7: Proposed Pedestrian Subway along Project Corridor					
Chainage (Km)	Clear Span Arrangement (m)	Total Length (m)	Overall Deck Width (m)	Type of Superstructure	Type of Foundation
98+550	1x6x3.5	7.0	2 x 25.1	RCC Box	Raft

49. **Foot Over Bridges (FOBs):** According to the Traffic study report, Foot Over Bridges have been proposed at four locations. Tentative locations and details of FOBs are given in **Table 3-8**.

Table 3-8: Proposed FOBs along Project Corridor					
Chainage (Km)	Span Arrangement (m)	Total Length (m)	Overall Deck Width (m)	Type of Superstructure	Type of Foundation
98+000	1x32.90+26.90	59.800	1 x 4.1	RCC/PSC Girder	Raft
98+244	1x24.40+ 1x34.75	59.150	1 x 4.1	RCC/PSC Girder	Raft

3.4.2 DRAINAGE

50. Roadside drainage facilities of the intersection are also required at some locations where the road passes through markets, business centers, agricultural land, and others. The proposed drainage systems and drainage pattern are given in the following image in **Figure 3-3**.
51. Rectangular Drain has been recommended for Chachra More Intersection. Also, different types of drains have been recommended based on road requirements. The recommended types of drains are as follows:
 (i) Roadside Drain on Both side at urban Area Straight section (Drain Type-1) (ii) Road Side Drain at urban Area in super elevated Section at outer Edge (Drain Type-2) (iii) At Inner Edge of super elevated Road Section (Drain Type-3) (iv) Drain at Depression Median in Rural area of straight reach (Drain Type-4) (v) Drain at Depression Median of super Elevated Road in Rural Area (Drain Type-5) (vi) V-Shape Drain at the end of carriageway (Drain type-6) (vii) Drain at Bridge Approach (Drain Type-7) (viii) Drain for overpass & Flyover.
52. The hydrological recommendation of the side Drain proposed in the Chachra Intersection alignment is shown in Table 3-9.



Figure 3-3: Drainage system of the proposed project area

Table 3-9: Proposed Roadside Drains in Chachra More Intersection

Sl. No.	Chainage		Length (m)
	U/S (m)	D/S (m)	
Road Side Drain: Jhenaidah - Chachra Circle Road			
1	46+483	46+625	142
2	46+483	46+625	142
3	46+625	47+470	845
4	47+500	47+470	30
5	46+625	47+470	845
Road Side Drain: RBK Road			
6	0+108	0+035	73
7	0+000	0+035	35
8	0+108	0+035	73
9	0+000	0+035	35
Road Side Drain: Jashore City Road			
10	0+242	0+215	27
11	0+215	0+000	215
12	0+242	0+215	27
13	0+215	0+000	215
Road Side Drain: Jashore - Satkhira Road			
14	97+748	97+908	160
15	97+930	98+130	200
16	97+780	98+160	380
17	98+254	98+400	146
18	98+400	98+790	390
19	98+400	98+790	390
Road Side Drain: Roundabout Road			
20	0+160	0+330	170
21	0+335	0+350	15
22	0+650	0+460	190
23	0+265	0+460	195
24	0+542	0+350	192

Source: Design Report for Roads and Bridges (2024)

3.4.3 PAVEMENT DESIGN

53. Pavement design was carried out using the AASHTO Pavement Design Method and taking reference from the RHD Pavement Design Guide 2005. The pavement design is alternatively cross-checked with IRC 37-2012 / 2018 and IRC 58-2015. The pavement design is based on the input derived from the traffic study, axle load survey, and pavement and material investigation, which have been carried out. The final pavement option and pavement compositions are recommended for the project road based on life cycle cost analysis.
54. During the pavement condition survey, the major pavement distresses and other such as type of carriageway, shoulder and dimension, road cutting /filling type, riding quality of pavement (Good, Fair or Poor), Crack, rut depth, pothole, patch, edge break, raveling, material loss in the shoulder and overall

condition of shoulder, embankment, embankment slope and drainage condition were captured. Overall pavement condition is generally found to be poor to fair.

55. Currently, the pavement needs reconstruction, as it will be either realigned or constructed as a slip road, service road & loop & approach road, or its vertical profile is to be raised. Provision of Diversion has to be thought of during construction of interchange & ramps & loops as finally entire road will be reconstruction.
56. Comparing the practices of different countries, the design period for the road project is 20 and 30 years for flexible and rigid pavement, respectively.
57. A life cycle cost analysis was also carried out to determine the most economical pavement option for the project road. Based on the life cycle option and practices followed in Bangladesh, conventional flexible pavement for the main carriageway and rigid pavement Joint reinforced concrete pavements (JRCP)/Continuous reinforced concrete pavements (CRCP) combinations were recommended.

3.4.4 ROAD SAFETY

58. The general road safety issues for the project are largely dependent on the mode of motorized traffic movement, Non-Motorized Vehicles (NMVs), and pedestrians. The road safety design issues mainly lie with features of road infrastructure, such as Horizontal and vertical alignment of road, Cross sections of roads and bridges, Lane configuration and provision for NMVs, Crash barriers, Pedestrian facilities along and across the carriageway, Intersections, Pavement, etc. The important road safety elements are considered in the engineering design as follows:

- ▶ Roadside Safety barriers,
- ▶ Intersection, Delineation and lighting,
- ▶ Median barriers,
- ▶ Pedestrian crossings and fences,
- ▶ Central hatching, Paved shoulders,
- ▶ Formation width,
- ▶ Medians / Dividers,
- ▶ Cross-section at bridges & culvert approaches,
- ▶ At Grade Rail Crossings,
- ▶ Pavement Width and Surfaces,
- ▶ Edge drop of Paved Shoulder,
- ▶ Junctions, Pedestrian under / Overpass,
- ▶ Footpath
- ▶ Traffic Calming Measures,
- ▶ Road Signs, Pavement Markings, etc.

59. The recommended designs of the identified safety issues are documented in detail in the Road Safety Audit of Chachra Intersection prepared by the Technical Design Team and adopted in the design.

ROAD SIGNS, PAVEMENT MARKINGS AND ROAD STUDS

60. In multi-level and multi-lane interchange, drivers are to take many decisions at diverging locations, wherein the direction information signs and pavement marking and road studs are very important. There shall be overhead advance direction sign, lane dedicated direction information sign at approaches gantry mounted butterfly direction and shoulder mounted flag type direction sign at gore area.
61. There shall be lane changing marking with direction arrows, bifurcation arrow and continuous and broken line, placed side by side at auxiliary lane of diverging and merging section. Also, raised profile edge line for the edge line on shoulder and median sides. All pavement markings shall be reinforced with road studs.

3.5 CONSTRUCTION MATERIALS, SOURCING AND UTILITIES REQUIREMENET

62. The construction materials such as, earth/sand, cement, steel, aggregate, bitumen and water are main requirement for the construction of the road. The construction materials will be procured/ purchased from the approved suppliers by the Contractors of his own arrangement subject to compliance of statutory/legal requirements of the Bid Documents and approval of the Construction Supervision Consultant (CSC) or Engineer and RHD-PIU.
63. **Borrow materials, sand, aggregates:** The major construction materials such as borrow materials, sand and aggregates and their sources with suitable route distances including are presented in **Table 3-10** and shown in **Figure 3-4**.

Table 3-10: Sources of Construction materials

Sl. No.	Construction Material	Source/ Location	Distance (Km)
1	Borrow Materials	Padma River Sand	140
		Gorai Sand	97
		BP 18*	27
		BP 14*	17
		BP 15*	17
2	Sand	Sylhet Sand	440
		Subarnakhali Sand (Navaron)	43
		Debhata Sand (Debhata Bazar)	82
		Kaliganj Sand (Kalinganj Bazar)	95
3	Aggregate	Meghalaya Stone	445
		Bhomra Land Port (Nalhati Stone)	95

*Borrow pits identified

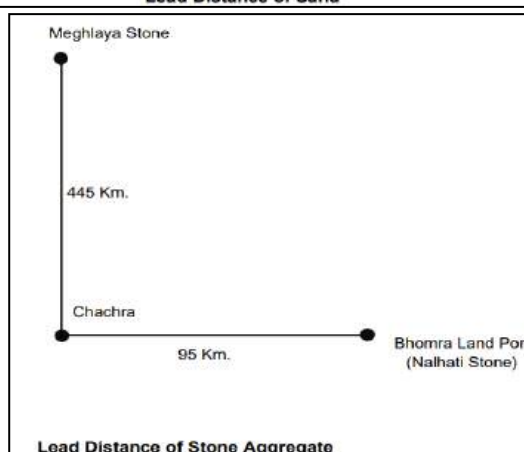
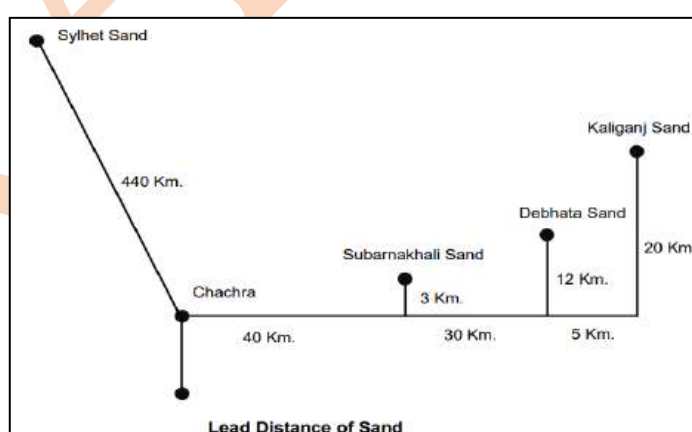
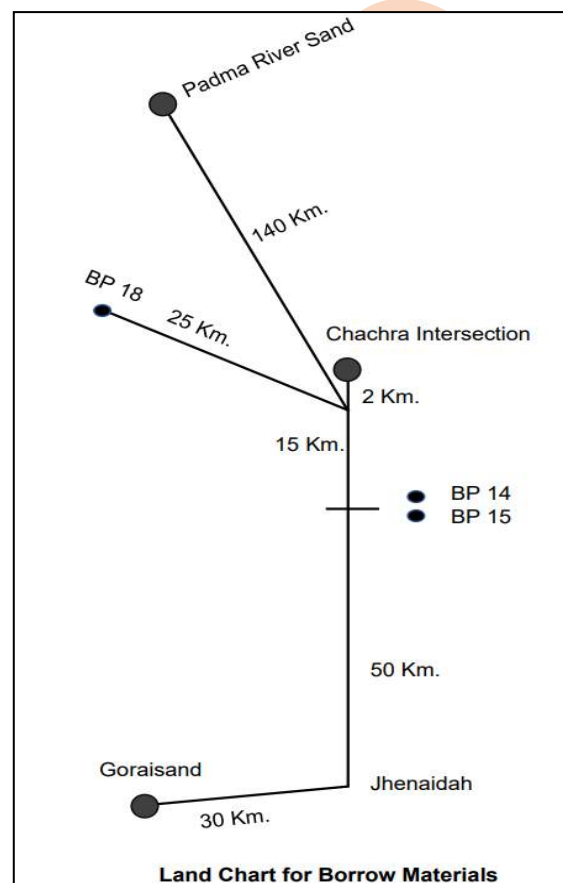


Figure 3-4: Locations of Suitable sources of Construction materials for the Project

- 64. Cement and Steel Reinforcement:** Admixture, Cement, and steel are available from the local market.
- 65. Bitumen:** Bitumen can be obtained from Eastern Refinery and abroad.
- 66. Water:** Generally, non-potable water sources for construction works and sanitation will be extracted from shallow aquifers. During the construction period, two types of water consumption will be needed as follows.
 - ▶ Water use with construction materials such as concrete mixing and compaction, etc.;
 - ▶ Water use for site offices, construction yards, and construction camps during project operation.
- 67. Non-potable water sources for construction** will come mostly from shallow aquifers or surface water. Drinking water may be taken from the deep aquifer if the shallow aquifer is contaminated with excessive Iron and Arsenic. In addition, the contractor will provide safe drinking water by supplying bottled drinking water at the construction sites and offices. An overhead tank and water reservoir will be constructed to supply water facilities within the premises of the site project office, contractor's office, and labor camps.
- 68. Sewerage and Waste:** The project site office, contractor's offices, construction yard, and construction camps will have sanitary toilets with proper solid/liquid waste management facilities. Sufficient toilets will be provided in all construction camps for the workers, offices, and construction yards, at a formula of one toilet for every 10-12 persons.
- 69. Energy:** The project area is mostly urban or semi-urban, so electricity will be provided from the national grid.

3.6 LAND ACQUISITION AND RESETTLEMENT

- 70.** A total of 25.456 acres of land will be acquired for the proposed Chachra intersection improvement purposes at Jashore under the WeCARE Program Phase 1. Compensation will be paid only for 9.446 acres of private lands (both commercial and residential) since RHD owns the remaining 16.01 acres. The proposed estimated cost for acquiring land is **BDT 1,891,312,005¹⁸**.
- 71.** The estimated resettlement cost for the Chachra Intersection encompasses the costs of land acquisition and resettlement benefits for the Project Affected Persons (PAPs). For the permanent land acquisition, cash compensation at full replacement value should be provided based on the prevailing market value in the locality to purchase an equally productive plot of land near the affected villages. The eligible PAPs will be compensated for any permanent improvements to the land within ROW. This will be calculated based on the price of permanent improvement at current prevailing market rates for labor, equipment, and materials. Where residual land is only a small proportion of total land and remains unusable, compensation should be calculated based on the total land affected (i.e., the actual land lost plus the remaining unusable land). The land acquisition & resettlement costs and budget have been estimated at Mouza Rate 2023/24 of land and the structures and trees, etc., calculated at the rate of the current market price.
- 72.** DC will pay Cash Compensation under Law (CCL) for land, structures, trees, other resources, etc., after the RHD places the fund as per the Acquisition Requisition of Immovable Property Act (ARIPA) 2017 in conformity with the World Bank's ESF and ESS5.
- 73.** The RHD will pay resettlement benefits directly with assistance from the INGO. The INGO will reassess the quantity of losses and assist DC in assessing the Resettlement cost.

¹⁸ Volume I - Final Design Report of Roads & Bridges, RHD June 2024

74. The total estimated resettlement cost for Chachra Intersection is **BDT 2,821,125,397**. The eligible PAPs (EPs) will receive compensation of BDT 2,800,877,755 from the respective DCs and **BDT 20,247,642** from RHD.
75. The total estimated compensation for affected structures is **BDT 180,103,240**, and CCL with a 100% premium is **BDT 396,227,128**.
76. The land acquisition and RAP implementing agency of the Chachra Intersection is the RHD under MoRTHD. The concerned District Commissioners will play necessary significant roles in land acquisition. As practiced in all projects in Bangladesh, generally, Implementing NGOs/Firms assist the client/employer (e.g., RHD) in implementing the Resettlement Action Plan (RAP) for the respective projects. Against such a background, an Implementing NGO will also play a vital role as per INGO's ToR in implementing the RAP on behalf of RHD.
77. The project will affect the loss of income and livelihood of the affected persons. The E&S Consultant of the RAP preparation has been stipulating special measures to mitigate the impacts and risks of those whose income and livelihoods will be affected in the project area, and it will have a positive impact on the restoration of PAPs' income and livelihoods. The details on entitlement matrix for compensations and resettlement benefits of titled and non-titled affected peoples are to be documented in RAP, 2024 of the Project.

3.7 IMPLEMENTATION SCHEDULE

78. The implementation schedule is being prepared by the Technical Design Team—the Project is tentatively scheduled to be commissioned and completed within 2.5 years (30 months). The environmental compliance monitoring work will be carried out by the PIU unit headed by the Project Director and an appointed Construction Supervision Consultant (CSC) or Project Implementation Consultant (PIC), and the Contractor will collectively ensure the implementation of the project ESMP during construction and maintenance periods in their tenure. The tentative Project Implementation Schedule is given in **Table 3-11**.

Sl. No.	Major Work Components	Actual/ Schedule Date of Completion
1	Call of tender	September, 2024
2	Award of contract	December, 2024
3	Start of construction	January 2025
4	Construction period	30 Months
5	End of construction	June, 2027
6	Opening of road to traffic	June, 2027

DRAFT

4 DESCRIPTION OF THE ENVIRONMENTAL AND SOCIAL BASELINE

4.1 INTRODUCTION

79. The primary objective of this chapter is to provide an environmental and socio-economic status of the project area, which will serve as a baseline, and potential impacts during the construction and operation phases of the project can be mitigated accordingly. Baseline data includes an assessment of the physical environment along with the natural (pollution) of the project impact areas, ecological environment, and socio-economic environment of the project areas. Baseline data has been compiled in the ensuing sections to cover these aspects.

4.2 PHYSICAL ENVIRONMENT

80. The physical environment comprises the physiography and topography, geology and soil, meteorology, hydrology, water resources, and natural hazardous conditions of the project area. The physical environmental data for the study area had been collected using the following methods;

- ▶ Primary Survey
- ▶ Laboratory Analyses
- ▶ Local people consultations
- ▶ Organizational visit
- ▶ Observations and
- ▶ Websites browsing

4.2.1 PHYSIOGRAPHY AND TOPOGRAPHY

PHYSIOGRAPHIC FEATURES

81. The Chanchra intersection is in Jashore Sadar Upazila, Jashore district, in the country's southwestern region. The total area of Jashore Sadar Upazila is 43,298 ha, consisting of 15 unions and one (1) pourasabha. The Chanchra intersection is at (23° 9'28.91"N, 89°11'41.64"E) on Jhenaidah to Jashore Road and (23° 8'38.30"N, 89°11'48.79"E) on Benapole—Bhanga Road. The area is across the physiographic unit of the Ganges Floodplain. It borders India to the west, Khulna District and Satkhira District to the south, Khulna and Narail to the east, and Jhenaidah District and Magura District to the north.¹⁹

TOPOGRAPHY

82. The project area's topography is a flat plain. As shown in Figure 4-1: Elevation Profile of the Existing Road Alignment at Chanchra the Its elevation is between 5 and 7 meters above mean sea level, and its general slope is from north to south.

¹⁹ https://en.wikipedia.org/wiki/Jessore_District

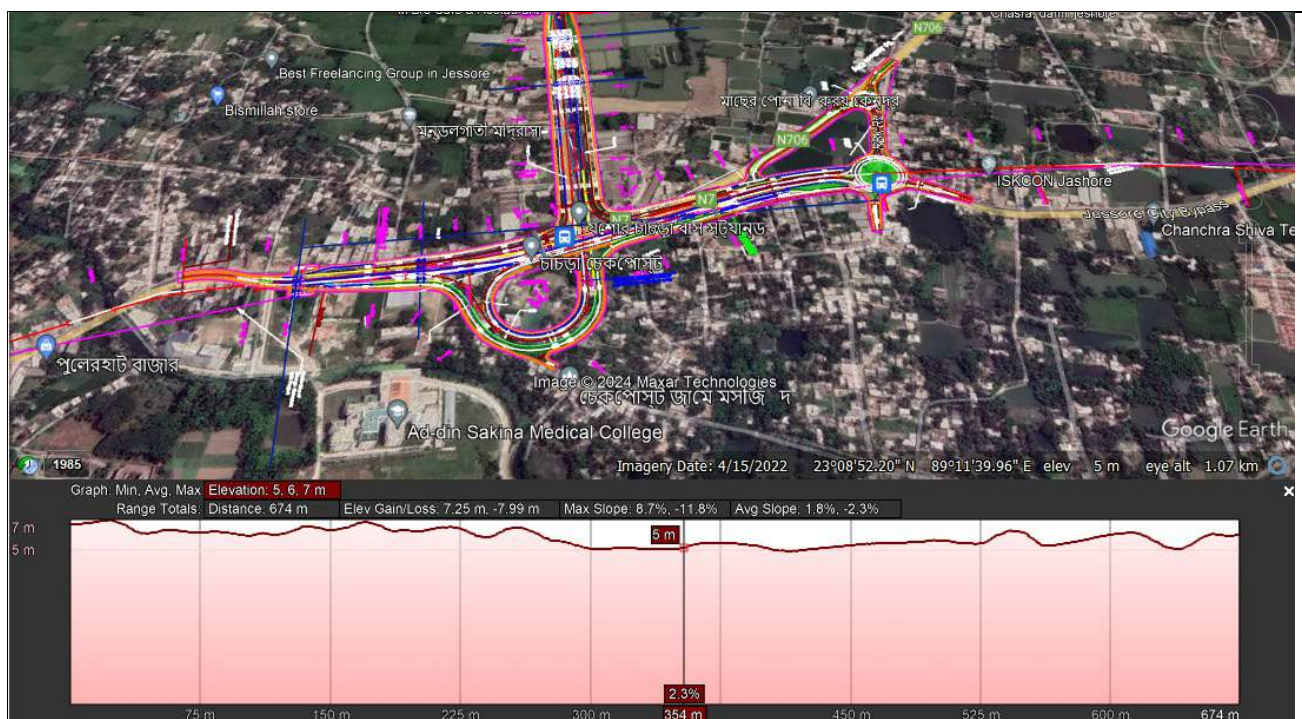


Figure 4-1: Elevation Profile of the Existing Road Alignment at Chanchra Intersection

4.2.2 GEOLOGY AND SOIL

GEOLOGICAL CHARACTERISTICS OF THE PROJECT AREA

83. The Bengal Basin is filled with Tertiary and Quaternary age sediments. The study area mainly covers the Ganges deltaic deposits of the Late Holocene to the recent age. The modern deltaic plain in the western Bengal Basin can be divided into two regions: The Upper Delta plain of meander belts of the Ganges–Bhagirathi River in the north and the lower delta plain with numerous tidal creeks in the south. The lower deltaic plain, formed in Pleistocene–Holocene time, is characterized by an extensive clay layer of varying thickness (15–76 m), underlain by silt, sand, and gravel. The landforms of the Bengal lowland, including the Ganges delta and its surrounding region, consist of Pleistocene uplands and alluvial lowlands. The Pleistocene upland's relative height above the alluvial lowland's surface is 3–10 m north and 0–5 m south. The alluvial lowlands are subdivided into three geomorphological regions, namely the Brahmaputra - Jamuna floodplain in the north, the Sylhet basin in the northeast, and the Ganges Delta in the south of the region.
84. The Ganges deltaic deposits of the late Holocene to recent age cover the project area. The surface lithology of the area is composed of deltaic deposits, which are tidal deltaic deposits, deltaic silt deposits, and mangrove swamp deposits. The subsurface lithology is characterized by a heterogeneous mixture of sand, silt, and clay. The Latest Pleistocene and Holocene sediments in the Ganges Delta and its surrounding region are divided into five units: the lowest, lower, middle, upper, and uppermost units.
85. Figure 4-2²⁰ shows the Geological Map of Bangladesh. During the site visit, it was observed that the soil type along the project road is clay, silty clay, and clayey silt. The soil is very good for cultivating paddy and other food grains.

²⁰ Volume I - Draft Design Report of Roads & Bridges Chachra Intersection. March 2024

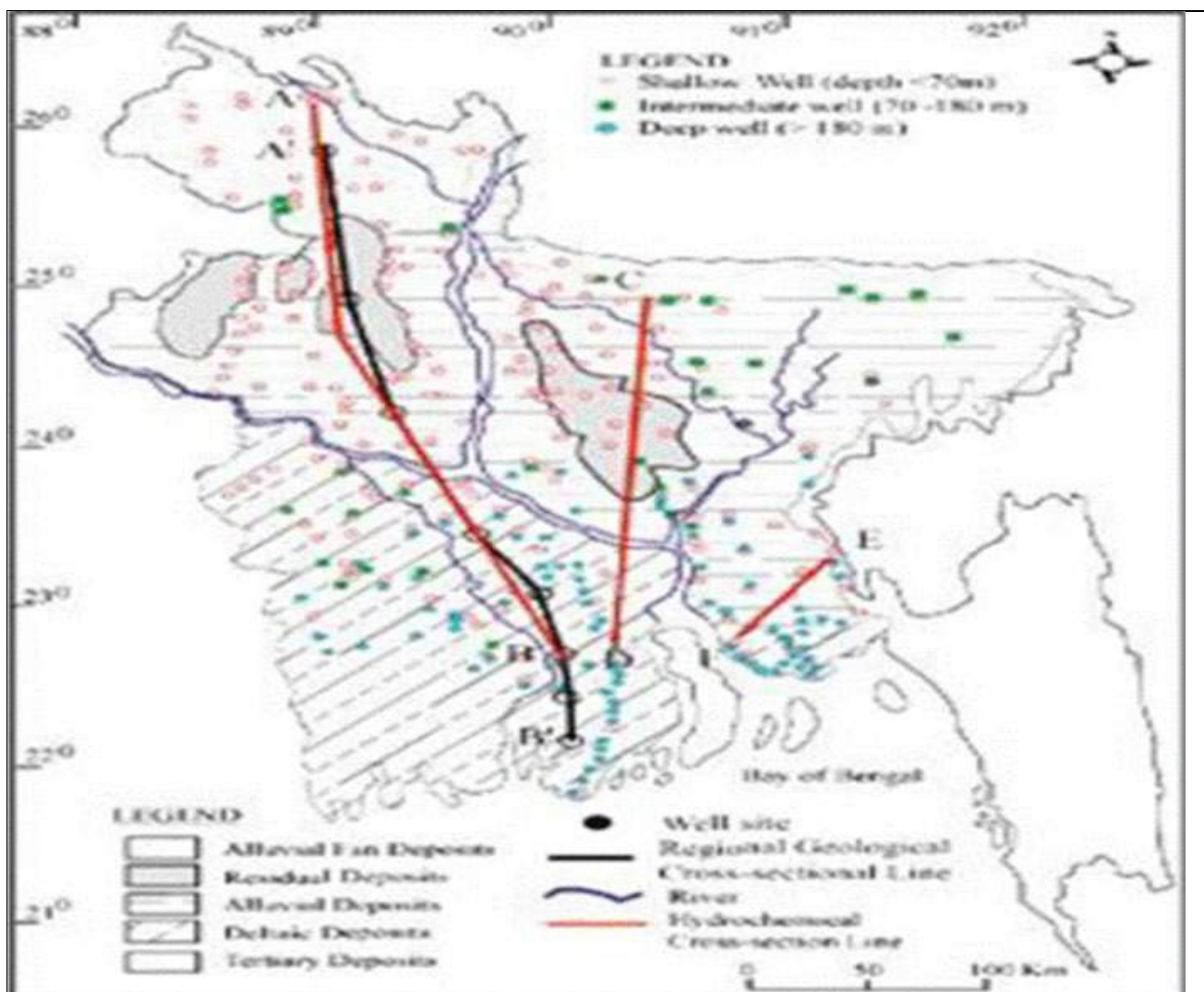


Figure 4-2: Geological Map at Chanchra Intersection

SEISMOLOGY

86. Bangladesh is one of the world's most tectonically active regions. Bangladesh has been divided into three generalized seismic zones based on the distribution of earthquake epicenters and the morph tectonic behavior of different tectonic blocks. The south of Bangladesh is a seismically severe zone represented by zone II with a Bask coefficient of 0.05. So, considering Bangladesh's seismic zoning, the project area is less vulnerable to earthquakes. Characteristic features of seismic zonation of Bangladesh are presented in Table 4-1.

Table 4-1: Characteristic features of seismic zonation of Bangladesh

Zoning	Area Mercalli Scale	Modified
I	North and eastern regions of Bangladesh (Seismically most active)	IX
II	Lalmaj, Barind, Madhupur Tracts, Dhaka, Comilla, Noakhali and western part of Chittagong Folded belt.	VIII
III	Khulna division S-E Bangladesh (Seismically relatively quiet)	VII

87. Seismic zoning map is shown in Figure 4-3²¹.

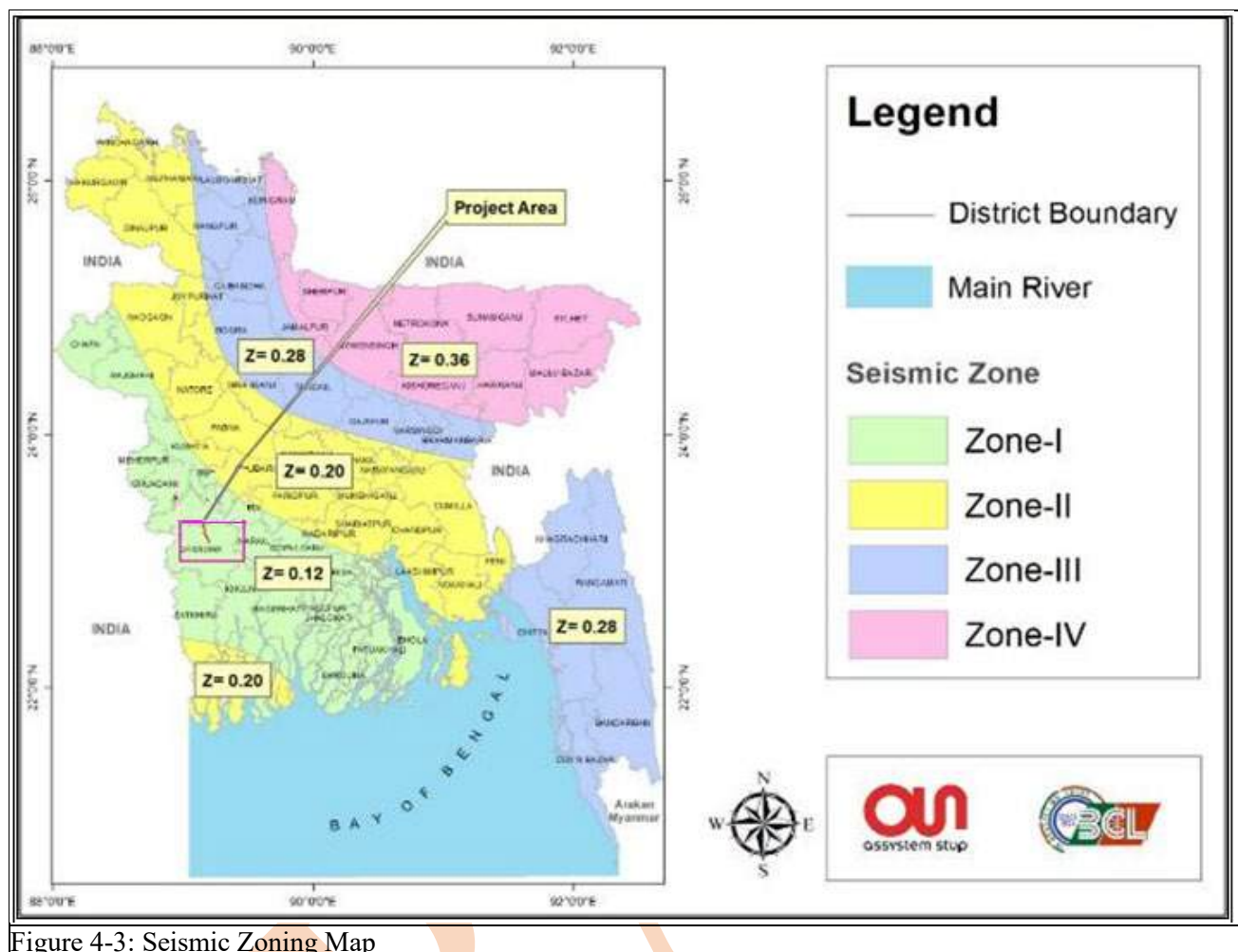


Figure 4-3: Seismic Zoning Map

4.2.3 SOILS

88. The alignment of the Chanchra intersection is in Jashore Sadar of Jashore District and is the endpoint of the Jhenaidah – Jashore road section. Soil profiles of the area characteristically have textural classification ranging from silt loam to silty clay or clay in most of the horizons. The property of clay content in the soils will lead to compaction, removal of air voids, increase of the soil's sheer strength, and decrease in its compressibility and permeability. It will reduce the void ratio, making it more difficult for water to flow through the soil.

- ▶ The soils with normal bulk density and low organic carbon (indicative of low organic matter) content show good load-bearing capacity.
- ▶ Owing to a good percentage of clay, soil of the project area are potentially less permeable, having very little susceptibility to erosion.
- ▶ The status of soil reaction (soil pH >7.5) in the project area shows the presence of liming material, including calcium and magnesium. This phenomenon prevailing in soils will considerably reduce wetness in soggy and clayey soils, enabling natural stabilization. On the other hand, the calcium combines with chloride present in the soils, forming calcium chloride (popularly known as hydrated lime), which may also supplement as an additive for obtaining optimum moisture during the construction of roads.

²¹ Final ESIA for Phase -1 (Jhenaidah to Jashore Road Section), RHD, 2022

- ▶ Low soil salinity (<1.0 dS/m) with lower content of sodium in the soils of the project area will not play any role in damaging the soil stability since the soils are potential enough to attain compaction as influenced by the presence of ample clay particles and particle density as well.
- ▶ Besides, the clay content, porosity, and water-holding capacity of the soils are not very favorable to increase surface soil salinity due to the capillary rise of salt water during the dry season.

4.2.4 LANDUSE PATTERN

89. Identification, delineation, and mapping of Land use/cover are important for global monitoring studies, resource management, and planning activities. A land-use study has a pivotal role in identifying and assessing the likely impacts of the proposed project on the land environment.

STUDY AREA

90. The land use map has been prepared for a 1.5 km buffer area of the Chanchra Intersection alignment to assess the impacts on the land environment.

METHODOLOGY

91. The downloaded satellite imagery from Google Earth was visually interpreted to study the qualitative and quantitative aspects of images. On-screen digitization of the GeoEye Data has been carried out. The study area layers have been exported to ESRI shape file format, and relevant attributes have been incorporated in GIS layer shape files. Land use spatial distribution statistics have been generated to study the land environment. The area statistics and maps generated have been presented in the following section.

LAND USE CLASSIFICATION

92. The land use classification system presented in this report includes the more generalized first and second levels to give an idea of changing land use patterns and the extent of spatial growth along the project road alignment. At the more generalized levels, it meets the principal objective of providing a land use and land cover classification system to determine land use patterns over the study area.

EXISTING LAND USE PATTERN ALONG THE PROJECT ROAD ALIGNMENT

93. The analysis of the existing land use pattern along the project road alignment has been carried out for the alignment and is presented in Table 4-2.

Table 4-2: Existing Land Use Pattern Along the Project Road Alignment		
SL No	Land Type	Affected Area (sq km)
1	Agricultural Land	2.892
2	Buildup Area	3.976
3	Canal	0.029
4	Hatchery	0.057
5	Low Land	1.190
6	Pond / Waterbodies	0.533
7	Railway	0.108
8	River	0.100
9	Road	0.678
10	Vegetation Area	4.250
Total Area		13.813

94. As shown in the Figure 4-4, predominant land use pattern within the 1.5 km buffer is vegetation, followed by built-up areas, Agriculture, and others.

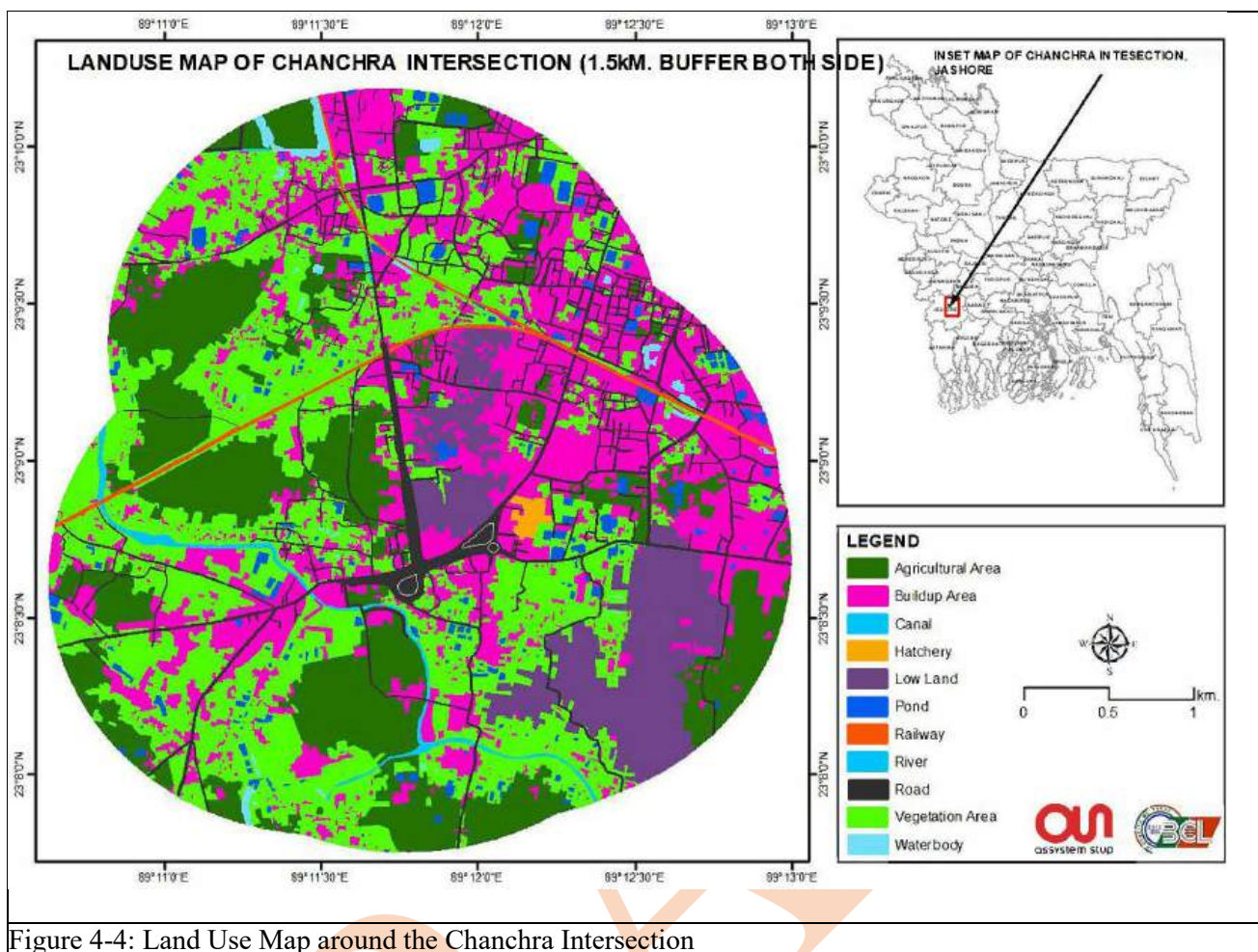


Figure 4-4: Land Use Map around the Chanchra Intersection

4.2.5 METEOROLOGICAL STUDY

4.2.5.1 CLIMATE

95. Bangladesh is in the central part of the Asiatic monsoon region, where the climate is tropical. The country's relatively small size and generally low-lying area cause moderate spatial variation of temperature, precipitation, relative humidity, wind speeds, and other climatic variables. However, Bangladesh's climate exhibits pronounced temporal variability. This is because of the moisture-laden monsoon winds flowing predominantly from the southwest during summer and the comparatively dry and colder north-western winds during winter.
96. Jessore district has a humid subtropical climate with large variations between summer and winter temperatures. The cluster has a tropical monsoon climate. It experiences the following three seasons:
 - ▶ Summer/Pre-monsoon - March to May
 - ▶ Rainy Season/Monsoon - June to October
 - ▶ Winter Season - November to February
97. The rainy season is hot and humid, with about 85 percent of the annual rainfall. The winter is predominantly cool and dry. The summer is hot and dry, interrupted by occasional heavy rainfall. The annual average temperature is 31.3 C, with a maximum of 31.3 C and a minimum of about 16 C.
98. The winds are mainly from the north and northwest in the winter, moving 3 to 6 km per hour along the coast. From March to May, intense thunderstorms emit winds of up to 60 km per hour. During the extreme storms of the early summer and late monsoon season, southerly winds of more than 160 km per hour trigger waves to crest as large as 6 m in the Bay of Bengal, creating catastrophic floods in coastal

areas. Heavy rainfall is traditional in Bangladesh. About 80 percent of rainfall comes during the monsoon season. In the study area, annual average rainfall is 1,651 mm.

99. The winter is predominately cool and dry. The summer is hot and dry, interrupted by occasional heavy rainfall. The annual average maximum temperature is 35.7°C, and the minimum is about 10.6 °C. The annual average rainfall is about 1402 mm. This is not a transitory zone between the Southeastern, northwestern, and southwestern zones, and most of the severe hailstorms, 'westers, and tornadoes have been recorded in the category 'F' Area. Figure 4-5²² showing the climate sub-region of the project area.

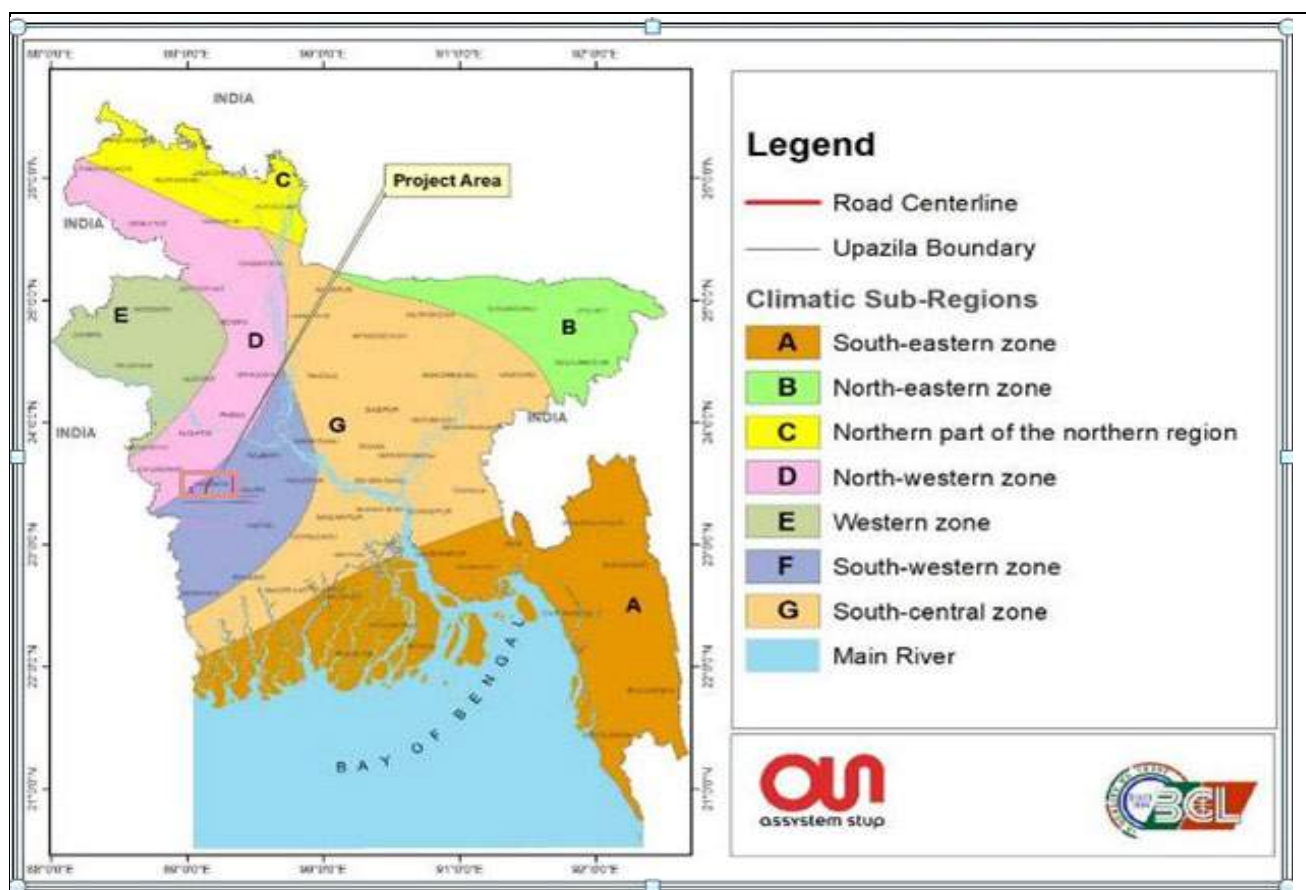


Figure 4-5: Climate Sub-Region in the Country and Project Area

100. Different meteorological data like rainfall, temperature, relative humidity, and wind speeds monitored at the meteorological station in Jashore is summarized in ²³

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean Temp (°C)	16.7	21.2	26.0	28.9	30.1	30.0	29.2	29.3	29.2	27.2	22.9	18.2
Max Temp (°C)	30.4	35.4	39.6	42.4	42.2	40.8	37.8	37.4	37.4	36.8	34.2	31.6
Min Temp (°C)	9.0	17.0	23.8	25.8	27.4	27.8	27.4	27.4	27.0	25.0	20.4	15.2
Rainfall (mm)	0.0	1.1	0.7	2.7	4.2	5.1	9.3	4.9	4.0	3.0	0.6	0.3
Humidity (%)	77.8	72.6	67.6	71.2	74.4	79.2	83.6	83.3	82.	81.	78.	80.

²² Sources: Climate Cell, Department of Environment, MoEF, 2020

²³ Source: Jashore Meteorological Station, Bangladesh Meteorological Department (BMD), 2021

Table 4-3: Monthly Averages of Climatic Variables of the Project Site, 2012-2021

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
									9	9	5	3
Avg. Wind speed (knot)	3.07	3.47	4.03	5.07	5.12	4.15	4.14	4.12	3.66	3.16	2.29	2.73
Max. Wind Speed(knot)	11.3	18.0	12.0	17.3	18.0	12.0	13.0	15.3	12.0	12.3	14.0	7.5

TEMPERATURE

101. The project area experiences significant temperature variations as the seasons change. May is the

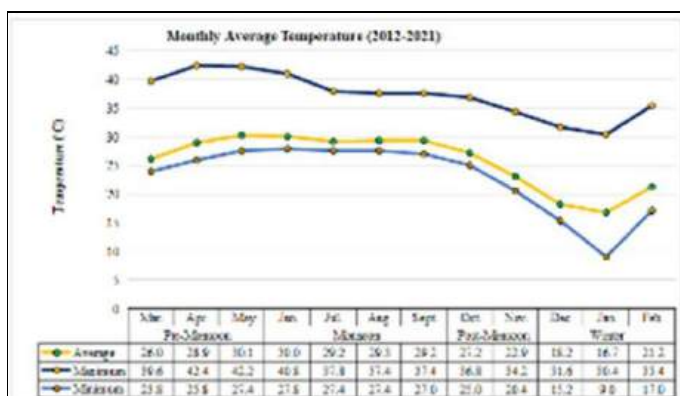


Figure 4-6: Temperature Variation from 2012 to 2021, Jashore

102. hottest month, with an average monthly high temperature of 35.7°C. On the other hand, it has a milder summer than inland locations, particularly the northwest district, where summer temperatures can reach 40°C. The temperature drops in June owing to monsoon outbreaks. The monthly average temperature during the monsoon is around 29.5°C. The cool, dry winter season begins in November, and the coldest month is January, with an average minimum temperature of 10.6°C. The temperature variation is shown in Figure 4-6²³.

RAINFALL

103. From 2012 to 2021, the project area got about 2.99 mm of rain on

average. Most of it came from the southern monsoon. More than 85% of the total rains are between May and September. The Northwestern effect caused some rain in March and April. July is the wettest month (179.0 mm), while winter is the driest season. This means the rainy season is strong in this area. The monsoon season (June-September) had an average monthly rain of 5.82 mm in the project area. The records show that the monsoon rain ranged from 66.0 mm to 179.0 mm. Winter (December and February) is almost dry, with only 0.50 mm of rain on average, as may be noted from Figure 4-7²³.

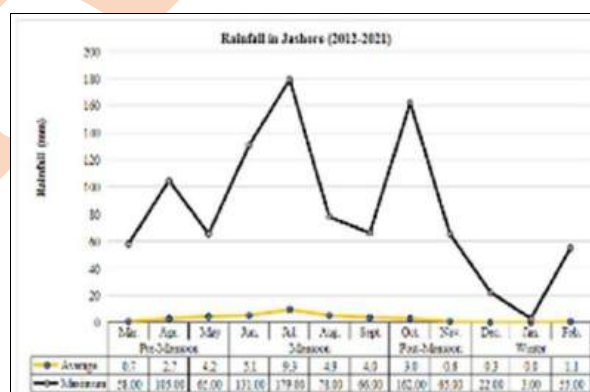


Figure 4-7: Average Rainfall Variation from 2012 to 2021, Jashore

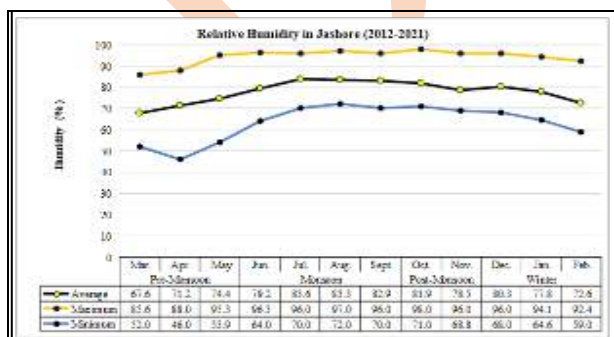


Figure 4-8: Relative Humidity Variation 2012 to 2021, Jashore

HUMIDITY

104. Humidity during the monsoon season is high, with a maximum average relative humidity of 93.9% in August and a minimum of 55.4% in March.

WIND SPEED AND DIRECTION

105. Wind may be the most significant and influential weather factor. As a result, knowing the direction and velocity is critical. To comprehend wind factors, the Wind Rose model is used to depict the prevailing wind conditions in the project area based on seasonal variation. The wind rose indicates the number of hours per year that the wind blows from the indicated direction. The wind rose diagrams show that the region is primarily characterized by West, West-Southwest, North, and North-West wind flow. In a year, wind speeds ranging from 0 to 4 knots dominated the entire wind speed spectrum.
106. Wind direction varies in the project area due to monsoonal variations in the climate. The south-westerly monsoon begins in the middle of March and ends around the end of September. From March to October, monsoon winds blow from the south with sustained force; in January, winds blow from the north and northeast. February is a quiet month, with foggy mornings. Figure 4-9²²Error! Reference source not found. shows the seasonal monthly maximum wind speed direction rose plot from 2012 to 2021.

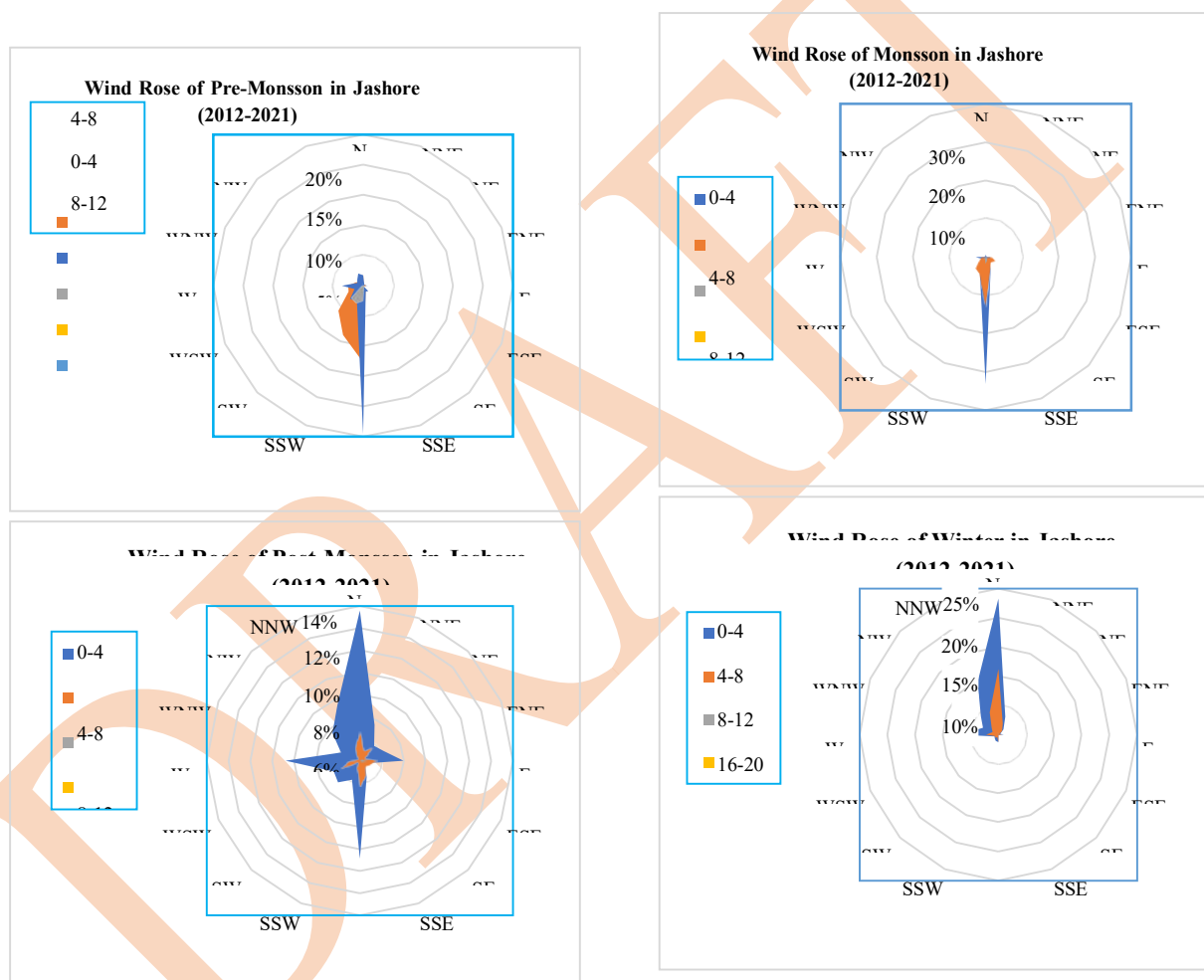


Figure 4-9: Seasonal Variation of Wind Rose in Jashore during the Years of 2012-2021

4.2.6 AMBIENT AIR QUALITY

107. Measurements of ambient air quality were taken at three (Refer to the **Table 4-4**) sampling locations were selected along the Chanchra Intersection. The sampling locations were selected depending on its intensity to affect the receptors. Samples were examined for criteria pollutants in ambient air quality, e.g., Particulate Matters PM10 and PM2.5; Nitrogen Dioxides (NO₂); Sulphur Dioxides (SO₂); Ozone (O₃); Carbon Monoxides (CO); Carbon Dioxides (CO₂) and meteorological indices e.g., Air Temperature, Pressure, Humidity, Wind Speed, and Direction.

Table 4-4: Ambient Air Quality Monitoring Details

Sl. No.	Code	Locations	Area Settings	GPS Coordinate	Date and Time
1.	AAQ1	In front of Kamal Super Market, Chanchra Bazar, Chanchra, Jashore	Commercial	23°08'45.6"N 89°12'02.4"E	21.05.2024 10:10 AM
2.	AAQ2	In front of Chanchra Check post Jame Mosque, Chanchra, Jashore	Silent	23°08'31.4"N 89°11'47.9"E	21.05.2024 02:05 PM
3.	AAQ3	In front of Pulerhat Secondary school, Chanchra, Jashore	Mixed	23°08'36.3"N 89°11'33.7"E	22.05.2024 02:15 PM

Source: Primary Data Collection by the Environment Team of BCL JV, May 2024

108. Figure 4-10 shows the photographs of the ambient air quality monitoring locations.

	
AAQ-1: In front of Kamal Super Market, Chanchra Bazar, Chanchra, Jashore	AAQ-2: In front of Chanchra Check post Jame Mosque, Chanchra, Jashore
	
AAQ-3: In front of Pulerhat Secondary school, Chanchra, Jashore	
Figure 4-10: Air Quality Monitoring Activities at three Location	

109. Among all the parameters CO, CO₂ and O₃ had been converted for 8 hours and the rest of the parameters were transformed on a 24-hourly basis. Both particulate and gaseous samples had been analyzed as per the proper procedures. Analysis results of every location are briefly mentioned in the following Error! Reference source not found.6. The test sheets of ambient air quality have been attached in Annex 4-1.

Table 4-5: Results of the Ambient Air Quality Monitoring

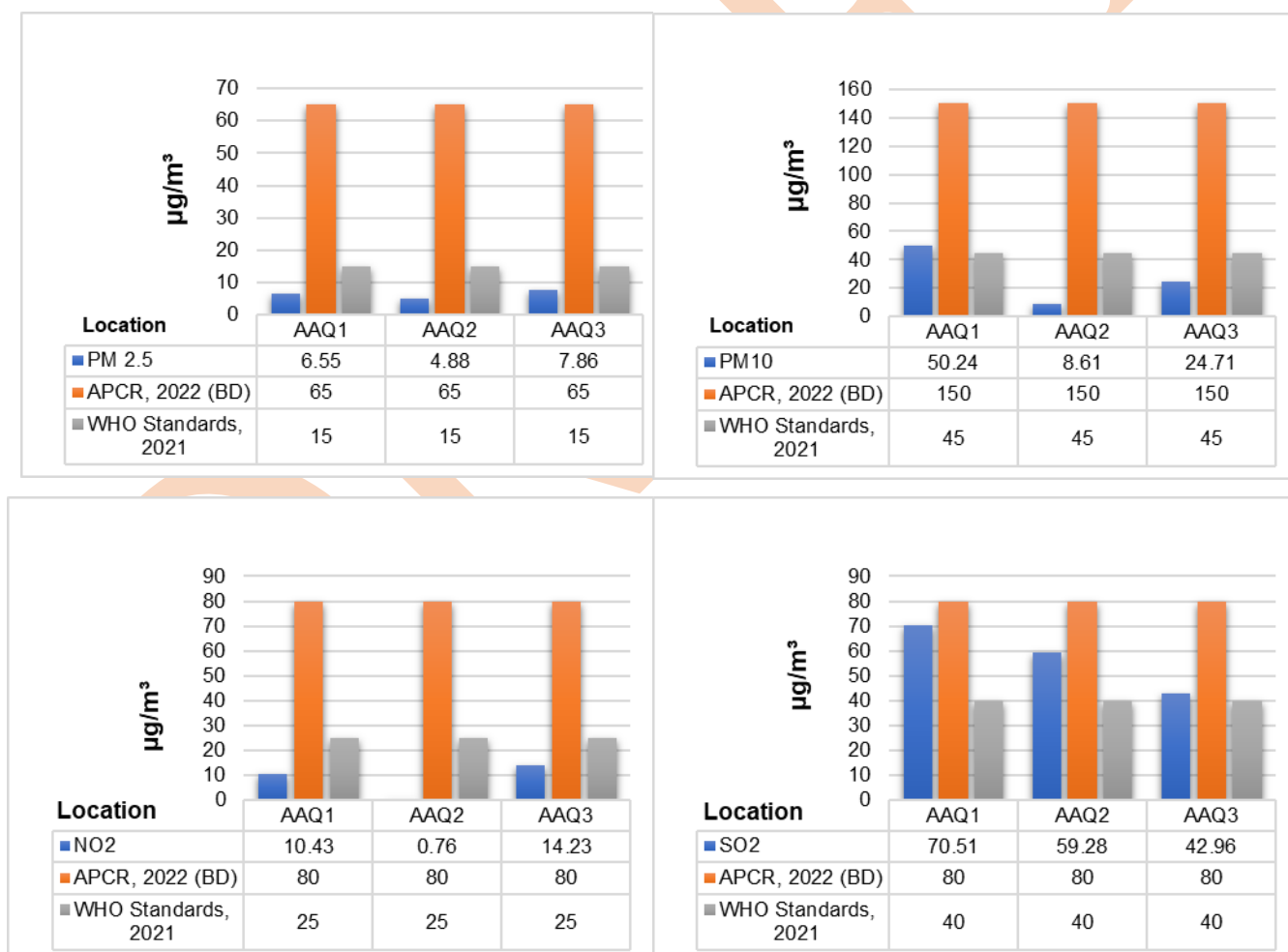
Sl. No.	Code	Concentrations (µg/m ³)					CO (ppm)	CO ₂ (ppm)
		PM _{2.5}	PM ₁₀	NO ₂	SO ₂	O ₃		
1.	AAQ1	6.55	50.24	10.43	70.51	8.67	0.75	185.11
2.	AAQ2	4.88	8.61	0.76	59.28	10.96	0.47	184.16

Table 4-5: Results of the Ambient Air Quality Monitoring

Sl. No.	Code	Concentrations (µg/m ³)					CO (ppm)	CO ₂ (ppm)
		PM _{2.5}	PM ₁₀	NO ₂	SO ₂	O ₃		
3.	AAQ3	7.86	24.71	14.23	42.96	24.40	0.56	175.45
National Standard ²⁴		65	150	80	80	100	05	-

Source: Primary Data Collection by the Environment Team of BCL JV May 2024

- 110. Result and Discussion:** Ambient air quality results are compared with the national ambient air quality standards²⁴ (NAAQS). The monitoring results shows that, particulate matter, i.e., PM_{2.5} and PM₁₀, have been observed below the national standards. AAQ1 and AAQ3 are comparatively high concentrations of particulate matters (PM 2.5 and PM 10) among all the sampling locations. Chanchra intersection is urban in nature. Several major highways cross the intersection. Heavy traffic movement is the main source of air and dust pollution. Beside this, domestic cooking using firewood is a potential source of sulphur dioxide in the ambient air.
- 111.** High volume SO₂ found in AAQ1 due to the bazar area have more vehicular movement found. It may also high due to cooking actives of various restaurants using fuel wood. However, SO₂ values are below standard level. showed the graphical presentation of air quality with national and International standard²⁵.



²⁴ Air Pollution (Control) Rules, 2022

²⁵ WHO Ambient Air Quality Guidelines Values (2021), which are also being referred in the World Bank and IFC's general EHS Guideline.

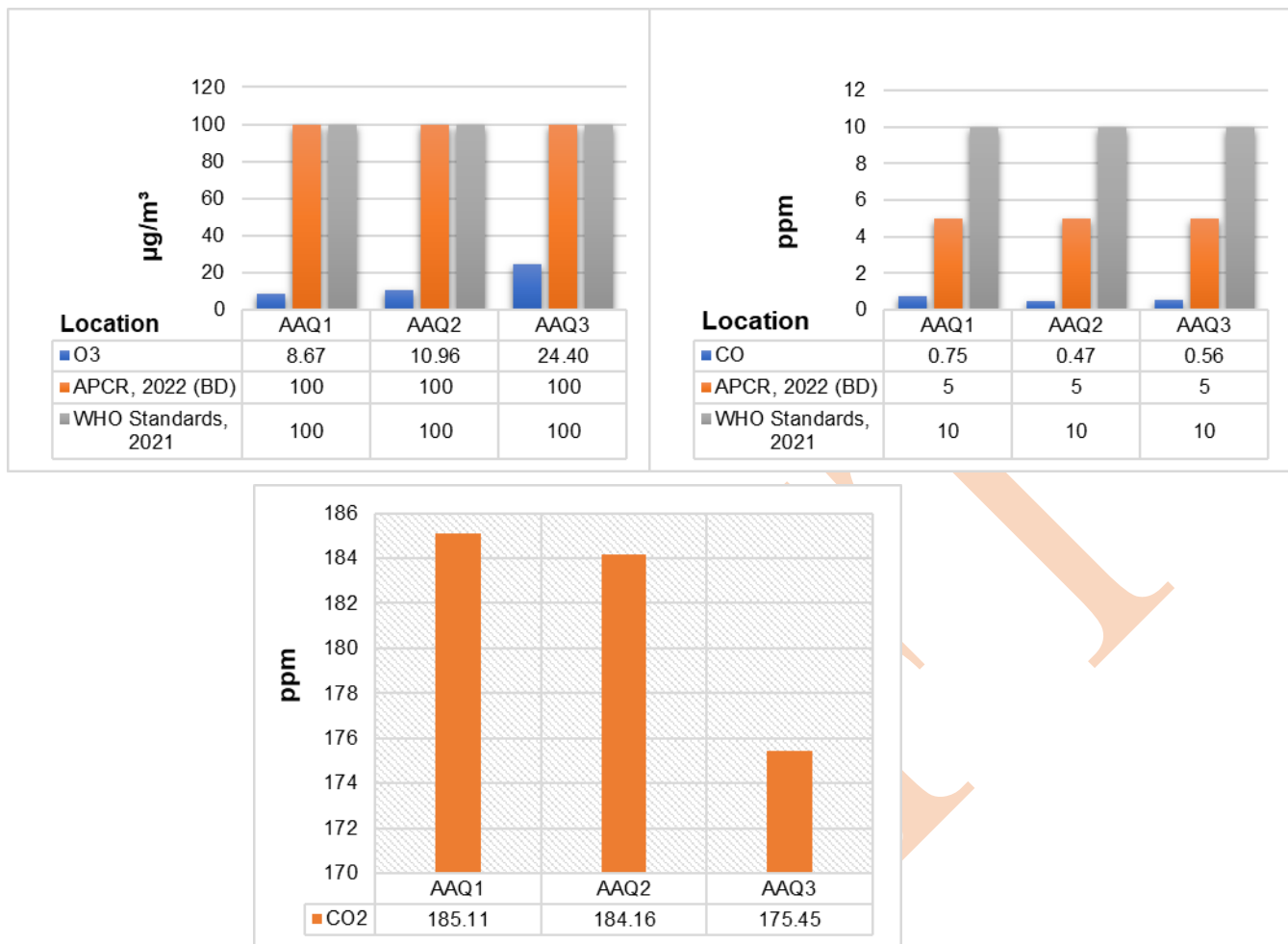


Figure 4-11: Ambient Air Quality at different sampling locations with standard

Source: Primary Data Collection by the Environment Team of BCL May 2024

4.2.7 AMBIENT NOISE LEVEL

112. Daily sound pressure levels of 50 decibels (dB) or higher can cause discomfort in humans, according to the World Health Organization's Guidelines for Community Noise (1999), while ongoing exposure to sound pressure levels over 85 dB is usually considered the critical level for temporary hearing damage. Three primary sources of noise have been identified in the project area:

- ▶ **Road Traffic:** Road traffic is one of the most significant sources of noise in the project area. This roadway transports many both motorized and non-motorized vehicles, resulting in noise pollution along the road corridors.
- ▶ **Industries:** There are few industries and factories in the project area. Noise is generated in the project area by these industries and manufacturing units. However, while noise from agro-based sectors is minimal, other types of enterprises, particularly roadside brick crushing plants and truck loading and unloading of bricks, cause significant noise in the impacted area.
- ▶ **Commercial / Bazar Areas:** There are some business or refreshment places where a large number of people always congregate and create constant turmoil and source of noise pollution.

113. To determine the baseline ambient noise level in the project area, the noise monitoring was carried out along the project at same three locations where ambient air quality monitored. Noise levels have been recorded in the form of sound pressure levels using a digital sound level meter. Photographs of monitoring are shown in Error! Reference source not found.6. The noise level monitoring locations shows in Error! Reference source not found.8. The sound level is recorded in form of A-weighted

equivalent continuous sound pressure level (Leq) values with the use of A-weighting filters in the noise measuring instrument.

Table 4-6: Ambient Noise Level Monitoring Details

Sl. No.	Code	Locations	Area Settings	GPS Coordinate	Date
1.	ANL 1	In front of Kamal Super Market, Chanchra Bazar, Chanchra, Jashore	Commercial	23°08'45.6"N 89°12'02.4"E	21.05.2024
2.	ANL 2	In front of Chanchra Check post Jame Mosque, Chanchra, Jashore	Silent	23°08'31.4"N 89°11'47.9"E	22.05.2024
3.	ANL 3	In front of Pulerhat Secondary school, Chanchra, Jashore	Mixed	23°08'36.3"N 89°11'33.7"E	23.05.2024

Source: Primary Data Collection by the Environment Team of BCL, May 2024



ANL-1: In front of Kamal Super Market, Chanchra Bazar, Chanchra, Jashore



ANL-2: In front of Chanchra Check post Jame Mosque, Chanchra, Jashore



ANL-3: In front of Pulerhat Secondary school gate, Chanchra, Jashore

Figure 4-12: Ambient Noise Level Monitoring Photos

Source: Primary Data Collection by the Environment Team of STUP-BCL JV, May 2024

114. A data logger noise meter has been used to conduct the study. The recorded noise levels monitoring results are shown in Table 4-7.

Table 4-7: Ambient Noise Level Monitoring Results

Sl. No.	Code	Noise Level (dBA)	*Standard (dBA)
		STUP Consultant Pvt. Ltd. On July 1 st , 2021, STUP was acquired by Assystem and rebranded as Assystem STUP.	BCL Associates Limited, Bangladesh

		Leq day	Leq night	Lmax	Lmin	Day	Night
1.	ANL1	60.9	53.1	80.2	38.2	70	60
2.	ANL2	55.7	44.2	81.1	30.6	55	45
3.	ANL3	63.0	57.8	82.8	43.8	60	50

Note: *Noise Pollution (Control) Rules, 2006

115. Discussion: According to the Noise Pollution Control Rules 2006, the sampling locations fall into three categories. Among these locations ANL-2, ANL-3 cross the national standard because of high noise from vehicles. Although ANL-2 fall under silent category in nature but this location surrounded by residential house and small business settings. On the other hand, ANL-3 mixed in nature but due to heavy movement of vehicles noise level exceed the standard. Graphical presentation of noise levels shown in **Figure 4-13** with national and international standard and details.

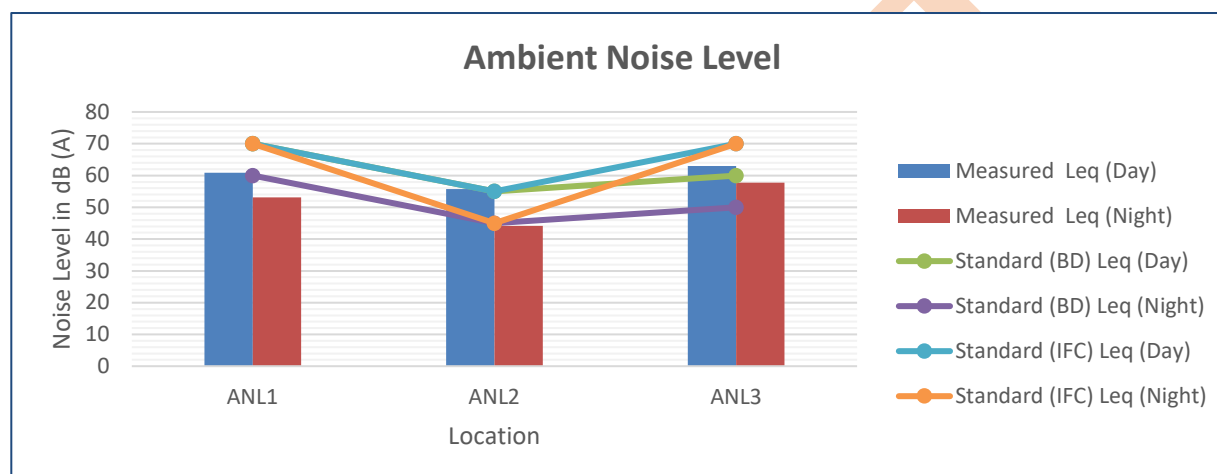


Figure 4-13: Ambient Noise Level and Standard

4.2.8 AMBIENT VIBRATION LEVEL

116. The project area's vibration intensity is negligible. The vibration from traffic on a neighboring road, on the other hand, is insignificant. On focusing on the heavy vehicle movement, vibration levels were measured at close to three locations where air and noise monitoring were carried out (**Figure 4-13**). An electronic and auto-recorded vibration meter has been used to conduct the measurement at three locations. The ambient vibration monitoring locations shows in **Table 4-8**.

Table 4-8: Vibration Level Monitoring Details					
Sl. No.	Code	Locations	Area Settings	GPS Coordinate	Date
1.	VL1	In front of Kamal Super Market, Chanchra Bazar, Chanchra, Jashore	Commercial	23°08'45.6"N 89°12'02.4"E	21.05.2024
2.	VL2	In front of Chanchra Check post Jame Mosque, Chanchra, Jashore	Silent	23°08'31.4"N 89°11'47.9"E	22.05.2024
3.	VL3	In front of Pulerhat Secondary school, Chanchra, Jashore	Mixed	23°08'36.3"N 89°11'33.7"E	23.05.2024

Source: Primary Data Collection by the Environment Team of BCL, May 2024



VL-1: In front of Kamal Super Market, Chanchra Bazar, Chanchra, Jashore

VL-2: In front of Chanchra Check post Jame Mosque, Chanchra, Jashore



VL-3: In front of Pulerhat Secondary school, Chanchra, Jashore

Figure 4-14: Vibration Level Monitoring Details

117. An electronic and auto-recorded vibration meter has been used to conduct the study. The recorded vibration levels summary monitoring results are presented in **Table 4-9**. The test sheets of vibration level have been attached in **Annex 4-2**.

Table 4-9: Vibration Level Analysis Results					
Sl. No.	Code	Vibration Level (mm/s)			Standard (mm/s)
		Average	Maximum	Minimum	
1.	VL1	0.68	1.39	0.21	No standards
2.	VL2	0.58	1.23	0.03	
3.	VL3	1.06	1.91	0.55	

118. The vibration level in the project area has been observed as a negligible state. The government of Bangladesh has not set any standard for vibration level in the perspective of construction or other activities. Therefore, the average vibration level is captured from 0.58 to 1.06 mm/s (**Figure 4-15**). The heavy high traffic movement during both daytime and nighttime is main source of vibrations.

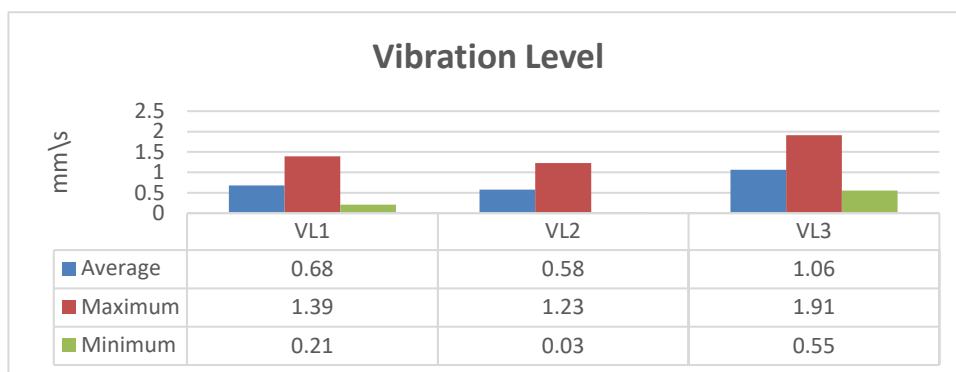


Figure 4-15:: Vibration level in different sampling locations

4.2.9 HYDROLOGY AND WATER RESOURCE

4.2.10 GENERAL HYDROLOGY AND RIVER NETWORK

119. Mukteassary River: A branch of the Padma River that flows through southwestern Bangladesh is the Mukteassary River. It follows a long winding course before joining the Rupsha River in Khulna district. It splits Khulna into two parts as it passes through it. The Mukteassary River starts from the Tengamari border of Meherpur District and runs through Jashore city. The river is 160 kilometers long and 300 feet wide. It has a lot of silt and a low water flow, with an average depth of 1.2 to 1.5 meters (4 to 5 feet). The Mukteassary River gives rise to the Khulna-Ichamati and the Kobadak rivers. The Khulna-Ichamati forms a boundary between Bangladesh and India. The towns of Khulna and Jashore are situated on the bank of the river. The river shaped their society and culture. The Rupsha River is formed by the merger of several rivers. The towns of Khulna and Jashore are also located on the shore of the river. The river affected their social and cultural development. The Rupsha River is the result of the union of the Mukteassary and Atai rivers, which then flows into the Pasur River.

4.2.11 SURFACE WATER QUALITY

120. Surface water have been analyzed to understand the baseline water condition of the project area. A river and a canal found in the project affected area which has been considered for sampling. Beside this several ponds also found in the project impacted area. These ponds usually used for fishing. Ground water in the project area usually used for drinking and household purpose.

121. For surface water sampling Mukteswari River and an unknown canal were considered. Mukteswari River flowing adjacent to the project boundary near Addin Sakina Medical College. Several drainages are connected to this river. Another small unknown canal crosses the Chachra check post which also considered for sampling. Sampling location details given in **Table 4-10**. Photos are given in **Figure 4-16**. Results of the surface water sample are given in **Table 4-11**.

Table 4-10: Surface Water Sampling Location Details				
Water Type	Code	Source of water	Sampling location	Coordinates
Surface Water	SW-1	Mukteswari River (Upstream)	Chanchra, Jashore	23° 8'33.33"N 89°11'29.72"E
Surface Water	SW-2	Mukteswari River (Upstream)	Chanchra, Jashore	23° 8'36.36"N 89°11'27.04"E
Surface Water	SW-3	Unknown Canal	Adjascent to the Chanchra Circle, Chanchra, Jashore	23° 8'56.85"N 89°11'46.26"E



SW-1: Mukteswari River (Upstream)



SW-2: Mukteswari River (Downstream)



SW-3: Unknown Canal

Figure 4-16: Surface Water Sampling Photos

Table 4-11: Surface water Analysis Results

Sl. No.	Parameters	Unit	SW1	SW2	SW3	Bangladesh Standard ²⁶	Test (APHA)	Method
1.	TDS	mg/L	327	258	314	1000	APHA 23 rd 2017 (2540 C)	EDN.
2.	Turbidity	NTU	4.03	4.11	4.07	NYS	APHA 23 rd 2017 (2130 B)	EDN.
3.	pH	--	6.71	6.47	7.03	6-9	APHA 23 rd 2017 (4500 O)	EDN.
4.	DO	mg/L	6.81	6.51	6.19	≥5	APHA 23 rd 2017 (4500 O)	EDN.
5.	BOD	mg/L	18.2	21.7	24.1	30	APHA 23 rd 2017 (5210 B)	EDN.
6.	Phosphate (PO ₄ ³⁻)	mg/L	1.03	1.07	1.01	NYS	APHA 23 rd 2017 (4500 P)	EDN.

²⁶ Environmental Conservation Rules. 2023, Schedule-2(A).

Table 4-11: Surface water Analysis Results

Sl. No.	Parameters	Unit	SW1	SW2	SW3	Bangladesh Standard ²⁶	Test (APHA)	Method
7.	Nitrate	mg/L	3.02	4.01	4.12	10	APHA 23 rd 2017 (4500 NO ₃ -)	EDN.
8.	Oil and Grease	mg/L	3.02	4.01	4.12	10	APHA 23 rd 2017 (5520 B)	EDN.
9.	TSS	mg/L	20.1	21.6	20.3	100	APHA 23 rd 2017 (2540 D)	EDN.
10.	TC	CFU/1000 ml	128	113	131	≤5000	APHA 23 rd 2017 (9222 B)	EDN.
11.	FC	CFU/1000 ml	47	44	38	NYS	APHA 23 rd 2017 (9222 D)	EDN.
12.	Temperature	°C	24	24	25	--	APHA 23 rd 2017 (2550 B)	EDN.

Source: Laboratory Analysis by Bangladesh Environmental Engineering Training & Lab Service Ltd., June 2024

122. The surface water of the project area is analyzed and found that all parameters in all sampling location are within the national standard. The surface water analysis results with comparing to the standard are shown in **Table 4-113**.

GROUND WATER QUALITY

123. The aquifer in the project region is mostly recharged by deep percolation of rain and floodwater. The actual recharge appears to be far less than its potential, resulting in a significant drop in the seasonal water table. During the dry season, the groundwater level in the Project area is said to be decreasing every year. The combined consequences of decreasing rainfall, severe droughts, increasing warmth, and reduced river flow during the dry season are most likely the reasons for this loss. The project site is in a high land area and water is available within 100-120 ft. depth. The groundwater table varies 4-8 meters in the year at the project area and is potable (refer to **Figure 4-17**).

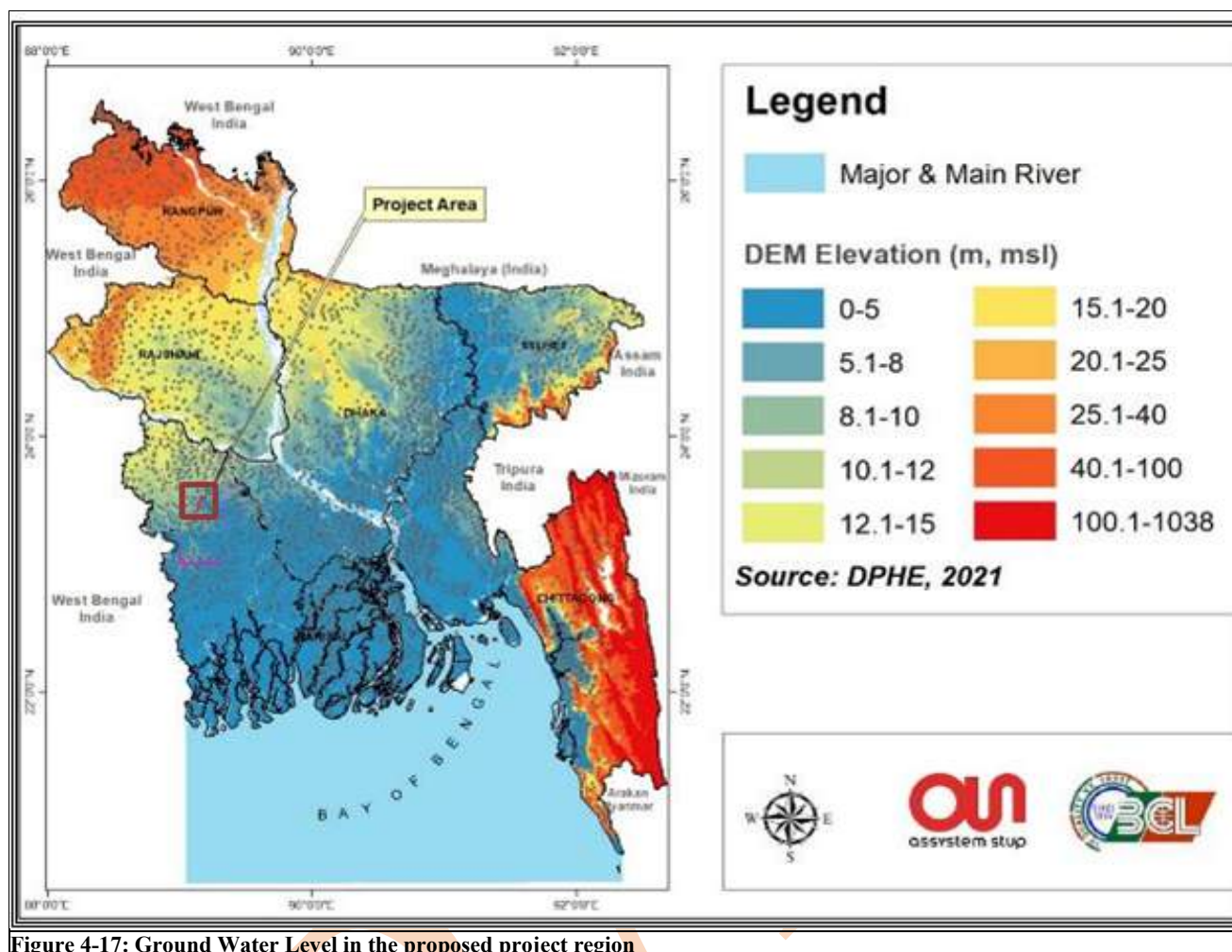


Figure 4-17: Ground Water Level in the proposed project region

124. Two ground water samples have been collected from the project affected area. One sample collected from the Chanchra Intersection and another sample collected from adjacent to the project area named Pulerhat Secondary school. Location details are given in Table 4-12 and sampling photos given in Figure 4-18. Results are shown in Table 4-12.

Table 4-12: Ground Water Sampling Location Details				
Water Type	Code	Source of water	Sampling location	Coordinates
Ground Water	GW-1	Tube well	Pulerhat Secondary school, Chanchra, Jashore	23° 8'35.06"N 89°11'33.36"E
Ground Water	GW-2	Tube well	Cachra Circle, Chanchra, Jashore	23° 8'42.67"N 89°11'53.86"E

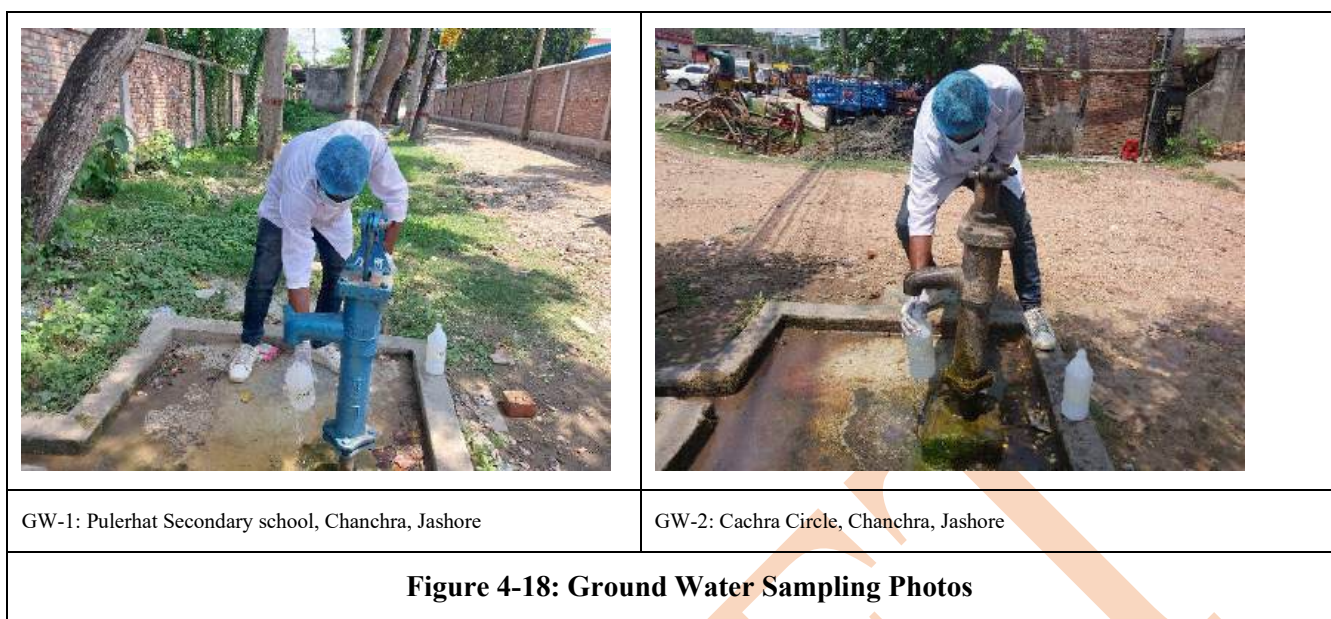


Table 4-13: Groundwater Analysis Results						
Sl. No.	Parameters	Unit	GW1	GW2	Bangladesh Standard ²⁷	Test Method (APHA)
1.	Fe	mg/L	0.57	0.62	0.3-1.10	APHA 23rd EDN. 2017 (3500- Fe)
2.	Mn	mg/L	0.24	0.34	0.4	APHA 23rd EDN. 2017 (3500- Mn)
3.	pH	--	6.21	7.01	6.5-8.5	APHA 23rd EDN. 2017 (4500 O)
4.	As	mg/L	<0.002	<0.002	0.05	APHA 23rd EDN. 2017 (3500- As)
5.	Cl-	mg/L	39	47	250	APHA 23rd EDN. 2017 (3500- Cl-)
6.	PO43-	mg/L	4.13	5.16	15	APHA 23rd EDN. 2017 (3500 P)
7.	NO3-	mg/L	18	22	45	APHA 23rd EDN. 2017 (3500-NO3-)
8.	SO42-	mg/L	88	84	250	APHA 23rd EDN. 2017 (3500-SO42-)
9.	Temperature	°C	25	23	20-30	APHA 23rd EDN. 2017 (2500 B)
10.	TC	CFU/1000 ml	12	13	0	APHA 23rd EDN. 2017 (9222 B)
11.	FC	CFU/1000 ml	7	6	0	APHA 23rd EDN. 2017 (9222 D)

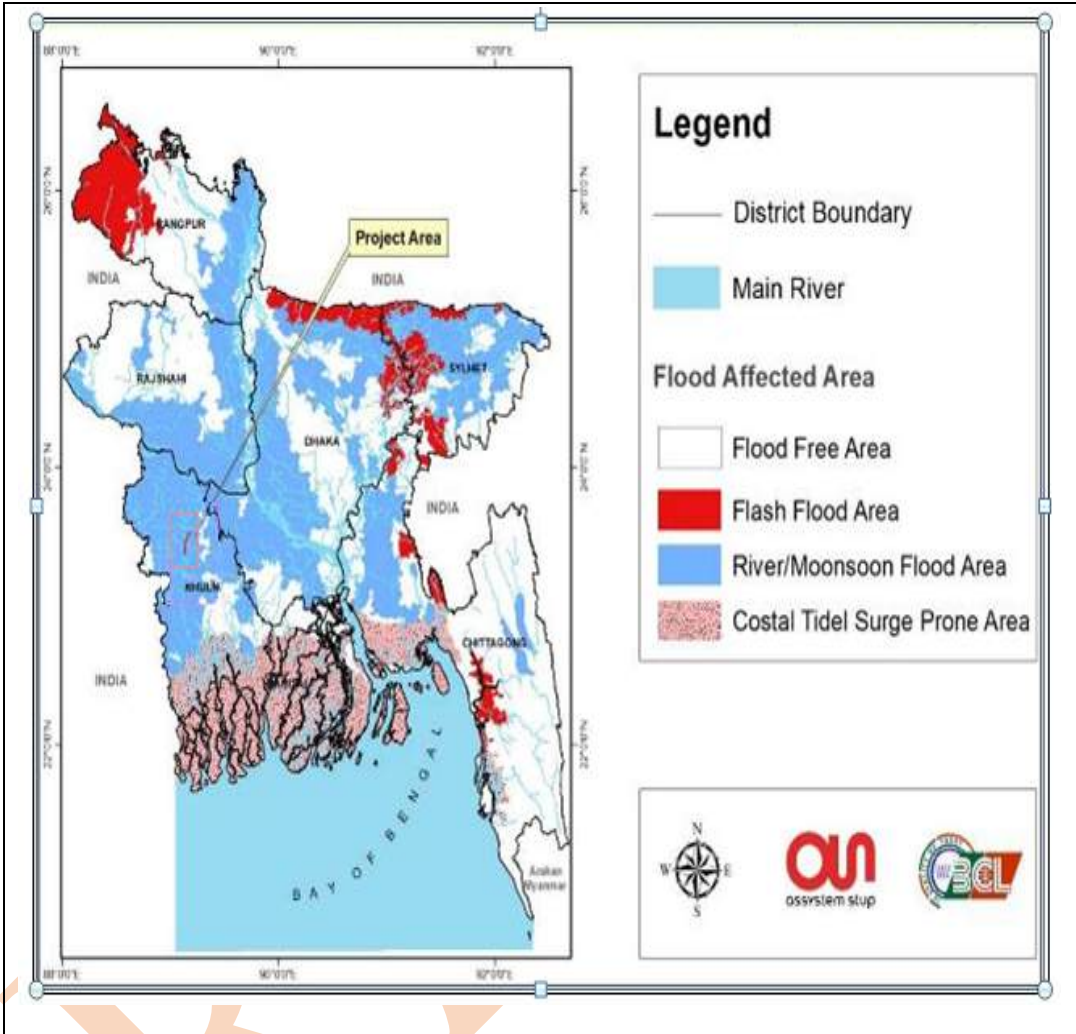
Source: Laboratory Analysis by Bangladesh Environmental Engineering Training & Lab Service Ltd., June 2024

125. The groundwater parameters of the existing sources have been compared to Bangladesh's best practices tools, the Environmental Conservation Rules (ECR), 2023, Schedule 3 (B), to understand the baseline status of the parameters' quality. Except for total and faecal coliform, all parameters found within the standard. Groundwater result sheets are in Annex 4-3.

4.2.12 NATURAL HAZARDS

126. Bangladesh is almost 10% prone to seasonal floods, with up to 24% of the country vulnerable to flooding during wet years. It is regularly hit by deadly tropical cyclones due to its unusual location. When cyclones land, the funnel-shaped northern region of the Bay of Bengal creates tidal waves, affecting thousands of people along the shore. Jashore is a southwestern region, near the Bhairab River; the project area is geographically elevated and hence has a low risk of natural disasters such as floods, cyclones, and earthquakes.

²⁷ Bangladesh Environment Conservation Rules, 2023, Schedule-2(B).

127. Flooding: The Faridpur-Jhenaidah-Jashore-Khulna highway location was prone to seasonal floods of 50-100 cm in the southeast, 0-50 cm in the northwest, and a tidal flood in the southeast just a few decades ago. The depth and duration of floods have changed because of surface water management measures by the Bangladesh Water Development Board (BWDB). Unless the flood protection bank is breached, the region is currently safe from flooding.
- 
- Figure 4 19: Flood Zone of ESMP for Chanchra Intersection**

128. Flood occurs moderately in the project region (Error! Reference source not found.) but not regularly due to its geographic location. The classification is based on the BWDB's flood management database from 1998. According to the BWDB, a moderate flood zone is defined as an area where 1-5 feet of flooding occurred in 1998. Rapid land filling by land developers has significantly altered the terrain of the surrounding area, and it is expected that rapid filling would gradually encroach on the floodplains of the Bhairab and Chitra rivers. The water levels of both rivers will rise because of the current landfilling tendency and future urbanization. The crest level of the road must be calculated because of rising water levels in adjacent rivers and unpredictable local high rainfall in a short period due to climate change. The water levels of the Periphery Rivers determine the drainage of the surrounding areas. As a result, the project region is safe from intensive flooding. According to flood records from 1988 and 1998, during the high flood, the project road communication was never hindered or damaged. This national roadway is elevated above the flood level. There are no river floods in the area.
129. Cyclone: Cyclones are most common in the Bay of Bengal between April and May and October and November. Bangladesh is frequently the landing ground of cyclones that originate in the Bay of Bengal because of its funnel-shaped shoreline. From 1793 to May 2021, there were approximately 54 devastating cyclones in Bangladesh's coastal area. During this time, cyclones occurred around once every 4.5 years on average. These cyclones wreak havoc on the country's farms, crops, infrastructure, and the lives of coastal residents. The cyclone intensity around the project site is often lower than in other parts of the coastal belt. Bangladesh is regularly hit by deadly tropical cyclones due to its unusual

location. When cyclones land, the funnel-shaped northern region of the Bay of Bengal creates tidal waves, affecting thousands of people along the shore. The project area is not located in a cyclone danger zone. The project area is geographically elevated because Jashore is in Bangladesh's southwestern region near the Bhairab River. It has a low risk of natural disasters such as cyclones, floods, and earthquakes.

4.3 ECOLOGICAL ENVIRONMENT

130. Field investigations along the road alignment for the ESIA study area have been carried out to establish the baseline of ecology and biodiversity.

4.3.1 TERRESTRIAL ECOLOGY

131. The area is semi-urban in nature, and many commercial fishing activities are being practiced by the local giant companies along the eastern part of the road from Palbari to Chanchra Point. Rest of the area is occupied by offices, homesteads and small cultivated land area. Natural wetlands were not found in the area except fisheries ponds, a canal and small river. A small river named Mukteshari was detected on the way to Benapole Road before Pulerhat. A man-made canal was detected along the road of Palbari towards Chanchra point and it finally crossed the Chanchra point and met with the Mukteshari river. A total of 195 species, including herbs, shrubs, trees, and climbers, have been recorded from the study area's terrestrial habitats. The terrestrial plant species found in the area are given in **Table 4-14**, based on a field survey in the intersection affected area in Chanchra. In addition, roadside flora, homestead flora, agricultural flora, and aquatic flora are briefly discussed in the following subsections. About 88 tree individuals are likely to be affected by the improvement of the Chanchra intersection, which are present from Chanchra towards Benapole Road. The following trees belong to the Road and Highway Department (RHD)/Zila Parishad. According to the Forest Department, social forestry was not practiced in this part of the road

Table 4-14: Girth Wise List of Major Tree Species

Girth Size in cm				
<30	30-80	81-120	120-180	>180 cm
<i>Mangifera indica</i> (Aam), <i>Artocarpus heterophyllus</i> (Khathal), <i>Cocos nucifera</i> (Coconut), <i>Moringa oleifera</i> (Sajina), <i>Areca catechu</i> (Supari), <i>Neolamarckia cadamba</i> (Kodom), <i>Terminalia catappa</i> (Kathbadam)	<i>Swietenia mahagoni</i> (Mehogoni), <i>Mangifera indica</i> (Aam), <i>Cocos nucifera</i> (Coconut), <i>Moringa oleifera</i> (Sajina), <i>Samanea saman</i> (Raintree/Motakoroi), <i>Lannea coromandelica</i> (Jeol), <i>Tectona grandis</i> (Segun), <i>Neolamarckia cadamba</i> (Kodom), <i>Manilkara zapota</i> (Sofeda), <i>Mimusops elengi</i> (Bakul)	<i>Swietenia mahagoni</i> (Mehogoni), <i>Mangifera indica</i> (Aam), <i>Samanea saman</i> (Raintree/Motakoroi), <i>Ficus benghalensis</i> (Bot), <i>Artocarpus heterophyllus</i> (Kanthal)	<i>Swietenia mahagoni</i> (Mehogoni), <i>Samanea saman</i> (Raintree/Motakoroi), <i>Mangifera indica</i> (Aam), <i>Dalbergia sissoo</i> (Sishu)	<i>Swietenia mahagoni</i> (Mehogoni), <i>Samanea saman</i> (Raintree/Motakoroi),

ROADSIDE FLORA

132. RHD/Zila Parishad planted the trees in the road alignment of RHD. The most common trees are *Swietenia mahagoni* (Mahagoni), *Samanea saman* (Raintree/Motakoroi), *Mangifera indica* (Aam), *Moringa oleifera* (Sajina), *Artocarpus heterophyllus* (Khathal), *Cocos nucifera* (Coconut), *Areca catechu* (Supari), *Neolamarckia cadamba* (Kodom), *Terminalia catappa* (Kathbadam), *Lannea coromandelica* (Jeol), *Tectona grandis* (Segun), *Manilkara zapota* (Sofeda), *Mimusops elengi* (Bakul), *Ficus benghalensis* (Bot), and *Dalbergia sissoo* (Sishu). Many shrub species have also been recorded from the area, including *Calotropis gigantea* (Akanda), *Streblus asper* (Sheora), *Abroma augusta* (Ulotkombol), *Ficus hispida* (Kakdumur), *Phyllanthus reticulatus* (Chitki), *Musa paradisiaca* (Kola), *Zizuphus mauritiana* (Boroi), *Jatropha curcas* (Verenda), *Glycosmis arborea* (Motkila), *Hibiscus rosa-sinensis* (Joba), *Hibiscus schizopetalus* (Jhumko Joba), *Ricinus communis* (Reri), *Urena lobata* (Okra), *Ficus heterophyllus* (Painna Dumur), etc. The ground has been covered by many herbaceous plants, particularly the members of Poaceae, Cyperaceae, Asteraceae, Euphorbiaceae, Araceae, Vitaceae, and Fabaceae. The most common herbs among them include *Cynodon dactylon* (Durba), *Sida acuta* (Berela), *Cyperus rotundus*, *Senna sophora*, *S. tora*, *Euphorbia hirta* (Dudhia), *Acalypha indica* (Muktajhuri), *Tridax procumbens* (Tridhara), *Phyla nudiflora* (Vui Akra), etc. The most worrying thing is *Parthenium hysterophorus*, abundantly present (beyond imagination) among the habitats, including roadside, homestead, and cultivated lands.

HOMESTEAD FLORA

133. Each homestead has been planted by a good number of tree species, and it has the most diversity of plants of the total species collected. The appearance of such a homestead looks like a segment of a mini-forest. The most common recorded tree species from the homestead part of the project site are *Swietenia mahagoni* (Mehogoni), *Moringa oleifera* (Sajina), *Artocarpus heterophyllus* (Khathal), *Mangifera indica* (Aam), *Cocos nucifera* (Coconut), *Areca catechu* (Supari), *Neolamarckia cadamba* (Kodom), *Lannea coromandelica* (Jeol), *Manilkara zapota* (Sofeda), *Citrus limon* (Lebu), *Alstonia scholaris* (Chatim), *Trewia nudiflora* (Pidali), *Averrhoa caramba* (Kamranga), *Psidium guajava* (Peyara), *Azadirachta indica* (Neem), *Melia azedarach* (Ghora neem), *Litchi chinensis* (Lichu), *Phoenix dactylifera* (Khejur), *Syzygium cumini* (Jaam), *Murraya paniculata* (Kamini), *Spondias pinnata* (Amra), *Delonix regia*, *Lawsonia inermis* (Mehedi), *Limonia acidissima* (Kodbel) etc. Apart from these trees, many cultivated vegetables were found in the homestead area. Examples include *Lagenaria siceraria* (Lau), *Cucurbita maxima* (Kumra), *Basella alba* (Puishak), *Solanum melongena* (Begun), *Momordica charantia* (Korola), *Abelmoschus esculentus* (Dheros), *Cucumis sativus* (Shosha), *Alocasia indica* (Mankochu), *Alocasia maximilani* (Dudhkochu), *Colocasia esculenta* (Kochu), etc. Besides, numerous herbaceous plants were also recorded in the study area. The most common of them are *Achyranthes aspera* (Apang), *Euphorbia hirta* (Dudhia), *Commelina benghalensis* (Kanshira), *Synedrella nudiflora* (Relanodi), *Amaranthus viridis* (Note Shak), *A. spinosus* (Kanta Note), *Nicotiana glauca* (Bon Tamak), *Acalypha indica* (Muktajhuri), *Croton bonplandianum* (Pani Morich) and *Heliotropium indicum* (Hatishur).

AGRICULTURAL LAND FLORA

134. The project area is semi-urban in nature. Agricultural lands were found to be scanty here. However, some cultivated lands were found on the west side of the Palbari road from Chanchra Point. The ground mainly covers many species from the families of the Poaceae, Cyperaceae, Araceae, Commelinaceae, and Amaranthaceae. During the monsoon season, the land is mainly cultivated with rice. In the winter season, many winter crops and vegetables are cultivated. The most common winter crops and vegetables are *Alium cepa* (Peyaj), *Alium sativum* (Rosun), *Lagenaria siceraria* (Lau), *Momordica charantia* (Korola), *Solanum lycopersicum* (Tomato), *Abelmoschus esculentus* (Sosha), *Solanum melongena* (Begun), *Cucumis sativus* (Cucumber), *Lablab purpureus* (Shim), *Amaranthus viridis* (Note), *Amaranthus spinosus* (Kata note), *Cucurbita maxima* (Misti Kumra), etc. Commercial cultivation of *Phoenix dactylifera* (date palm), *Musa sp.* (banana), *Carica papaya* (papaya), *Litchi chinensis* (litchi), *Mangifera indica* (mango), and *Swietenia mahagoni* (mehogoni) trees was also found adjacent to the project area.

4.3.2 TERRESTRIAL FAUNA

135. A total of 41 faunal species were observed in the proposed intersection area. Among them, 3 were amphibians, 4 were reptiles, 27 were birds, and 7 were mammals. The list for this status for all the wildlife present on the project site is given in **Annex 4-4**. Different amphibian species were recorded from the study area, including *Euphlyctis cyanophlyctis*, *Duttaohyranus melanotictus*, and *Hoplobatrachus tigerinus*. These are mainly frogs and toads inhabiting local ponds, canals, creeks, and narrow rivers. The reptiles found in the study area include *Calotes versicolor* (Common Garden Lizard), *Xenochrophis piscator* (Checkered Keelback), *Hemidactylus frenatus* (Common House Gecko), and *Naja naja* (Binocellate Cobra). Besides, different species of birds have also been found in the survey, which include *Passer domesticus* (House Sparrow), *Columba livia* (Rock Dove), *Sturnus malabaricus* (Chestnut-tailed Starling), *Halcyon smyrnensis* (White-breasted Kingfisher), *Ardeola grayii* (Indian Pond Heron), *Amaurornis phoenicurus* (White-breasted Waterhen), *Dicrurus macrocercus* (Black Drongo), *Copsychus saularis* (Oriental Magpie-Robin), *Alcedo atthis* (Common Kingfisher), *Corvus splendens* (House Crow), and so on. Common mammals in the project area are *Mus musculus* (House Mouse), *Pteropus giganteus* (Indian Flying Fox), *Herpestes edwardsii* (Common Mongoose), *Felis chaus* (Jungle Cat), and *Paradoxurus hermaphroditus* (Common Palm Civet). All the terrestrial fauna species found in the study area have the status of least concern according to the 2015 IUCN Red List of Bangladesh, except *Naja naja* (Binocellate cobra), which is near threatened. Among the recorded species, four are protected by CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora). *Paradoxurus hermaphroditus* is in Appendix III. *Hoplobatrachus tigerinus*, *Naja Naja*, and *Felis Chaus* are under CITIES Appendix II. Finally, all these species are protected by the Wildlife Protection and Security Act, 2012.

4.3.3 AQUATIC ECOLOGY

4.3.3.1 AQUATIC FLORA

136. The project area contains many commercial ponds, which are cultivated by local giant companies. Natural wetland was absent; however, a canal and a small river named Mukteshwari were found crossing the roads. The canal flows from Palbari towards Chanchra Point, and after crossing it, it finally meets the Mukteshwari River. The river crosses the road from Chanchra to Benapole near Pulerhat market. The aquatic bodies contain non-luxurious growth of aquatic flora except the river surface, which is covered by invasive alien species, including water hyacinth (*Eichhornia crassipes*). The water bodies also support a good number of algal flora, although those were not counted and assessed during the study. From the assessment of the aquatic habitat along the road alignment, a total of 21 species have been recorded, which are mentioned in **Annex 4-5**. Of these, the most common aquatic species are *Enhydra fluctuans* (Helenncha), *Ludwigia adscendens* (Molsi), *Ipomoea aquatica* (Kolmi), *Sagittaria vaginalis*, *Sagittaria sagittalis* (Nukha), *Pistia stratiotes* (Topapana), *Lemna minor* (Lemna), and so on. In the aquatic habitats, the surface water was mostly covered with the luxurious growth of *Eichhornia crassipes* (water hyacinth). As a result, the native aquatic species do not get enough opportunity to grow. So, the diversity of native species in aquatic habitats is very low. From the assessment of aquatic flora, species under the Red List categories of IUCN (Threatened, Endangered, Critically Endangered, Vulnerable, and so on), species protected by laws including CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), and species protected by the Wildlife Protection and Security Act, 2012, were not recorded. Apart from the lists of both aquatic and terrestrial angiosperm flora, a nonsignificant growth of lower groups of flora such as fungi, algae, moss, and ferns was observed along the alignment, which were not counted and assessed during the field survey.

4.3.3.2 AQUATIC FAUNA, INCLUDING FISH

137. In total, 29 fish species were identified through interviews and discussions with local fishermen. These fish species are said to be caught from 4 rivers that crisscross highway. The area covered a number of man-made ponds, approximately more than 100 in number, 4 rivers and small channels and some seasonal

ditches. During dry season, all seasonal ditches become dry. During rainy season, they contain some water and support a number of local fish population. In case of pond, some are commercially cultivated, some are not. The rivers have adequate flow during rainy period but in summer or dry season, the water becomes almost stagnant. A good number of local fishes were recorded during the catchment survey and market survey. The major fishes are *Notopterus notopterus* (Poli), *Anguilla bengalensis* (Bain), *Oxyurichthys petersii* (Baila), *Mystus bleekeri* (Tengra), *Amblypharyngodon* (Mola), *Putinus* (Puti), *Channa punctatus* (Taki), *Channa striata* (Shoal), *Heteropneustes* (Shing), *Clarias batrachus* (Magur), *Macrobrachium rosenbergii* (Chingri), *Anabustudineus* (Koi), *Channa marulius* (Gojar) and so on. From the assessment of aquatic fauna, species under Red List categories of IUCN (Threatened, Endangered, Critically Endangered, Vulnerable and so on), species protected by laws including CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), and species protected by Wildlife Protection & Security Act, 2012 were not recorded.

138. Discussion: From the assessment of both terrestrial and aquatic flora and aquatic fauna, species under the Red List categories of IUCN (Threatened, Endangered, Critically Endangered, Vulnerable, and so on), species protected by laws including CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), and species protected by the Wildlife Protection and Security Act of 2012 were not recorded in the project area except for a few species. In the case of terrestrial fauna, the species observed at the project site belonging to the IUCN category were seen occasionally during the survey. The road alignment is not their permanent habitat. So, ultimately, these fauna species will not stay on the project site; rather, they will return to their original habitats. Moreover, among all the species, no endemic species was found in the study area, and even no genetic resource (wild relatives of cultivated crops such as wild rice, wild bean, wild banana, etc.) was recorded from the survey. Further, there are no flagship species, umbrella species, or keystone species found in the study area. Some faunal supporting species, such as *Ficus benghalensis* (Bot), *Ficus religiosa* (Ashwath), *Ficus racemosa* (Jogdumur), *Madhuca longifolia* (Mohua), etc., have been found during the survey within the study area, and these are also found outside the study area. Thus, the removal of these species will not cause any impact on faunal species due to the project road. No previously declared protected area, national park, or wildlife sanctuary is located within the study area or along the project corridor.

4.4 SOCIOECONOMIC CONDITION

139. The social-economic condition assessment was carried out by conducting a primary survey in March-April 2024. Based on primary data collected from the field, the following subsections discuss the existing socioeconomic conditions in and around the Chanchra intersection.

4.4.1 CENSUS AND INVENTORY OF LOSS SURVEY

140. A census and inventory of loss survey were conducted by BCL Associates Limited in the Chanchra Intersection Improvement Project from April 2024 to May 2024. The main reason behind using these crucial steps is to assess the social impacts and risks of the Chanchra Intersection Improvement Project on the potentially affected commercial premises/businesses and residential households, especially displacement or significant changes in the lives of the affected households and their communities. Salient points on the conducted census and IOL are presented below:

- ▶ To gather detailed relevant information about the affected people in the Chanchra Intersection Improvement project area,
- ▶ To identify all potential individuals and households affected by the project,
- ▶ To provide a baseline for monitoring and evaluating the impact of the project,
- ▶ **Household survey:** conducted survey with 237 households and the concerned management committees of two potential affected mosques and one other entity to collect demographic data (e.g., age, gender, occupation, education, etc.),
- ▶ **Key Informant Interviews:** interviewed the seven (7) key informants to gather qualitative data and information about the social and economic conditions of individuals and households to be affected by the project,

- **FGDs and SCMs:** conducted five focus group discussions (FGDs) to facilitate and engage relevant stakeholders (two stakeholder consultation meetings) to generate data, information, and the participants' analyses and their perspectives, which will be based on their local knowledge. This will help verify and validate data and information collected and provide an opportunity to gather additional data and insights as well,

4.4.2 ADMINISTRATIVE STRUCTURE

141. The RHD, through the World Bank Assistance, is the implementing agency of the Chanchra Intersection improvement under the WeCARE program in phase 1.
142. The Chanchra Intersection, the endpoint of the Jhenaidah – Jashore road section (refer to), is 2.507 km long and falls in Jashore Sadar Upazila. This intersection passes through two mouzas, Chanchra and Mondolgati, beside Jashore Sadar Pourasabha. Concerned Union Parishad, Upazila Parishad, Pourasabha, Zilla Parishad, and DC Office have a significant role in the land acquisition. They will also play a role in implementing the project and RAP.

Table 4-15: Affected Upazilas, Unions, and Mouzas under the Project

Project	Chainage (Km. + M.)	District	Upazila	Union/Pourasabha	Mouza
Chanchra Intersection Improvement	47+130Km at Jhenaidah to Jashore road	Jashore	Jashore Sadar	Jashore Sadar	Chanchra Mondolgati

4.4.3 DEMOGRAPHY OF AFFECTED POPULATION

DISTRIBUTION OF HOUSEHOLDS BY SEX

143. 237 households will likely be affected in the Chanchra and Mondolgati mouza due to land acquisition for the proposed project. In Chanchra mouza, the total number of affected households is 233, while in Mondolgati, 4 are affected. The total average number of male-headed households is 86.27%, while women-headed households are 13.73% in the affected areas in the project. The distribution of households likely to be affected by the Chanchra Intersection improvement is presented in **Table 4-16**.

Table 4-16: Mouza Wise Distribution of Households by Sex in the Chanchra Intersection

Category of Vulnerable Households	Chanchra		Mondolgati		Total	
	No.	%	No.	%	No.	%
Male Headed HHs	201	86.27	4	100	205	86.5
Women-Headed HHs	32	13.73	0	0	32	13.5
Total	233	100	4	100	237	100

Source: Field survey conducted by BCL, April 2024 to May 2024

144. Mouza-wise distribution and other social profiles of the affected population are presented in **Table 4-16**. The average household size in the project area is 4.25 per person. The sex ratio is 1.133.

Table 4-17: Mouza Wise Distribution of Affected Population, Household Size, and Sex Ratio in the Chanchra Intersection

SL. No.	Affected Population by Sex	Unit	Chanchra	Mondolgati	Total (Entire Chanchra Intersection)
0	1	2	3	4	5=(3+4)
1.	Male Population	No.	523	12	535
		%	97.78	2.242	100
2.	Female Population	No.	463	8	471
		%	98.301	1.698	100
3.	Hijra (Third Gender)	No.	0	0	0

Table 4-17: Mouza Wise Distribution of Affected Population, Household Size, and Sex Ratio in the Chanchra Intersection

SL. No.	Affected Population by Sex	Unit	Chanchra	Mondolgati	Total (Entire Chanchra Intersection)
0	1	2	3	4	5=(3+4)
		%	0	0	0
4.	Number of Household	No.	233	4	237
5.	Total (SL. No. 1+2+3)	No.	986	20	1006
		%	98.0119	1.988	100
6.	Household Size (SL. No. 4/5)	No.	4.23	5	0.2355
7.	Sex Ratio (SL. No. 1/2*100)	No.	1.13	1.50	1.136

Source: Field survey conducted by BCL, April 2024 to May 2024

4.4.4 AGE-WISE DISTRIBUTION OF POPULATION

145. Table 4-18 presents the population pattern of the affected households. It shows that the total affected population is 1007. The highest population of female is 253 (53.6%), and Males 247 (46.17%) belong to the 15-45 years age group, followed by Males 120(22.43%) and Female 94 (19.92%) belonging to the 46 to 64 years age range the project area.

Table 4-18: Mouza Wise Age Composition of the Affected Population in the Chanchra Intersection

Age Range (Years)	Affected Population				Total Affected Male and Female Population in the Chanchra Intersection			
	Chanchra		Mondolgati		Male		Female	
	Male	Female	Male	Female	Population	%	Popn.	%
0-4	36	24	0	1	36	6.54	25	5.51
5-14	87	77	1	1	88	16.45	78	16.53
15 to 45	241	250	6	3	247	46.17	253	53.6
46 to 64	117	91	3	2	120	22.43	93	19.92
65 and above	43	22	1	0	44	8.22	22	4.45
Total	524	464	11	7	535	100	471	100

Source: Field survey conducted by BCL, April 2024 to May 2024

4.4.5 DEPENDENCY RATIO

146. The number of dependent populations is 292, which belong to two age ranges, such as (i) 0 to 14 years, and (ii) 65 and above years. On the other hand, the active income earning population 714 under two age ranges (i) 15 to 45 years and (ii) 46 to 64 years' age range. Total dependency ratio refers to ratio of dependent population and the active earning population in the project. According to this calculation $(292 \times 100 / 714)$ dependency ratio is found to be 40.89.

4.4.6 HOUSEHOLD CHARACTERISTICS

HOUSEHOLD SIZE

147. Table 4-19 shows that 59.49% of affected households belong to a 4-6 household size, followed by 33.33% of affected households belonging to a 1-3 household size. The lowest 7.17% of affected households belong to > 6 household size (Table 4-19).

Table 4-19: Mouza Wise Affected Households and Population by Household Size in Chanchra Intersection

HH Size Range	No. of Affected Population by Household Size			Average HH Size
	Chanchra	Mondolgati	Entire Chanchra Intersection	

	No. HHs	Population	No. HHs	Population	No. HHs	% of HHs	Popn.	
1 to 3	79	199	1	6	80	33.75527	205	2.56
4 to 6	137	650	3	16	140	59.07173	666	4.75
> 6	17	135	0	0	17	7.172996	135	7.94
Total	233	984	4	22	237	100	1006	4.24

Source: Field survey conducted by BCL from April 2024 to May 2024

AFFECTED HOUSEHOLDS LOSING PRIMARY & SECONDARY STRUCTURE

148. Details of the affected Title and Non-titled households, along with the encroachments, are given in **Table 4-20**. A total of 96 primary & secondary structures are being affected due to the proposed project.

Table 4-20: Mouza Wise Total Affected Households Losing Primary & Secondary Structures by Type													
Type of Structure	Chanchra				Mondolgati				Entire Chanchra Intersection				
	Titled HHs	Non-titled HHs	Encro. HHs	Total	Titled HHs	Non-titled HHs	Encro. HHs	Total	Titled HHs	Non-titled HHs	Encro. HHs	Grand Total	%
Residential	27	2	0	29	0	0	0	0	27	2	0	29	28.13
Commercial	58	108	3	169	2	0	0	2	60	108	3	171	37.5
Residential-cum-Commercial	34	1	1	36	1	0	0	1	35	1	1	37	34.38
Total	119	111	4	234	3	0	0	3	122	111	4	237	100
%	50.854	47.435	1.709	100	100	0	0	100	51.476	46.835	1.687	100	

Source: Field survey conducted by BCL, April 2024 to May 2024

149. Details of the affected Title and Non-titled household, along with the encroachments, are given below mentioned **Table 4-21**. Data shows that a total of 140 primary structures are being affected by the project.

Table 4-21: Mouza Wise Total Affected Households Losing Primary Structures by Type													
Type of Structure	Chanchra				Mondolgati				Entire Chanchra Intersection				
	Titled HHs	Non-titled HHs	Encro. HHs	Total	Titled HHs	Non-titled HHs	Encro. HHs	Total	Titled HHs	Non-titled HHs	Encro. HHs	Grand Total	%
Residential	29	5	0	34	0	0	0	0	29	5	0	34	14.345
Commercial	63	105	3	171	3	0	0	3	66	105	3	174	73.417
Residential-cum-Commercial	26	1	1	28	1	0	0	1	27	1	1	29	12.236
Total	118	111	4	233	4	0	0	4	122	111	4	237	100
%	50.643	47.639	1.716	100	100	0	0	100	51.476	46.835	1.687	100	

Source: Field survey conducted by BCL, April 2024 to May 2024

150. A total of 204 fully affected households lost primary structures, and 32 Partially Affected Households Losing Primary Structures due to the proposed project. Details of the fully and Partially affected households, along with the encroachments, are given below **Table 4-22**.

Table 4-22: Mouza Wise Number of Fully and Partially Affected Households Losing Primary Structures by Type													
Type of Structure	Chanchra				Mondolgati				Entire Chanchra Intersection				
	Titled HHs	Non-titled HHs	Encro. HHs	Total	Titled HHs	Non-titled HHs	Encro. HHs	Total	Titled HHs	Non-titled HHs	Encro. HHs	Grand Total	%
Fully Affected Households Losing Primary Structures by Type													
Residential	24	2	0	26	0	0	0	0	24	2	0	26	13.197
Commercial	38	103	3	144	2	0	0	2	40	103	3	146	74.111
Residential-cum-Commercial	23	1	1	25	0	0	0	0	23	1	1	25	12.690
Total	85	106	4	195	2	0	0	2	87	106	4	197	100
%	43.589	54.358	2.051	100	100	0	0	100	44.162	53.807	2.0304	100	
Partially Affected Households Losing Primary Structures by Type													
Residential	1	0	0	1	0	0	0	0	1	0	0	1	1
Commercial	16	2	0	18	2	0	0	2	18	2	0	20	16
Residential-cum-Commercial	9	0	0	9	0	0	0	0	9	0	0	9	9
Total	26	2	0	28	2	0	0	2	28	2	0	30	26
%													
Grand Total	111	108	4	223	4	0	0	4	115	108	4	227	100
%													

Source: Field survey conducted by BCL, April 2024 to May 2024

151. One commercial non-titled holder's secondary structure in Chanchra mouza is being affected due to the proposed project. Details are given in **Table 4-23**.

Table 4-23: Mouza Wise Total Affected Households Losing Secondary Structures by Type													
Type of Structure	Chanchra				Mondolgati				Entire Chanchra Intersection				
	Titled HHs	Non-titled HHs	Encro. HHs	Total	Titled HHs	Non-titled HHs	Encro. HHs	Total	Titled HHs	Non-titled HHs	Encro. HHs	Grand Total	%
Residential													
Commercial	1	1	1	3					1	1	1	3	100
Residential-cum-Commercial													
Total	1	1	1	3					1	1	1	3	100
%		100		100						100		100	100

Source: Field survey conducted by BCL, April 2024 to May 2024

152. One commercial non-titled holder's secondary structure in Chanchra mouza is being fully affected and one is partially affected due to the proposed project. Details are given in **Table 4-24**.

Table 4-24: Mouza Wise Number of Fully and Partially Affected Households Losing Secondary Structures by Type													
Type of Structure	Chanchra				Mondolgati				Entire Chanchra Intersection				

	Titled HHs	Non-titled HHs	Encro. HHs	Total	Titled HHs	Non-titled HHs	Encro. HHs	Total	Titled HHs	Non-titled HHs	Encro. HHs	Grand Total	%
Fully Affected Households Losing Secondary Structures by Type													
Residential													
Commercial	1	1	1	3					1	1	1	3	100
Residential-cum-Commercial													
Total	1	1	1	3					1	1	1	3	100
%		100		100						100		100	100
Partially Affected Households Losing Secondary Structures by Type													
Residential													
Commercial													
Residential-cum-Commercial													
Total													
%													
Grand Total		1		1						1		1	100
%		100		100						100		100	100

Source: Field survey conducted by BCL April 2024 to May 2024

153. Affected HHs Losing Primary Structures in Chanchra and Mondolgati Mouza are 389,801sft and affected CPRs and Other entities Losing Primary Structures in Chanchra and Mondolgati Mouza is 13858 ft. Details are given in Table 4-25.

Table 4-25: Mouza Wise Floor Areas (Sft.) of Affected Primary Structures by Ownership Type in the Chanchra Intersection							
Sl. No.	Affected Primary Structure	Unit	Title HHs	Non-title HHs	Encro. HHs	Quantity	%
Affected HHs Losing Primary Structures in Chanchra Mouza							
1.	Pucca	Sft	43602	213446	162356	317795	83.49
2.	Semipucca	Sft	627	10371	0	10108	2.66
3.	Tin	Sft	8254	3244	1525	50750	13.33
4.	Katcha	Sft	380	1306	0	0	0
5.	Thatched	Sft	0	0	0	0	0
6.	Polithin	Sft	150	0	0	1975	0.52
A. Sub Total			353054	24022	53013	228367	163881
Affected HHs Losing Primary Structures in Mondolgati Mouza							
1.	Pucca	Sft	12068	0	0	8693	94.77
2.	Semipucca	Sft	0	0	0	480	5.23
3.	Tin, Katcha, Thatched, Polythene	Sft	0	0	0	0	0
B. Sub Total			9173	0	12068	0	0
(i) Total (A+B)			362,227	24,022	65081	228367	163881
Affected CPRs and Other Entity Losing Primary Structures in Chanchra Mouza							
	Pucca	Sft	16660	0	0	16660	100
	Semi-pucca	Sft					
	Tin Made	Sft					
	Katcha	Sft					
Sub Total			16660	0	0	16660	100

Table 4-25: Mouza Wise Floor Areas (Sft.) of Affected Primary Structures by Ownership Type in the Chanchra Intersection

Sl. No.	Affected Primary Structure	Unit	Title HHs	Non-title HHs	Encro. HHs	Quantity	%
Affected CPRs and Other Entity Losing Primary Structures in Mondolgati Mouza							
	Pucca	Sft					
	Semi-pucca	Sft					
	Tin Made	Sft					
	Katcha	Sft					
Sub Total							
Total (C+D)							
Grand Total [(i) + (ii)]			16660	0	0	16660	100

Source: Field survey conducted by BCL, April 2024 to May 2024

154. Table 4-26 shows that 48 water pumps, 36 Water tanks, 28 tubewells (shallow), 21 Tubewell (submersible Pump/Deep), and 15 numbers of sanitary toilets are likely to be affected in the Chanchra Intersection project.

Table 4-26: Mouza Wise Affected Secondary Structures by Ownership Type in the Chanchra Intersection

SL. No.	Types of Secondary Structures by HHs, CPRs & Other Entities	(Sft./Cft./Rft./ No.) as per questionnaire	Chanchra	Mondolga ti	Total
0	1	2	3	4	5=(3+4)
1. Secondary Structure of Affected HHs					
1.1. Secondary Structure of Affected Titled HHs					
1.	Boundary Wall	Rft	172	0	172
2.	Slab Toilet	No	3	0	3
3.	Sanitary Toilet	No	13	0	13
4.	Tube well (Submersible Pump/Deep)	No	2	0	2
5.	Tube well (Shallow)	No	15	1	15
6.	Water Pump/Motor	No	17	0	17
7.	Oil Tank	No	0	0	1
8.	Water Tank (Plastic)	No/CFT	10	0	10
9.	Pillar (RCC)	No/2	1	0	1
1.2. Secondary Structure of Affected Non-titled HHs					
1.	Boundary Wall	RFT	520	0	520
2.	Sanitary Toilet	No.	1	0	1
3.	Tube well (Submersible Pump/Deep)	No.	4	0	4
4.	Tube well (Shallow)	No.	4	1	5
5.	Water Pump/Motor	No.	7	1	8
6.	Safety Tank	Cft/2880	1	0	1
7.	Water Tank (Plastic)	No.	4	0	0
1.3. Secondary Structure of Affected Encroacher HHs					
1.	Boundary Wall,	Rft	270	0	0
2.	Tube well (Submersible Pump/Deep),	No.	15	0	15
3.	Water Pump/Motor	No.	24	0	24
4.	Sanitary Toilet	No	1	0	1
5.	Steel Gate	No	1	0	1
6.	Tube well (Shallow),	No.	8	0	8
7.	Oil Tank	CFT /3900	2	0	2

Table 4-26: Mouza Wise Affected Secondary Structures by Ownership Type in the Chanchra Intersection

SL. No.	Types of Secondary Structures by HHs, CPRs & Other Entities	(Sft./Cft./Rft./ No.) as per questionnaire	Chanchra	Mondolga ti	Total
0	1	2	3	4	5=(3+4)
8.	Safety Tank	No/CFT /10700	6	1	7
9.	Toilet Tank, (CFT)	No/CFT1620	1	0	1
10.	Water Tank (Plastic)	No/CFT	21	1	22
11.	Pillar (RCC),	No./9	1	0	1
12.	Steel Gate	No.	1	0	1
13.	Concrete Gate	No	1	0	1
A. Total Secondary Structure of affected HHs (1.1+1.2+1.3)					
1.	Boundary Wall	Rft	962	0	962
2.	Slab Toilet	No	3	0	3
3.	Sanitary Toilet	No	15	0	15
4.	Tube well (Submersible Pump/Deep)	No	21	0	21
5.	Tube well (Shallow)	No	28	0	28
6.	Water Pump/Motor	No	48	1	49
7.	Steel Gate	No	1	0	1
8.	Concrete Gate	No	1	0	1
9.	Oil Tank	CFT/ 3900	2	0	2
10.	Safety Tank	No/CFT/13580	8	0	8
11.	Toilet Tank	CFT /1600	1	0	1
12.	Water Tank (CFT)	CFT/ 1620	1	0	1
13.	Water Tank (Plastic)	No/CFT	36	0	36
14.	Pillar (RCC)	No 2+9=11	2	0	2
2. Secondary Structure of Affected CPRs and Other Entities					
2.1. Primary Structure of Affected Titled CPRs and Other Entities					
1.	Boundary Wall	Rft	1	0	1
2.	Katcha Toilet, Slab Toilet, Sanitary Toilet, Tube well (Submersible Pump/Deep), Tube well (Shallow), Tube well (Irrigation works), Water Pump/Motor, Steel Gate, Concrete Gate, Ozukhan, Oil Tank, Safety Tank, Toilet Tank, Water Tank (CFT), Water Tank (Plastic), Drain, Pillar (RCC), Pillar (Normal), Flag Stand, Gumboj, Minar, Family Graveyard, Others, Duck and Hen House	No	0	0	0
2.2. Secondary Structure of Affected Non-titled CPRs and Other Entities					
1.	Boundary Wall, Katcha Toilet, Slab Toilet, Sanitary Toilet, Tube well (Submersible Pump/Deep), Tube well (Shallow), Tube well (Irrigation works), Water Pump/Motor, Steel Gate, Concrete Gate, Ozukhan, Oil Tank, Safety Tank, Toilet Tank, Water Tank	Rft	0	0	0

Table 4-26: Mouza Wise Affected Secondary Structures by Ownership Type in the Chanchra Intersection					
SL. No.	Types of Secondary Structures by HHs, CPRs & Other Entities	(Sft./Cft./Rft./ No.) as per questionnaire	Chanchra	Mondolga ti	Total
0	1	2	3	4	5=(3+4)
	(CFT), Water Tank (Plastic), Drain, Pillar (RCC), Pillar (Normal), Flag Stand, Gumboj, Minar, Family Graveyard, Others, Duck and Hen House				
2.3. Secondary Structure of Affected Encroacher CPRs and Other Entities					
1.	Boundary Wall, Katcha Toilet, Slab Toilet, Sanitary Toilet, Tube well (Submersible Pump/Deep), Tube well (Shallow), Tube well (Irrigation works), Water Pump/Motor, Steel Gate, Concrete Gate, Ozukhan, Oil Tank, Safety Tank, Toilet Tank, Water Tank (CFT), Water Tank (Plastic), Drain, Pillar (RCC), Pillar (Normal), Flag Stand, Gumboj, Minar, Family Graveyard, Others, Duck and Hen House	Rft	0	0	0
B. Total Secondary Structure of Affected Encroacher CPRs and Other Entities					
1.	Boundary Wall	Rft	1	0	1
2.	Katcha Toilet, Slab Toilet, Sanitary Toilet, Tube well (Submersible Pump/Deep), Tube well (Shallow), Tube well (Irrigation works), Water Pump/Motor, Steel Gate, Concrete Gate, Ozukhan, Oil Tank, Safety Tank, Toilet Tank, Water Tank (CFT), Water Tank (Plastic), Drain, Pillar (RCC), Pillar (Normal), Flag Stand, Gumboj, Minar, Family Graveyard, Others, Duck and Hen House	No	0	0	0

Source: Field survey conducted by BCL, April 2024 to May 2024

155. Table 4-27 shows that 113 squatters on RHD land due to Land by Utilization Category of Structure in the Chanchra Intersection.

Table 4-27: Mouza Wise Squatters on RHD Land/Govt. Land by Utilization Category of Structure in the Chanchra Intersection						
Utilization Type of Squatters' Structures	No. & % of Squatters in the Chanchra Intersection					
	Chanchra		Mondolgati		Total	
	No.	%	No.	%	No.	%
0	1	2	3	4	5=(1+3)	6
Residential Structures	2	1.834862	0	0	2	1.834862
Residential-cum-Commercial	1	0.91743	0	0	1	0.917431

Table 4-27: Mouza Wise Squatters on RHD Land/Govt. Land by Utilization Category of Structure in the Chanchra Intersection						
Utilization Type of Structures	No. & % of Squatters in the Chanchra Intersection					
	Chanchra		Mondolgati		Total	
	No.	%	No.	%	No.	%
0	1	2	3	4	5=(1+3)	6
Structures		1				
Commercial Structures	106	97.2477	0	0	106	97.24771
		1				
Total	109	100	0	0	109	100

Source: Field survey conducted by BCL and STUP, April 2024 to May 2024

DISPLACEMENT AND RELOCATION IN THE CHANCHRA INTERSECTION

156. Table 4-28 shows 29 displacement-affected households in Chanchra mouza due to proposed project. Out of that, 7 households need to be relocated.

Table 4-28: Mouza Wise Displacement and Relocation of Residential HHs in the Chanchra Intersection							
Category of Loss Due to Project Intervention		Units	Displacement of Affected HHs			Requirement of Relocation of Affected Residential HHs	
			Chanchra	Mondolgati	Total	Not Required	Required
0		1	2	3	4=(2+3)	5	6
Residential HHs	THHs	No.	27	0	27	0	27
	NTHHs	No.	2	0	2	0	2
	Encro. HHs	No.	0	0	0	0	0
	Total	No.	29	0	29	0	29

Source: Census and IOL survey conducted by BCL Associates Ltd, April 2024 to May 2024

157. The Table 4-29 below shows that about 171 entities were displaced due to the proposed project, including 97 households that must be relocated.

Table 4-29: Mouza Wise Displacement and Relocation of Businesses in the Chanchra Intersection							
Category of Loss Due to Project Intervention		Units	Displacement of Affected Entities			Requirement of Relocation of Affected Residential HHs	
			Chanchra	Mondolgati	Total	Not Required	Required
0		1	2	3	4=(2+3)	5	6
Business Entities	THHs	No.	57	3	60	0	60
	NTHHs	No.	108	0	108	2	106
	Encro. HHs	No.	3	0	3	0	3
	Total	No.	168	3	171	2	169

Source: Census and IOL survey conducted by BCL Associates Ltd, April 2024 to May 2024

158. Table 4-30 shows that 37 displacement affected entities in Chanchra Intersection due to proposed project, out of that 21 households needs to be relocated.

Table 4-30: Mouza Wise Displacement and Relocation of Residential HHs and Businesses in the Chanchra Intersection							
Category of Loss Due to Project Intervention		Units	Displacement of Affected Entities			Requirement of Relocation of Affected Residential HHs	
			Chanchra	Mondolgati	Total	Not Required	Required
0		1	2	3	4=(2+3)	5	6

Table 4-30: Mouza Wise Displacement and Relocation of Residential HHs and Businesses in the Chanchra Intersection							
Category of Loss Due to Project Intervention		Units	Displacement of Affected Entities			Requirement of Relocation of Affected Residential HHs	
			Chanchra	Mondolgati	Total	Not Required	Required
0		1	2	3	4=(2+3)	5	6
Residential HHs & Businesses (Residential-cum-Shops)	THHs	No.	34	1	35	16	19
	NTHHs	No.	1	0	1	0	1
	Encro. HHs	No.	1	0	1	0	1
	Total	No.	36	1	37	16	21

Source: Census and IOL survey conducted by BCL Associates April 2024 to May 2024

159. Table 4-31 shows that 3 displacement affected entities CPRs and others in Chanchra Intersection due to proposed project and need to be relocated.

Table 4-31: Displacement and Relocation of Community Property Resources and Other entities in the Chanchra Intersection					
Category of Loss Due to Project Intervention	Units	Displacement of Affected CPRs and Other Entities			Relocation of Affected Other Entities
		Chanchra	Mondolgati	Total	Total
0	1	2	3	4=(2+3)	5
Community Property Properties (CPR)	No.	2		2	2
Other Entities	No	1		1	1
Grand Total	No.	3		3	3

Source: Census and IOL survey conducted by BCL Associates Ltd, March – April 2024

160. The Table 4-32 below shows that 32 HH, below 90%, and 205 HH, above 90%, are overall losses due to the proposed project.

Table 4-32: Mouza Wise Magnitude of Overall Loss of Households, CPRS & Other Entities in the Chanchra Intersection					
Sl. No.	Type of Loss (Partially/Fully)	Unit	Chanchra	Mondolgati	Total
0	1	2	3	4	5=(3+4)
Residential					
1.	Partially (Below 90%)	No.	0	0	0
2.	Fully (Above 90%)	No.	29	0	29
Commercial					
3.	Partially (Below 90%)	No.	2	0	2
4.	Fully (Above 90%)	No.	166	3	169
Residential-cum-commercial					
5.	Partially (Below 90%)	No.	16	0	16
6.	Fully (Above 90%)	No.	20	1	21
Total					
7.	Partially (Below 90%) (SL. No. 1+3+5)	No.	18	0	18
8.	Fully (Above 90%) (SL. No. 2+4+6)	No.	215	4	219

Source: Census and IoL Survey, April 2024 to May 2024

RELIGION

161. This Table 4-33 below presents package wise affected population by religion. Islam (98.31% followers) is found as the main religion followed by Hinduism (1.27% followers) and Christian is 0.42% in the project area.

Table 4-33:: Mouza Wise Affected Population by Religion				
Religion	Distribution of affected Population by Religion			
	Chanchra	Mondolgati	Entire Chanchra Intersection	%
Islam	229	4	233	98.31
Hinduism	3	0	3	1.27
Christian	1	0	1	0.42
Total	233	4	237	100

Source: Field survey conducted by BCL, April 2024 to May 2024

EDUCATION LEVEL

162. The literacy rate in Bangladesh is 75%. The literacy rate in Jashore district is 80.49%. To assess literacy during the primary data collection, data about the education level of affected persons have also been collected and are presented in Table 4-34 and Table 4-35.

Table 4-34:: Mouza Wise Distribution of Affected Female Population (7 Years and Above) by Education Level						
Sl. No.	Education Level	Sex	Unit	Chanchra	Mondolgati	Total (Chanchra Intersection)
0	1	2	3	4	5	6=(4+5)
1.	Literate (Who can only read & write without passing any class exam)	Female	No.	46	0	46
2.	Class 1	Female	No.	15	0	15
3.	Class 2	Female	No.	12	0	12
4.	Class 3	Female	No.	15	0	15
5.	Class 4	Female	No.	10	0	10
6.	Primary School Certificate (PSC)	Female	No.	31	2	33
7.	Ebteday (Madrasha)	Female	No.	9	0	9
8.	Class 6	Female	No.	10	0	10
9.	Class 7	Female	No.	30	0	30
10.	Junior School Certificate (JSC)	Female	No.	30	3	33
11.	Class 9	Female	No.	41	0	41
12.	SSC/Equivalent	Female	No.	54	1	55
13.	Dakhil(Madrasha)	Female	No.	1	0	1
14.	HSC/Equivalent	Female	No.	59	0	59
15.	Alim(Madrasha)	Female	No.	2	0	2
16.	BA/Equivalent	Female	No.	25	0	25
17.	Fajil(Madrasha)	Female	No.	3	0	3
18.	MA/Equivalent	Female	No.	35	0	35
19.	Kamil (Madrasha)	Female	No.	0	0	0
20.	Hafez	Female	No.	1	0	1
21.	Dip. (Engg.)	Female	No.	1	0	1
22.	BSc(Engg.)	Female	No.	2	0	2
23.	MSc(Engg.)	Female	No.	0	0	0
24.	Higher Education	Female	No.	0	0	0

Table 4-34:: Mouza Wise Distribution of Affected Female Population (7 Years and Above) by Education Level

Sl. No.	Education Level	Sex	Unit	Chanchra	Mondolgati	Total (Chanchra Intersection)
0	1	2	3	4	5	6=(4+5)
	Degree(General)					
25.	Higher Education Degree(Engg.)	Female	No.	2	0	2
26.	Other	Female	No.	29	2	31
27.	Total Literate (SL. No. 1 to 26)	Female	No.	463	8	471
28.	Total Illiterate	Female	No.	46	0	46
A	Total Population (above 7 years)	Female	No.	427	6	433
B.	Total Population (below 7 years)	Female	No.	36	2	38
Grand Total Population (SL. No. 27+28)		Female	No.	463	8	471

Source: Field survey conducted by BCL, April 2024 to May 2024

Table 4-35:: Mouza Wise Distribution of Affected Male Population (7 Years and Above) by Education Level

Sl. No.	Education Level	Sex	Unit	Chanchra	Mondolgati	Total (Chanchra Intersection)
0	1	2	3	4	5	6=(4+5)
1.	Literate (Who can only read & write without passing any class exam)	Male	No.	39	0	39
2.	Class 1	Male	No.	20	0	20
3.	Class 2	Male	No.	12	0	12
4.	Class 3	Male	No.	17	3	20
5.	Class 4	Male	No.	12	1	13
6.	Primary School Certificate (PSC)	Male	No.	45	0	45
7.	Ebteday (Madrasha)	Male	No.	7	0	7
8.	Class 6	Male	No.	5	1	6
9.	Class 7	Male	No.	25	0	25
10.	Junior School Certificate (JSC)	Male	No.	38	0	38
11.	Class 9	Male	No.	38	1	39
12.	SSC/Equivalent	Male	No.	49	2	51
13.	Dakhil(Madrasha)	Male	No.	1	0	1
14.	HSC/Equivalent	Male	No.	54	4	58
15.	Alim(Madrasha)	Male	No.	1	0	1
16.	BA/Equivalent	Male	No.	51	0	51
17.	Fajil(Madrasha)	Male	No.	1	0	1
18.	MA/Equivalent	Male	No.	55	1	56
19.	Kamil (Madrasha)	Male	No.	1	0	1
20.	Hafez	Male	No.	2	0	2
21.	Dip. (Engg.)	Male	No.	4	0	4
22.	BSc(Engg.)	Male	No.	5	0	5
23.	MSc(Engg.)	Male	No.	2	0	2
24.	Higher Education	Male	No.	2	0	2

Table 4-35:: Mouza Wise Distribution of Affected Male Population (7 Years and Above) by Education Level

Sl. No.	Education Level	Sex	Unit	Chanchra	Mondolgati	Total (Chanchra Intersection)
0	1	2	3	4	5	6=(4+5)
	Degree(General)					
25.	Higher Education Degree (Engg.)	Male	No.	0	0	0
26.	Other	Male	No.	36	0	36
27.	Total Literate (SL. No. 1 to 26)	Male	No.	522	13	535
28.	Total Illiterate	Male	No.	39	0	21
A	Total Population (above 7 years)	Male	No.	479	9	487
B.	Total Population (below 7 years)	Male	No.	43	4	48
Grand Total Population (SL. No. 27+28)		Male	No.	522	13	535

Source: Field survey conducted by BCL April 2024 to May 2024

4.4.7 AFFECTED EDUCATIONAL INSTITUTES AND CPR

163. According to findings of survey, only 2 Mosque will be affected. Detailed information on affected community property resources are presented in **Table 4-36**.

Table 4-36:: Mouza Wise No. of Affected Community Property Resources (CPRs) and Degree of Impacts

Mouza	Degree of Impacts	Mosque	School & College	Madrasha	Graveyard	Community Centre	Orphanage	Temple	Total	
									No.	%
Chanchra	<25% Mild	0	0	0	0	0	0	0	0	0
	25-65% Moderate	0	0	0	0	0	0	0	0	0
	>65% Severe	2	0	0	0	0	0	0	2	100
	Subtotal			2	0	0	0	0	0	0
Mondolgati	<25% Mild	0	0	0	0	0	0	0	0	0
	25-65% Moderate	0	0	0	0	0	0	0	0	0
	>65% Severe	0	0	0	0	0	0	0	0	0
	Subtotal			0	0	0	0	0	0	0
Entire Chanchra Intersection	<25% Mild	0	0	0	0	0	0	0	0	0
	25-65% Moderate	0	0	0	0	1 Public Toilet	0	0	1	100
	>65% Severe	1	1	1	1	1	0	0	1	100

Source: Field survey conducted by BCL, April 2024 to May 2024

4.4.8 MARITAL STATUS

164. A Mouza wise marital status is presented in Table 4-37 of proposed road. In Bangladesh, the legal marriageable ages for the first marriage are 21 for males and 18 for females. However, the Child Marriage Act 2017 allows girls under 18 to marry with the consent of their parents. The marital status

among the surveyed population of affected mouzas shows that most marriages are solemnized above the marriageable age.

Table 4-37:: Mouza Wise Marital Status of the Affected Population in the Chanchra Intersection

Marital Status	Affected Population				Total Affected Male and Female Population in the Chanchra Intersection			
	Chanchra		Mondolgati		Male		Female	
	Male	Female	Male	Female	Popn.	%	Popn.	%
0	1	2	3	4	5	6	7	8
Married	293	286	5	0	298	42.82	286	47.83
Unmarried	230	157	0	0	230	33.05	157	26.25
Widow	0	27	0	0	0	0.00	27	4.52
Widower	0	0	0	0	0	0.00	0	0.00
Abandoned by Husband	0	1	0	0	0	0.00	1	0.17
Abandoned by Wife	1	0	0	0	1	0.14	0	0.00
Divorced Woman	0	1	0	0	0	0.00	1	0.17
Divorced Man	0	0	0	0	0	0.00	0	0.00
Population below 21 age for male & 18 age for female	167	126	0	0	167	23.99	126	21.07
Total	691	598	5	0	696	100	598	100

Source: Field survey conducted by BCL April 2024 to May 2024

4.4.9 ECONOMIC PROFILE

OCCUPATIONAL BACKGROUND

165. Table 4-38 shows that the highest primary occupation of affected male household heads is businesses for 146 HHHs (61.6%), followed by male household heads (21/8.6%) whose occupation is service (employment). Detailed information about the primary occupations of other active members of the affected households is presented in the following table.

Table 4-38:: Mouza Wise Distribution of Affected Household Heads by Primary Occupation

Primary Occupations	Primary Occupation of Household Heads		Total	
	Chanchra	Mondolgati	No.	%
Farmer	3	0	3	0.32
Teacher	37	0	37	3.97
Employed Abroad/Overseas	7	0	7	0.75
Employment or Service (Male)	59	6	65	6.98
Employment or Service (Female)	13	0	13	1.40
Housewife	262	0	262	28.14
Fisherman	0	0	0	0.00
Business (Male)	192	3	195	20.95
Business (Female)	8	0	8	0.86
Daily Labor	8	0	8	0.86
Driver	6	0	6	0.64
Manson's Helper	0	0	0	0.00
Mason	3	0	3	0.32
Carpenter	2	0	2	0.21

Table 4-38:: Mouza Wise Distribution of Affected Household Heads by Primary Occupation				
Primary Occupations	Primary Occupation of Household Heads		Total	
	Chanchra	Mondolgati	No.	%
Tailor	1	0	1	0.11
Doctor	3	0	3	0.32
Kabiraj	1	0	1	0.11
Boatman	0	0	0	0.00
Student	150	0	150	16.11
Girl Student	113	0	113	12.14
Rickshaw/Van Puller	2	0	2	0.21
Old Man	14	0	14	1.50
Old Woman	28	0	28	3.01
Maid Servant	0	0	0	0.00
Barber	0	0	0	0.00
Renting House	2	0	2	0.21
Cobbler	0	0	0	0.00
Mechanic/Technician	2	0	2	0.21
Unemployed	5	0	5	0.54
Other	1	0	1	0.11
Total	922	9	931	100

Source: Field survey conducted by BCL April 2024 to May 2024

166. Table 4-39 shows that the Mouza Wise Number of Affected Employed Laborer(s)/Employee(s) in Business/Industrial Institutions of Owners & Tenants in the Commercial Structure in the Proposed project. Details information about the laborers/employer of affected Titled household, Non-titled Households, Encroacher Households and . Laborer(s)/Employee(s) of Affected Titled CPRs & Other Entities, Laborer(s)/Employee(s) of Affected Non-titled CPRs & Other Entities, Affected Encroacher CPRs & Other Entities is given in the table.

Table 4-39: Mouza Wise Number of Affected Employed Laborer(s)/Employee(s) in Business/Industrial Institutions of Owners & Tenants in the Commercial Structures					
SL. No.	Types of Structure Laborer(s)/Employee(s)	Unit	Chanchra	Mondolgati	Total (Entire Chanchra Intersection)
0	1	2	3	4	5=(3+4)
A Laborer(s)/Employee(s) of Affected Households					
1.1. Laborer(s)/Employee(s) of Affected Titled Households					
1.	Labor	No.	15	3	18
2.	Teacher	No.	0	0	0
3.	Employment	No.	34	0	34
4.	Officer	No.	45	5	50
5.	Salesman	No.	50	1	51
6.	Engineer	No.	0	0	0
7.	Mechanic/Technician	No.	12	1	13
8.	Driver	No.	2	0	2
9.	Mason's Helper, Mason, Carpenter, Tailor, Physician/Doctor, Nurse,	No.	0	0	0

Table 4-39: Mouza Wise Number of Affected Employed Laborer(s)/Employee(s) in Business/Industrial Institutions of Owners & Tenants in the Commercial Structures

SL. No.	Types of Structure Laborer(s)/Employee(s)	Unit	Chanchra	Mondolgati	Total (Entire Chanchra Intersection)
0	1	2	3	4	5=(3+4)
	Boatman, Rickshaw/Van Puller				
10.	Cook/Chef	No.	4	0	4
11.	Waiter/Hotel Boy	No.	6	0	6
12.	Maid Servant	No.	0	0	0
13.	Barber	No.	0	0	0
14.	Security Guard	No.	0	0	0
15.	Gardener, Fisherman	No.	0	0	0
16.	Other	No.	8	0	8
1.2. Laborer(s)/Employee(s) of Affected Non-titled Households					
1	Labor	No.	16	0	16
2	Teacher, Employment, Officer, Salesman, Engineer	No.	0	0	0
3	Mechanic/Technician	No.	13	0	13
4	Driver, Mason's Helper, Mason, Carpenter, Tailor, Physician/Doctor, Nurse, Boatman, Rickshaw/Van Puller	No.	0	0	0
5	Cook/Chef	No.	4	0	4
6	Waiter/Hotel Boy	No.	2	0	2
7	Maid Servant, Barber, Security Guard, Gardener, Fisherman,	No.	0	0	0
8	Other	No.	0	0	0
1.3. Laborer(s)/Employee(s) of Affected Encroacher Households					
1.	Labor, Teacher, Employment, Officer, Salesman, Engineer, Mechanic/Technician, Driver, Mason's Helper, Mason, Carpenter, Tailor, Physician/Doctor, Nurse, Boatman, Rickshaw/Van Puller, Cook/Chef, Waiter/Hotel Boy, Maid Servant, Barber, Security Guard, Gardener, Fisherman, Other	No.	0	0	0
A. Total Laborer(s)/Employee(s) of Households (1.1+1.2+1.3)					
1	Labor	No.	14	3	17
2	Teacher	No.	0	0	0
3	Employment	No.	35	0	35
4	Officer	No.	36	5	41
	Salesman	No.	37	3	40
5	Engineer	No.	0	0	0
6	Mechanic/Technician	No.	14	0	14
7	Driver	No.	2	0	2
8	Mason's Helper, Mason, Carpenter, Tailor, Physician/Doctor, Nurse, Boatman, Rickshaw/Van Puller	No.	0	0	0

Table 4-39: Mouza Wise Number of Affected Employed Laborer(s)/Employee(s) in Business/Industrial Institutions of Owners & Tenants in the Commercial Structures

SL. No.	Types of Structure Laborer(s)/Employee(s)	Unit	Chanchra	Mondolgati	Total (Entire Chanchra Intersection)
0	1	2	3	4	5=(3+4)
9	Cook/Chef	No.	6	0	6
10	Waiter/Hotel Boy	No.	8	0	8
11	Maid Servant	No.	0	0	0
12	Barber	No.	1	0	1
13	Security Guard, Gardener, Fisherman	No.	0	0	0
14	Other	No.	10	0	10

2. Laborer(s)/Employee(s) of Affected CPRs & Other Entities

2.1. Laborer(s)/Employee(s) of Affected Titled CPRs & Other Entities

1.	Labor	No.	4	0	4
2.	Teacher, Employment, Officer, Salesman, Engineer, Mechanic/Technician, Driver, Mason's Helper, Mason, Carpenter, Tailor, Physician/Doctor, Nurse, Boatman, Rickshaw/Van Puller, Cook/Chef, Waiter/Hotel Boy, Maid Servant, Barber, Security Guard, Gardener, Fisherman, Other	No.	0	0	0

2.2. Laborer(s)/Employee(s) of Affected Non-titled CPRs & Other Entities

1.	Labor	No.	2	0	2
2.	Teacher, Employment, Officer, Salesman, Engineer,	No.	0	0	0
3.	Mechanic/Technician	No.	4	0	4
4.	Driver, Mason's Helper, Mason, Carpenter, Tailor, Physician/Doctor, Nurse, Boatman, Rickshaw/Van Puller.	No.	0	0	0
5.	Cook/Chef	No.	1	0	1
6.	Waiter/Hotel Boy	No.	1	0	1
7.	Maid Servant, Barber, Security Guard, Gardener, Fisherman	No.	0	0	0
8.	Other	No.	1	0	1

2.3. Laborer(s)/Employee(s) of Affected Encroacher CPRs & Other Entities

1.	Labor, Teacher, Employment, Officer, Salesman, Engineer, Mechanic/Technician, Driver, Mason's Helper, Mason, Carpenter, Tailor, Physician/Doctor, Nurse, Boatman, Rickshaw/Van Puller, Cook/Chef, Waiter/Hotel Boy, Maid Servant, Barber, Security Guard, Gardener, Fisherman, Other	No.	0	0	0
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B. Total Laborer(s)/Employee(s) of CPRs & Other Entities (1.1+1.2+1.3)

1.	Labor	No.	4	0	4
2.	Teacher, Employment, Officer, Salesman, Engineer, Mechanic/Technician, Driver, Mason's	No.	0	0	0

Table 4-39: Mouza Wise Number of Affected Employed Laborer(s)/Employee(s) in Business/Industrial Institutions of Owners & Tenants in the Commercial Structures

SL. No.	Types of Structure Laborer(s)/Employee(s)	Unit	Chanchra	Mondolgati	Total (Entire Chanchra Intersection)
0	1	2	3	4	5=(3+4)
	Helper, Mason, Carpenter, Tailor, Physician/Doctor, Nurse, Boatman, Rickshaw/Van Puller, Cook/Chef, Waiter/Hotel Boy, Maid Servant, Barber, Security Guard, Gardener, Fisherman, Other.				

Source: Field survey conducted by BCL April 2024 to May 2024

4.3.1.1 OCCUPATIONAL SKILL DEVELOPMENT (OSD)

167. Table 4-40 shows that 40 Person Proposed Possible Trade for Occupational Skill Development (OSD) Trainings in the Chanchra Intersection.

Table 4-40: Mouza Wise Proposed Possible Trade for Occupational Skill Development (OSD) Trainings

Sl. No.	Training Options	Unit	Chanchra	Mondolgati Mouza	Total (Entire Chanchra Intersection)
0	1	2	3	4	5=(3+4)
1.	Poultry Rearing	No.	13	0	13
2.	Fish Farming	No.	2	0	2
3.	Sewing/Tailoring/Embroidery	No	13	0	13
4.	Vegetables Cultivation	No	2	0	2
5.	Cow Rearing & Beef Fattening	No	10	0	10
6.	Technical	No	0	0	0
7.	Other	No	0	0	0
	Total person		40	0	40

Source: Census & IoL survey conducted by BCL Associates Ltd April 2024 to May 2024

4.4.10 AFFECTED COMMON PROPERTY RESOURCES (CPRS)

168. According to findings of census and IOL survey, a total of 3 affected common property resources (CPRs) in Chanchra Mouza are identified. Common Property Resources is given in Table 4-41 with information on affected various CPRs.

Table 4-41: Mouza Wise Distribution of Affected CPRs & Other Entities by Type of Overall Utilization of CPR Structure

Mouza	Unit	Type of Overall Structure Utilization								Total	
		Religion Activities (Player/Puja/Orchona)	Educational Institute (School/College)	Madrasa Educational Institute	Residential	Commercial	Residential-cum-Commercial	Farming & Fish Cultivation	Others	No.	%
Chanchra	No.	2							1	3	100
Mondolgati	No.	-	-	-	-	-	-	-	-	-	-
Total	No.	2							1	3	100
Percentage (%)	%	67							33		

Source: Field survey conducted by BCL April 2024 to May 2024

169. According to findings of census and IOL survey, a total of 139 house hold are being used wood fuel & LPG Cylinder (Both) for cooking their foods and 65 households in Chanchra Mouza is using LPG Cylinder. Type of fuel/gas is being used in the affected households is given in Table 4-42.

Table 4-42: Mouza Wise Distribution of Affected Households, CPRS & Other Entities by Type of Fuel/GasUse the									
Mouza	Type of Fuel/Gas	Unit	Source of Fuel/Gas						Total
			Privately	Retailer	Wholesaler	Privately & Retailer	Privately & Wholesaler	Others	
Chanchra	Wood Fuel	No.	17	19	0	0			36
	LPG Cylinder	No.	3	62	0	0			65
	Wood Fuel & LPG Cylinder (Both)	No.	4	11	0	120			135
Mondolgati	Wood Fuel	No.	0	0	0	0			0
	LPG Cylinder	No.	0	0	0	0			0
	Wood Fuel & LPG Cylinder (Both)	No.	0	0	0	4			4
Total	Wood Fuel	No.	17	19	0	0			36
	LPG Cylinder	No.	3	62	0	0			65
	Wood Fuel & LPG Cylinder (Both)	No.	4	11	0	124			139
Source: Field survey conducted by BCL April 2024 to May 2024									

Source: Field survey conducted by BCL April 2024 to May 2024

4.4.11 SANITATION AND WATER SUPPLY

4.4.11.1 SANITATION

170. It was reported that the affected businessmen and their employees who stay and/or live at bazars in urban areas utilize sanitary latrines in most of the cases. However, some businessmen at rural market areas use both the sanitary and ring slab latrines. The affected households who have pucca structures, their household members utilize sanitary latrines attached inside their pucca structures. However, some affected households having semi-pucca structures which have ring slab latrines outside their semi-pucca structures. They utilized sanitary and ring slab latrines Households losing tin made houses and katcha houses generally utilize the following types of latrines which were found in the findings of census and IOL survey shows that 204 such households utilize sanitary latrines followed by ring slab latrines 35 in the project affected areas (refer to Table 4-43).

Table 4-43: Mouza Wise Distribution of Affected Households, CPRS & Other Entities by Type of Latrine Use					
Sl. No.	Type of Latrine Use	Unit	Chanchra	Mondolgati	Total
0	1	2	3	4	5=(3+4)
1.	Sanitary	No.	200	4	204
2.	Ring Slab	No.	35	0	35
3.	Katcha/Hanging Latrine	No.	1	0	1
4.	Pit	No.	0	0	0
5.	Others	No.	0	0	0

Source: Field survey conducted by BCL April 2024 to May 2024

171. Drainage system is being used in the project area is tabulated in Table 4-44. Out of 240, 210 is private septic tank, 14 is private drain, 6 are govt drain and 40 others drainage system exists in the project area.

Table 4-44: Mouza Wise Distribution of Affected Households, CPRS & Other Entities by Type of Drainage System/Facility Use			
Mouza	Unit	Type of Drainage System	Total

		Private Septic Tank	Private Drain	Govt. Drain	Others	
Chanchra	No.	206	7	3	20	236
Mondolgati	No.	4	0	0	0	4
Total	No.	210	7	3	20	240

Source: Field survey conducted by BCL April 2024 to May 2024

4.4.11.2 WATER SUPPLY

172. Almost 100% of affected households use underground water for their drinking, domestic, bathing, washing and other purposes. Ground water is lifted with the deep, shallow and hand tube wells. Commercial entities including businessmen, factory owners, CPRs also use ground water for drinking, washing, bathing and other necessary purposes. Underground water is lifted with motor pumps and store in the water tank in the ground and on roof top as well.

Table 4-45: Mouza Wise Distribution of Affected Households, CPRS & Other Entities by Water Supply System and/or Arrangement

Sl. No.	Type of Water Supplier	Unit	Chanchra	Mondolgati	Total
0	1	2	3	4	5=(3+4)
1.	Self/Private	No.	230	4	234
2.	Govt.	No.	6	0	6
3.	Organization	No	0	0	0
4.	Others	No	0	0	0

Source: Field survey conducted by BCL April 2024 to May 2024

173. During the survey it has been reported that Arsenic Contamination of Water Sources and Water Utilization in Chanchra Intersection. Mouza Wise Distribution of Affected Households, CPRS & Other Entities by Yes of Arsenic Contamination of Water Sources and Water Utilization in proposed project is given in Table 4-46.

Table 4-46: Mouza Wise Distribution of Affected Households, CPRS & Other Entities - Arsenic Contamination of Water Sources and Water Utilization

Sl. No.	Information of Water Usage	Arsenic contamination yes or not?	Unit	Chanchra	Mondolgati	-mTotal
0	1	2	3	4	5	6=(4+5)
For Drinking						
1.	Hand Tubewell	Yes	No.	1	0	1
2.	Shallow Tubewell	Yes	No.	0	0	0
3.	Deep Tubewell	Yes	No.	0	0	0
4.	Pond	Yes	No.	0	0	0
5.	River/Canal	Yes	No.	0	0	0
6.	Rain Water	Yes	No.	0	0	0
7.	Others	Yes	No.	1	0	1
For Domestic Purpose						
1.	Hand Tubewell	Yes	No.	8	0	8
2.	Shallow Tubewell	Yes	No.	6	0	6
3.	Deep Tubewell	Yes	No.	1	0	1
4.	Pond	Yes	No.	0	0	0
5.	River/Canal	Yes	No.	0	0	0
6.	Rain Water	Yes	No.	0	0	0

Table 4-46: Mouza Wise Distribution of Affected Households, CPRS & Other Entities - Arsenic Contamination of Water Sources and Water Utilization

Sl. No.	Information of Water Usage	Arsenic contamination yes or not?	Unit	Chanchra	Mondolgati	-mTotal
0	1	2	3	4	5	6=(4+5)
7.	Others	Yes	No.	4	0	4
For Bathing						
1.	Hand Tubewell	Yes	No.	8	0	8
2.	Shallow Tubewell	Yes	No.	6	0	6
3.	Deep Tubewell	Yes	No.	1	0	1
4.	Pond	Yes	No.	1	0	1
5.	River/Canal	Yes	No.	0	0	0
6.	Rain Water	Yes	No.	0	0	0
7.	Others	Yes	No.	4	0	4
For Toilet						
1.	Hand Tubewell	Yes	No.	9	0	9
2.	Shallow Tubewell	Yes	No.	6	0	6
3.	Deep Tubewell	Yes	No.	1	0	1
4.	Pond, River/Canal, Rain Water	Yes	No.	0	0	0
5.	Others	Yes	No.	4	0	4
		No	No.	9	0	9
For Ozu or Hand-wash						
1.	Hand Tubewell	Yes	No.	9	0	9
2.	Shallow Tubewell	Yes	No.	7	0	7
3.	Deep Tubewell	Yes	No.	2	0	2
4.	Pond, River/Canal, Rain Water	Yes	No.	0	0	0
5.	Others	Yes	No.	4	0	4
For other works						
1.	Hand Tubewell, Shallow Tubewell, Deep Tubewell, Pond, River/Canal, Rain Water, Others	Yes	No.	0	0	0

Source: Field survey conducted by BCL April 2024 to May 2024

174. Mouza Wise Distribution of Affected Households, CPRS & Other Entities by No of Arsenic Contamination of Water Sources and Water Utilization in project affected area is given in .

Table 4-47: Mouza Wise Distribution of Affected Households, CPRS & Other Entities by No of Arsenic Contamination of Water Sources and Water Utilization

Sl. No.	Information of Water Usage	Arsenic contamination yes or not?	Unit	Chanchra	Mondolgati	Total
0	1	2	3	4	5	6=(4+5)
For Drinking						

Table 4-47: Mouza Wise Distribution of Affected Households, CPRS & Other Entities by No of Arsenic Contamination of Water Sources and Water Utilization

Sl. No.	Information of Water Usage	Arsenic contamination yes or not?	Unit	Chanchra	Mondolgati	Total
0	1	2	3	4	5	6=(4+5)
1.	Hand Tubewell	No	No.	29	0	29
2.	Shallow Tubewell	No	No.	25	0	25
3.	Deep Tubewell	No	No.	140	4	144
4.	Pond, River/Canal, Rain Water	No	No.	0	0	0
5.	Others	No	No.	31	0	31
For Domestic Purpose						
1.	Hand Tubewell	No	No.	28	1	29
2.	Shallow Tubewell	No	No.	26	0	26
3.	Deep Tubewell	No	No.	127	3	130
4.	Pond, River/Canal, Rain Water	No	No.	0	0	0
5.	Others	No	No.	28	0	28
For Bathing						
1.	Hand Tubewell	No	No.	27	1	28
2.	Shallow Tubewell	No	No.	26	0	26
3.	Deep Tubewell	No	No.	125	3	128
4.	Pond	No	No.	1	0	1
5.	River/Canal, Rain Water	No	No.	0	0	0
6.	Others	No	No.	28	0	28
For Toilet						
1.	Hand Tubewell	No	No.	35	1	36

Table 4-47: Mouza Wise Distribution of Affected Households, CPRS & Other Entities by No of Arsenic Contamination of Water Sources and Water Utilization

Sl. No.	Information of Water Usage	Arsenic contamination yes or not?	Unit	Chanchra	Mondolgati	Total
0	1	2	3	4	5	6=(4+5)
2.	Shallow Tubewell	No	No.	26	0	26
3.	Deep Tubewell	No	No.	119	3	122
4.	Pond, River/Canal, Rain Water	No	No.	0	0	0
6.	Others	No	No.	28	0	28
For Ozu or Hand-wash						
1.	Hand Tubewell	No	No.	37	1	38
2.	Shallow Tubewell	No	No.	25	0	25
3.	Deep Tubewell	No	No.	116	3	119
4.	Pond, River/Canal, Rain Water	No	No.	0	0	0
7.	Others	No	No.	28	0	28
For other works						
1.	Hand Tubewell, Shallow Tubewell, Deep Tubewell, Pond, River/Canal, Rain Water, Others	No	No.	0	0	0

Source: Field survey conducted by BCL April 2024 to May 2024

4.4.12 UTILIZATION OF ELECTRICITY

175. Almost 100% of affected households, commercial entities& CPRs under the project use electricity for various purposes, such as, various residential and commercial purposes including light, fan, lifting water with motor pumps, cooking, etc. Source of electricity is tabulated in Table 4-48.

Table 4-48: Mouza Wise Distribution of affected Households, CPRS & Other Entities by Source of Electricity

Mouza	Unit	Source of Electricity	Total
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		Solar	Palli Bidyut Samity	Bangladesh Rural Electrification Board (BREB)	Others	
Chanchra	No.	16	82	138	0	236
Mondolgati	No.	0	2	2	0	4
Total	No.	16	84	140	0	240

Source: Field survey conducted by BCL April 2024 to May 2024

4.4.13 HEALTH FACILITIES

176. Land acquisition has impacts on drug shops/medicine shop/pharmacies, chambers of some doctors at different affected Bazars in the Proposed Project. It may be mentioned that land acquisition has impact on health facilities only. Table 4-49 shows that 534 Health service center is affected in Chanchra mouza following the 8 in Mondolgati affected due to the project.

Table 4-49: Mouza Wise Distribution of Affected Households, CPRS & Other Entities by Utilization of Health Service Center/Provider									
Mouza	Unit	Name of Health Service Center/Provider							Total
		Community Clinic	Union Health & Family Welfare Centre	Upazila Health Complex	Zila Sadar Hospital	Private Clinic	Physician/Doctor Chamber	Others	
Chanchra	No.	57	18	135	159	39	125	1	534
Mondolgati	No.	1	0	3	2	1	1	0	8
Total	No.	58	18	138	161	40	126	1	542

Source: Field survey conducted by BCL April 2024 to May 2024

4.4.14 IMPACT ON TREES

177. About 942 large, medium, Small and sapling tree is being affected due to Land acquisition in the Proposed Project. Details are given in Table 4-50.

Table 4-50: Mouza Wise Distribution of Affected Trees by Category							
Sl. No.	Type of Trees	Unit	Large	Medium	Small	Sapling	Total
A. Chanchra							
1.	Fruits	No	184	303	292	88	867
2.	Timber	No	11	39	16	3	69
3.	Medicinal	No	0	4	0	2	6
4.	Total		195	346	308	93	942
B. Mondolgati							
1.	Fruits, Timber, Medicinal,	No.					
Total (A+B)							
1.	Fruits	No	184	303	292	88	867
2.	Timber	No	11	39	16	3	69
3.	Medicinal	No	0	4	0	2	6
4.	Total		195	346	308	93	942

Source: Field survey conducted by BCL April 2024 to May 2024

178. About 942 large, medium, Small and sapling tree is being affected due to Land acquisition in the Proposed Project and market price and 100% premium of trees on private and govt land shall be payable. Details are given in Table 4-51.

Table 4-51: Mouza Wise Estimated Amount of Compensation for Trees in the Chanchra Intersection					
Size of Tree	Chanchra Mouza		Mondolgati Mouza		Grand Total
	Govt. Tee	Private Tree	Govt. Tree	Private Tree	
Large	9	186			195
Medium	29	317			346
Small	15	293			308
Sapling	8	85			93
Total	61	881			942
Mouza Wise Market Price and 100% premium of Trees on Private and Govt. Land in Chanchra Intersection					
Trees on Private/ Govt. Land	Market Price and 100% Premium				Total
	Chanchra Mouza		Mondolgati Mouza		
Govt. Land	TBD		TBD		
Private Land	TBD		TBD		
Total	TBD		TBD		

Source: Field survey conducted by BCL April 2024 to May 2024

4.4.15 GENDER BASED VIOLENCE (GBV) IN JASHORE

179. The worst manifestation or existing forms of SEA/SH is child marriage, also known as early marriage. Child marriage and the dowry system put girls at particular risk of sexual, physical and psychological violence throughout their lives. Bangladesh has one of the highest early marriage rates in the world at 59 percent in 2018 (UNFPA, 2019).
180. Early marriage nearly always results in school drop-outs or from to pursuing higher education and early childbirth, and is often used as a way for trafficking young girls. This is hazardous from a health perspective and is a hindrance to academic and economic development.
181. The provision of GBV services to the host communities in RHD has been limited. Only the One Crisis Center (OCC) at District Sadar Hospital (DSH) and a one stop cell at Jhenaidah and Jashore to serve the host communities. These are operated under the Multisectoral Program on Violence against Women (MSPVAW) led by the Ministry of Women and Children Affairs (MOWCA) in coordination with eleven other ministries and law enforcement, and legal agencies/organizations. However, the GBV issues are also serious among the local population and services to them are badly needed as well.

5 ANALYSIS OF ALTERNATIVE ALIGNMENTS

5.1 GENERAL

182. The proposed development of the Chanchra intersection will improve the current traffic scenario. The construction of the flyover will reduce traffic congestion, thus reducing commute time. It improves connectivity and ensures that the traffic is smooth and organized. For all these positive impacts of road projects, there will also be potential negative impacts on the following -

- a) Environmental Impacts on various attributes such as ambient air quality, noise quality, cutting of avenue trees and vegetation, and water bodies (ponds/drainage)
- b) Land acquisition and loss of structures and livelihoods will have social impacts on people on the direct path of road alignment.

183. This section briefly examines the different alternatives/options from environmental and social perspectives.

5.2 CONCEPTUAL DESIGN FOR JUNCTION IMPROVEMENT

184. The following conceptual design and structure are studied to integrate all the movements at this busy intersection.

- ▶ **A trumpet arrangement** is provided for the interchange at the Chanchra location between roads N7 and N706. The trumpet loop is placed towards the Benapole side.
- ▶ Jhenaidah—Jashore Road is at **Flyover** (Level-1) since the Bhanga—Benapole will be an access-controlled at-grade road.
- ▶ **Railway overpass (ROP)** cum Flyover of Jhenaidah—Jashore road.
- ▶ **Two Ramps** for uninterrupted one-directional traffic movement. One Ramp is from Jhenaidah to Khulna, and another is from Jhenaidah to Benapol.
- ▶ A slight adjustment of the alignment/center line proposed in Bhanga—Benapole, a line of credit (LOC) Corridor Project, is being considered to save Government Buildings, Religious places, etc.
- ▶ **Pedestrian crossing Facilities:** Facilities such as **Foot-over bridges (FOBs)** and Pedestrian subways are provided.
- ▶ Chanchra, in a change of scope (COS), is extended up to the gate of Medical College on the Benapole side, **Roundabout at Chanchra Bazar/ Raja Bordakanta (RBK)** road on the Bhanga/Khulna side, and Flyover on Jhenaidah—Jashore starts after the Pier of Railway overpass.
- ▶ **Road Widening:** Extra widening is provided on the main loop of Trumpet and Ramps 1 and 2. The carriageway on the service road also needs to be widened.
- ▶ **Grade Separation:**

185. The possible Grade Separation is as follows -

- a. Since the Traffic Movement between Benapole and Khulna and vice versa is significant, these movements will be separated by a two-way Elevated Structure (Flyover) along the Khulna—Benapole Corridor. Also, this Flyover will be extended to provide viaducts across the N706 Intersection for movement into and out of the N706 Highway.
- b. Further, the Grade Separation for the following two turning movements on the right side is planned as follows:
 - ▶ Right Turning Traffic from Jhenaidah to Benapole
 - ▶ Right Turning Traffic from Khulna to Jhenaidah

5.2.1 OPTIONS STUDY FOR THE CHANCHRA INTERSECTION

186. Based on the above, the following five options have been considered for the Chanchra Intersection in the inception report, with the conceptual designs prepared by the RHD in January 2024. They are discussed as follows.

A. Option 1 with Grade Separation Between Benapole and Khulna and Roundabout N7 to Jhenaidah

187. As shown in **Figure 5-1**, the Option 1 consists of the following:

- ▶ Grade-separated movement between Benapole and Khulna.
- ▶ Roundabout arrangement for traffic dispersal with N7 to Jhenaidah and N706 Highway. The roundabout arrangement will be safer traffic control for all users, including Vulnerable Road Users (VRUs)

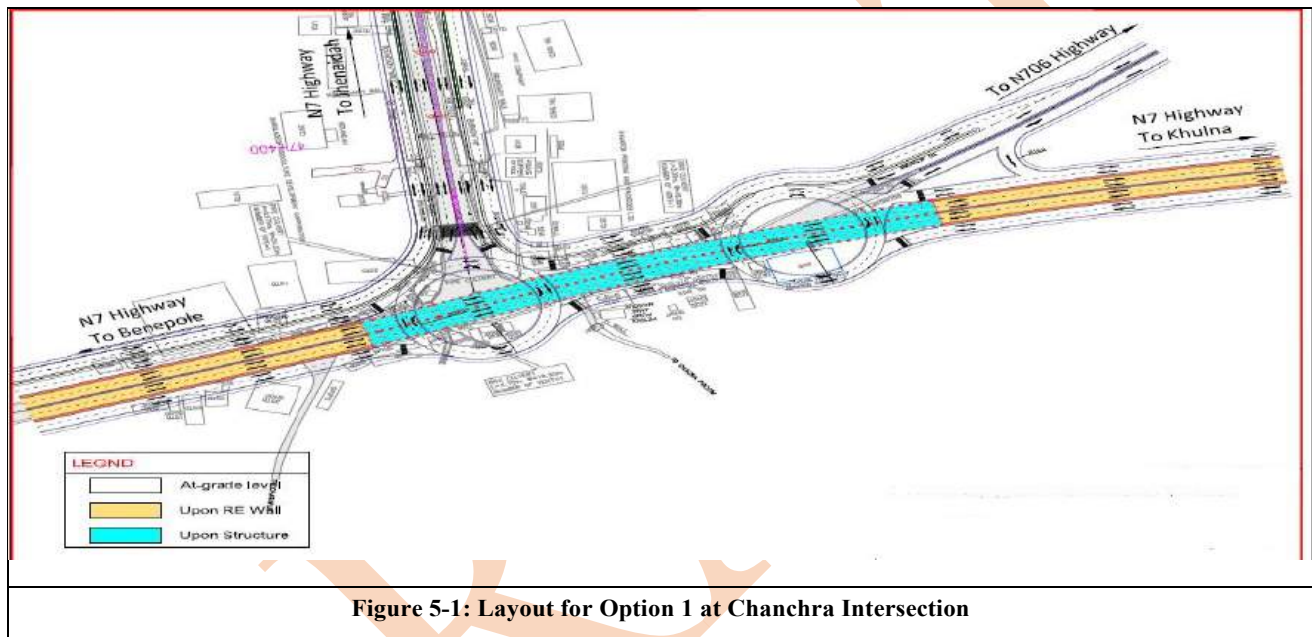
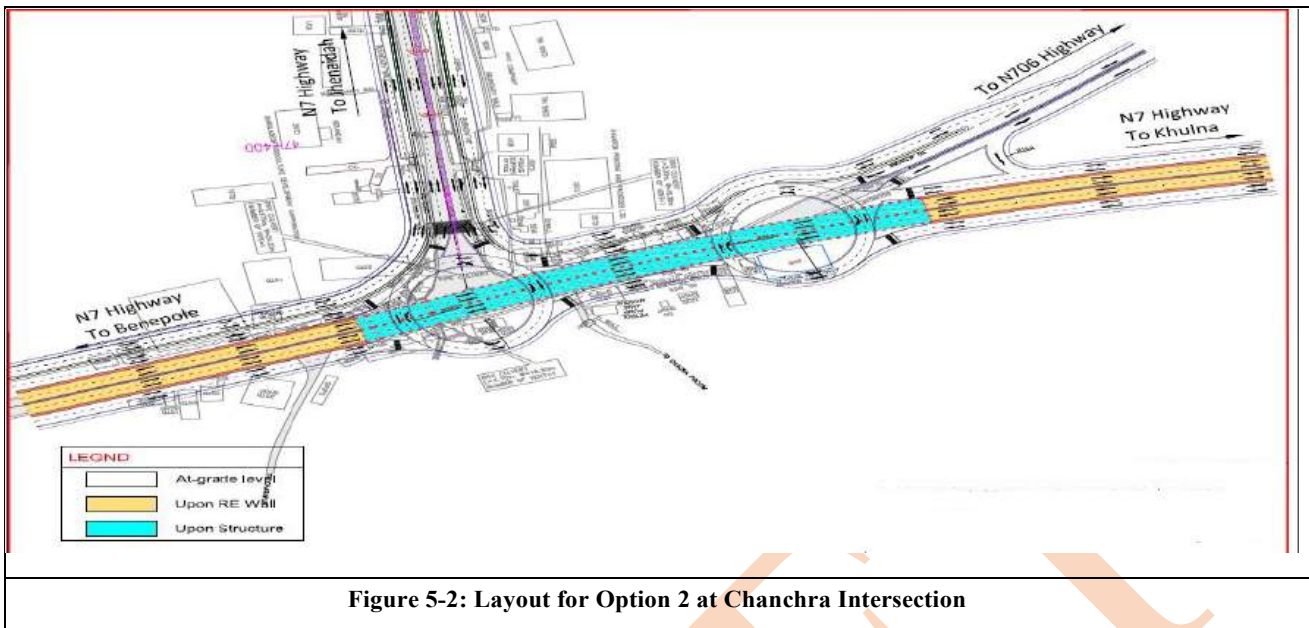


Figure 5-1: Layout for Option 1 at Chanchra Intersection

188. This option involves marginal land acquisition and a relatively less costly proposal. i.e., the major component of the cost will be for a 6-lane viaduct of around 250m in length.

B. Option 2 with Grade Separation between Benapole, Khulna, and Jhenaidah

189. As shown in **Figure 5-2**, this option is grade separation and consists of the following components:



- ▶ Grade-separated movement between Benapol, Khulna, and Jhenaidah
- ▶ Grade-separated ramp from Benapol to N706 Highway.
- ▶ The alignment of the N706 highway will be retained, but with marginal land acquisition for the ramp from Benapol to N706 Highway
- ▶ Roundabout arrangement for traffic dispersal with N706 Highway

190. Land acquisition is required for trumpet interchange for grade-separated movement between Benapole, Khulna, and Jhenaidah

C. Option 3: Grade Separation and Elevated Ramp

191. As shown in **Figure 5-3**, the Option 3, which is as follows, consist of the following:

- ▶ Grade Separated Movement between Benapol, Khulna, Jhenaidah, and N706 Highway.
- ▶ The Elevated Ramp has been proposed for the Benapole—Jhenaidah and Jhenaidah—Khulna Sections. Also, the Movement from Khulna—Jhenaidah and Jhenaidah—Benapol is through the Trumpet.
- ▶ The ROP Structure on Jhenaidah—Jashore near Jashore will be extended up to the Jashore Intersection and gradually descend with the RE Wall.

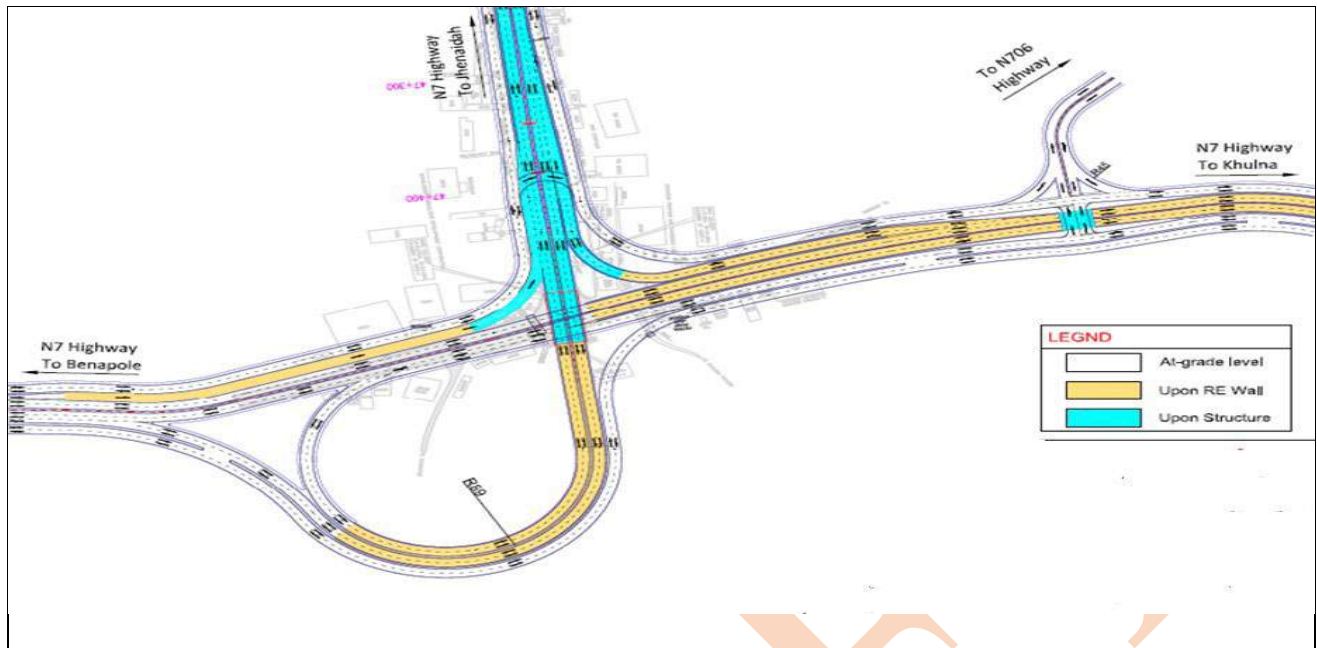


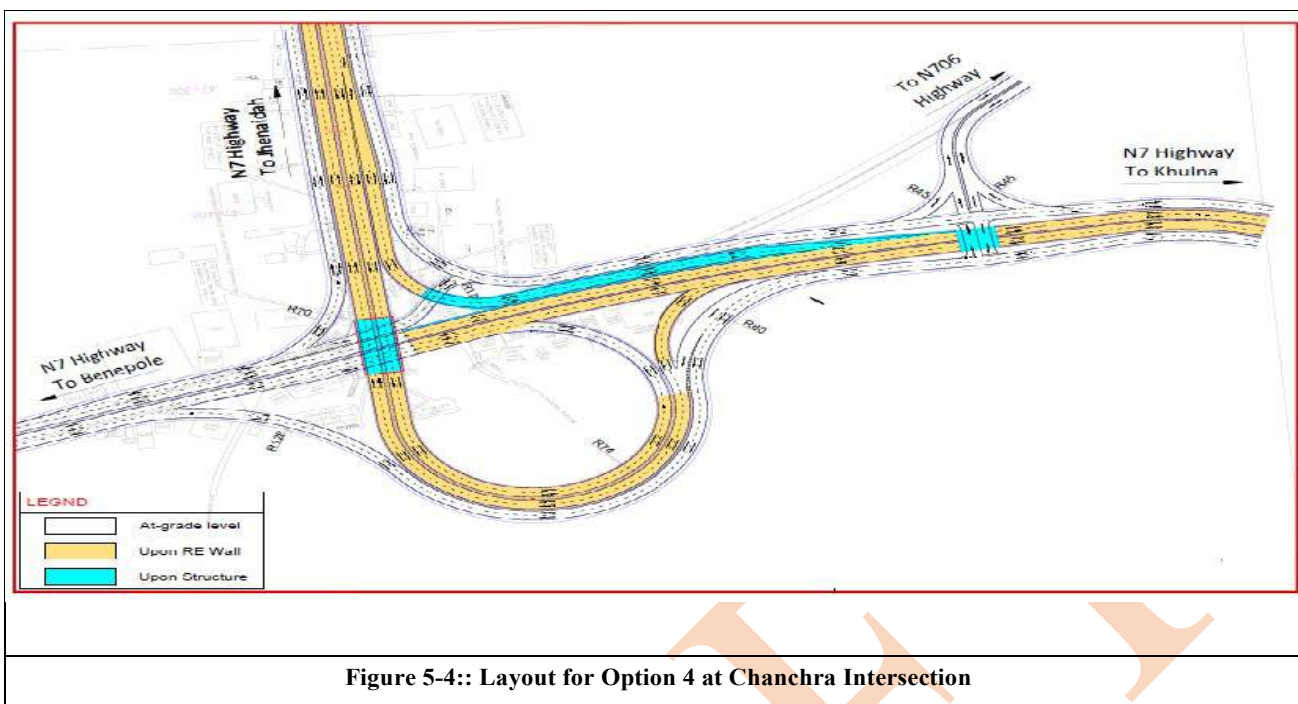
Figure 5-3:: Layout for Option 3 at Chanchra Intersection

- ▶ The Road from Jhenaidah Jashore will fly above the Railway line and have a direct exit to Khulna and the N706 Highway.
 - ▶ The Road from Benapol will directly enter the Jhenaidah—Jashore Highway and then fly over the Railway line.
 - ▶ Service Road all along the Khulna—Benapol Highway and Jhenaidah—Jashore.
192. Land acquisition for trumpet interchange for Grade-separated movement between Benapole, Khulna, and Jhenaidah

D. Option 4: Grade-separated movement between Benapole, Khulna, and Jhenaidah

193. The Option 4 consists of the following:

- ▶ Grade-separated movement between Benapol, Khulna, and Jhenaidah
- ▶ The alignment of the N706 highway has been altered to insert a VUP.
- ▶ The alignment of the N706 highway has been altered to insert a VUP, requiring land acquisition
- ▶ The trumpet of interchange has been positioned on the VUP side to avoid widespread land acquisition.

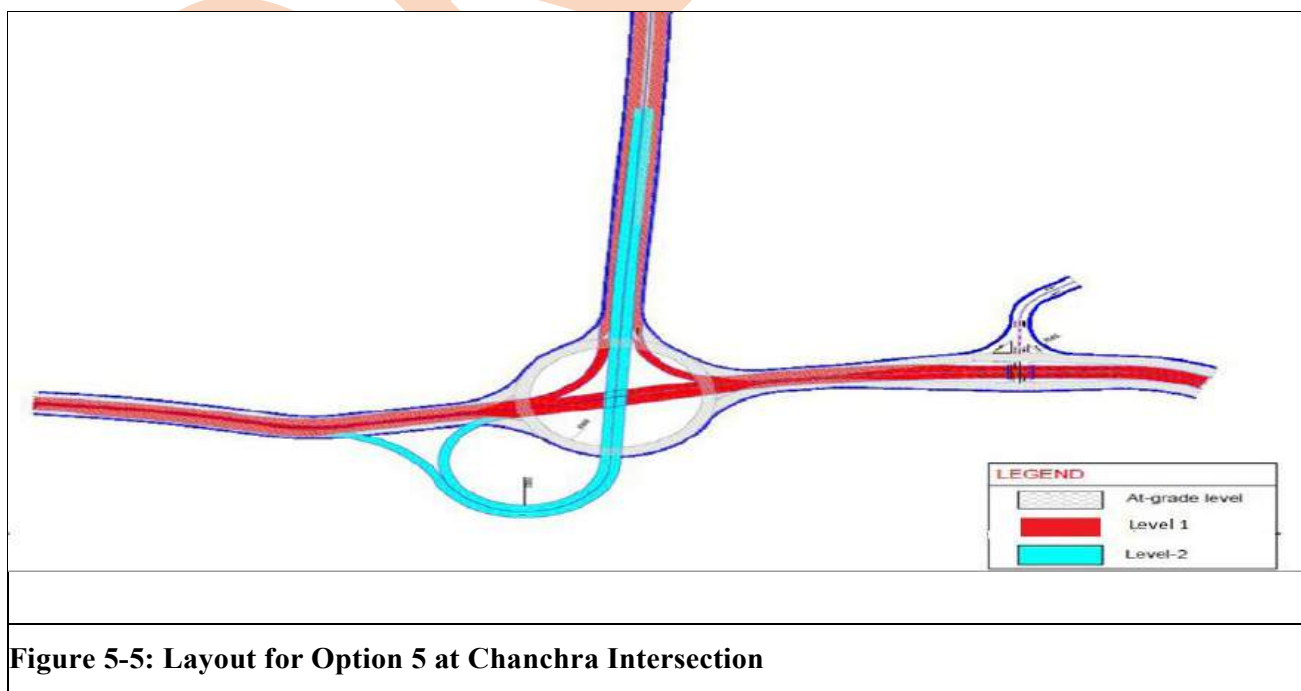


194. Land acquisition for trumpet interchange for Grade-separated movement between Benapol, Khulna, and Jhenaidah

E. Option 5: Grade Separation and Flyover at Junction at Level 1 and Level 2

As shown in **Figure 5-5**, the Option 5 consists of the following:

- ▶ Grade-separated movement between Benapol, Khulna, and Jhenaidah
- ▶ Traffic from Benapol to Khulna will be over the level-1 flyover at Junction.
- ▶ The Road from Jhenaidah will fly above the Railway line at Level-2 at Chanchra junction.
- ▶ Service roads will be at grade and have an at-grade roundabout at the junction.
- ▶ One directional elevated ramp will be provided for left-turning traffic from Benapole—Jhenaidah and from Jhenaidah—Khulna.



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- ▶ The N706 highway alignment has been altered to form a safer junction and viaduct span for flyovers.
- ▶ Service Road all along Khulna—Benapol Highway and Jhenaidah Highway.

195. The environmental issues and other issues of all the above-presented options are summarized in Table 5-1.

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Table 5-1: Characteristics and Impacts of the Proposed Five Alternative Alignments

Alternatives	Environmental issues	Other Issues
Option 1	Although the land acquisition is minor, it will significantly adversely impact human interests, including the livelihoods of the affected persons, as well as social and environmental interests.	It is relatively less expensive, with the major cost component being the 250m long, 6-lane viaduct. This option is a short-term solution and requires implementing option two to accommodate future demand.
Option 2	Higher land acquisition is needed to accommodate the trumpet interchange, roundabout arrangement, and ramps, affecting livelihood and significantly impacting social and environmental interests. Many trees must be cut down to accommodate all the structures as per design.	Option 2 can be considered the next stage of development after option 1, ensuring grade-separated movement between Benapol, Khulna, and Jhenaidah.
Option 3 (Original)	Land acquisition exists, but most of it is uninhabited land, thus reducing the impacts on livelihood. Many trees must be cut down to accommodate the service road and other structures as per design. Land acquisition is being done near the N706 highway to accommodate the VUP.	It would provide better commutation with direct routes between all locations, thus reducing travel time and congestion.
Option 3 (Revised)	Land acquisition exists, but most of it is uninhabited, thus reducing the impacts on livelihood. Many trees will have to be cut down to accommodate the service road and other structures as per the design. The design has better connectivity and less land acquisition.	It would provide better commutation with direct routes between all locations, thus reducing travel time and congestion.
Option 4	Land acquisition needed is comparatively less for the trumpet interchange; however, to accommodate the VUP, land is to be acquired, thus affecting livelihood.	The land to be acquired is fully inhabited, making the resettlement expensive and complicated.
Option 5	Land acquisition exists, but most of it is uninhabited, thus reducing the impacts on livelihood. Many trees must be cut down to accommodate the service road and other structures per the design. The design has better connectivity and less land acquisition.	High construction costs are involved as the design is intricate, thus making it infeasible.

Thus, the preferred alignment is Option 3 (Revised). Source—Proposed Concept Designs of the Chachra Intersection Study

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5.3 ENVIRONMENTAL IMPACT OF ‘WITHOUT PROJECT’ AND ‘WITH PROJECT’ ALTERNATIVES

196. It is learned from the above section that the existing alignment will be followed with some modifications to accommodate future traffic with improved geometry. All the alternatives' environmental and social aspects will remain more or less the same. Thus, two alternatives, the ‘With the project’ scenario and “without the project,” are studied in this subsection.

197. Suppose the proposed road follows the “without project” alternative. In that case, there will be environmental impacts, such as vehicle idling due to frequent traffic congestion, noise and air pollution due to increased traffic and frequent congestion, and an increase in road accidents due to the poor geometry of the existing road. The traffic analysis study report has indicated that the traffic will increase in the coming years on this road and ‘without project scenario’ would render the following problems in the future:

- ▶ Crossing the road will become more dangerous
- ▶ Traffic congestion will increase
- ▶ The economic disadvantages will be due to the idling of vehicles, increased travel time, and the operating cost of vehicles due to frequent wear and tear.

198. The ‘with the project’ alternative will involve new capital investment in road development, and the present road would be capable of catering to future traffic demand. Environmental and social impacts will certainly arise from the ‘with project’ scenario, which can be mitigated by adopting mitigation measures as suggested in Chapter 7 of this report.

5.3.1 CARBON SAVINGS DUE TO ‘WITH PROJECT’ SCENARIO

199. Bangladesh is considered one of the most vulnerable countries regarding global warming and climate change. Thus, any development designated for this country must be environmentally sustainable and economically viable. Greenhouse gases emitted from vehicles have a positive correlation with global warming. Thus, reducing the total amount of greenhouse gases emitted per year will also mean reducing global warming, which in the long run is environmentally beneficial both nationally and globally.

200. Thus, an attempt has been made to work out the carbon reduction due to the project scenario, which is presented in **Table 5-2**. This table shows a positive difference between the scenarios- ‘with the project’ and ‘without the project.’ In the latter option, i.e., ‘without project,’ the amount of carbon emission is higher than in the ‘With Project’ scenario. Further, it is worth mentioning that with the ‘with project’ option, the difference gradually increases over the years, which implies that over the years, the amount of emission with the project will continue to be less than the ‘without Project’ scenario.

Table 5-2: CO2 Emission in tons

Year	Without	With Project	Difference
2025	10,192.61	7,644.46	2,548.15
2026	10,837.32	8,127.99	2,709.33
2027	11,523.18	8,642.39	2,880.80
2028	12,252.83	9,189.63	3,063.21
2029	13,029.10	9,771.82	3,257.27
2030	13,854.97	10,391.23	3,463.74
2031	14,810.43	11,107.82	3,702.61

Table 5-2: CO2 Emission in tons

Year	Without	With Project	Difference
2032	15,832.29	11,874.22	3,958.07
2033	16,925.21	12,693.91	4,231.30
2034	18,094.15	13,570.62	4,523.54
2035	19,344.47	14,508.35	4,836.12
2036	20,771.29	15,578.47	5,192.82
2037	22,303.97	16,727.98	5,575.99
2038	23,950.40	17,962.80	5,987.60
2039	25,719.08	19,289.31	6,429.77
2040	27,619.14	20,714.35	6,904.78
2041	29,025.96	21,769.47	7,256.49
2042	30,504.92	22,878.69	7,626.23
2043	32,059.74	24,044.81	8,014.94
2044	33,694.35	25,270.76	8,423.59
Total Design Life	4,02,345.41	3,01,759.05	1,00,586.35

5.3.2 COMPARISON SCENARIO MATRIX

201. The following matrix describes the comparison scenarios, including both environmental and social factors associated with the project. A comparison scenario of “with the project” and “without the project” is presented in **Table 5-3**.

Table 5-3: Comparison Scenario Matrix of With and Without the Project

Sl. #	Factors	With the Project	Without the Project
1.	Connectivity & Economic Growth	This will facilitate faster, safer economic links as the connectivity is improved and the commute time is also greatly reduced.	The current road system is insufficient for the increasing traffic, so it is congested and unable to provide adequate logistical support to the regional economy.
2.	Social and environmental conditions	Implementing this project will offer improved environmental and social conditions.	The existing road network is congested and insufficient to support the growing economic growth. It is burdening the existing environment and social conditions.
3.	Community health and safety	The improved junction will offer better and safer travel. Travel time will be less. There will be safe road crossings, foot-overs, etc. for the community people.	The existing junction is already congested with traffic and lacks proper public crossings, foot-overs, etc.
4.	Flooding and drainage	The upgrade intends to install necessary culverts, bridges, and drainage lines so that the natural flow of water is undisturbed. It will also decrease the chance of waterlogging due to excess rainfall.	Excessive rains lead to waterlogging due to inadequate drainage crossing.

Table 5-3: Comparison Scenario Matrix of With and Without the Project			
Sl. #	Factors	With the Project	Without the Project
5.	Traffic congestion	The proposed flyover will ensure smooth traffic flow and help keep it organized.	The existing roads are insufficient to support the increased traffic flows, which causes frequent congestion, time loss, and irritation.
6.	Topography and soil	The intersection is in flat terrain, so there is no impact on the existing topography and soil.	There is no impact on the topography and soil.
7.	Trees and vegetation	In this option, trees will be cut to meet the requirements of ROW. However, it is envisaged that the number removed will be planted three times. Trees in their juvenile stages will be replanted, which will be more beneficial to the environment.	There is no impact on the trees in the “Without Project” alternative.
8.	Wildlife and Aquatic Biology	There are no national reserved areas in the project area. Thus, the project will not impact the existing wildlife and aquatic biology.	The existing road system faces traffic congestion and waterlogging, which negatively impacts the local fauna.
9.	Climate	There will be a decrease in greenhouse emissions from vehicles, thus leaving a positive impact on global warming.	The current road network is causing higher levels of greenhouse gas emission from vehicles.
10.	Noise pollution	The project will provide noise barriers (trees/physical barrier) to protect the community from noise pollution.	The current roads are already congested with traffic and there are no noise barriers. Hence the community is impacted by noise pollution.
11.	Carbon emission (Table 5-2)	With project, a significant amount of decrease is anticipated in the carbon emission.	Whereas, without the project, with the increasing traffic flows, the level of carbon emission will also increase at an exponential Rate.
Thus, the preferred scenario is ‘With the Project’			

202. Overall, the quality of the environment and social conditions will deteriorate further if the ‘without project scenario’ is adopted with the present road condition. Thus, the preferred alternative is “with the project”

6 CONSULTATIONS, PUBLIC PARTICIPATION, AND INFORMATION DISCLOSURE

6.1 INTRODUCTION

203. Communicating and engaging with stakeholders is key to ensuring any development program's efficiency, responsibility, and clarity. Through discussion and involvement, people can participate in project activities, express their views, and share feedback on project design, planning, and implementation. Environmental Social Standards (ESS10) highlight the importance of honest and clear dialogue between project proponents and stakeholders. The E&S consultants carried out consultations and included their ideas and advice in the project design.
204. This section elucidates the diverse consultation methods, topics, and process outcomes. The consultant's consultation methods, public participation, and information disclosure are meticulously designed to be transparent and comprehensive. They encompass stakeholder consultation meetings, Key Informant Interviews (KIIs), Focus Group Discussions (FGDs), individual contact, etc. The consultations, conducted from May 7, 2024, to June 5, 2024, were aimed at preparing this ESIA and sharing all relevant information with the PAPs of the proposed Chachra Intersection, ensuring that all stakeholders are well-informed and involved.

6.2 OBJECTIVES

205. Public consultations aim to share relevant information about the project with the people and groups (including Common Property Resources (CPRs) and their communities and the beneficiaries) affected by or will benefit from the project. The information includes the following: (i) about the project, the need of the project, and project goals and benefits; (ii) major environmental and social impacts of land acquisition and resettlement for the project development; (iii) the risks, environmental and social impacts of the proposed intersection improvement; (iv) mitigation measures for environmental and social impacts as per environmental and social management plan; and (v) the scope and objectives of updating RAP and carrying out the RAP. The process has enabled stakeholders to voice their concerns, opinions, questions, and views on environmental and social impacts and suggested mitigation measures.

6.3 RELEVANT STAKEHOLDERS

206. **Primary Stakeholders:** The Primary stakeholders of the proposed development of Chachra Intersection Improvement are the project-affected persons (PAPs) and entities, including affected land owners (agricultural land, commercial and industrial land, pond, etc.), owners of affected structures on private or government land, owners of affected commercial and business enterprises, wage income workers, day laborer group, squatters, encroachers vulnerable persons and groups, women groups, disadvantaged groups, drivers and transport workers group etc.
207. **Secondary Stakeholders:** The people who have a great influence on the project are the secondary stakeholders, such as public administrators, local government representatives (Municipal Mayor, Councillor, and UP Chairmen, Members), Local Elites, teachers, imams, civil society people, influential personnel, and other people who have stakes in the project.

6.4 INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

208. A total of Fourteen (14) events, comprising two (2) stakeholder consultations, five (5) focus group discussions (FGDs), and seven (7) key informant interviews (KIIs), were conducted between April and May 2024. Focus groups and stakeholder consultation meetings for the Chachra Intersection were

attended by 226 individuals, comprising 150 men and 76 women, excluding the KII participant. Throughout the consultation process, the following topics were discussed with the relevant parties: Project objectives and benefits, Land acquisition (LA) and involuntary resettlement for proposed development, as well as the LA process, compensation process, issues of gender-based violence, human trafficking, and the need for skill development under the Livelihood Restoration Program for poor and vulnerable households. Influx of workers during construction, removal of trees to make way for road sections, impact on pedestrian safety, pollution and drainage due to movement of construction vehicles and equipment

209. Site and timings for stakeholder consultations, such as Focus Group Discussions and Key Informant Interview, was chosen using the design team's WeCARE RHD program road map. The stakeholders were informed of the locations, venue, date, and time via a variety of channels, such as direct conversations, announcements, attendance sheets of participants in focus groups, consultation meetings, and key informant interviews. The **Table 6-1** provides comprehensive details on the total number of participants, including the number of men and women.

SI. No	Place	Type of Meeting	Date	Time	Male	Female	Total Participants
1.	Chachra Bazar Market	SCM	08.05.2024	10.00 am	49	-	49
2.	Mujibpara, Chachra more, Jashore	FGD	21.05.2024	9.30 am	23	44	67
3.	Chachra more, Check post, Westside, Jashore	FGD	21.05.2024	11.30 am	38	01	39
4.	Paschimpara, Chachra, Jashore	FGD with Female Group	03.06.2024	4.30 pm	00	11	11
5.	Paschimpara, Chachra, Jashore	SCM	04.06.2024	3.30 pm	20	12	32
6.	Mondolgati, Chachra, Jashore	FGD	05.06.2024	9.30 am	19	01	20
7.	Uttarpara, Chachra, Jashore	FGD	05.06.2024	11.30 am	01	07	08
8.	Total of 7 KII conducted						
Total Participants					150	76	226

6.5 KEY INFORMANT INTERVIEWS (KII)

210. A total of Seven (07) KIIs with the Project Affected People (PAPs), Landowners, Structure owners, Lessee, Businessmen, Women Social institutions committee heads/representatives of management committees of Mosque, Madrasa, Schools, Colleges, Temples, graveyards, etc., in and around the project were conducted. KIIs are also organized with secondary stakeholders such as public administrators, local government representatives (municipal mayor, councillor, UP chairmen, members), local champions, influential personalities, and other people with stakes in the project. It is also explained to them that improved intersections will improve life quality and reduce road accidents and frequent congestion.

211. The opinions were sought from the stakeholders, and their opinions are as follows: -

- ▶ Expecting a guarantee of getting fair and hassle-free compensation

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- ▶ Local people anticipate that the enhancement will affect their living conditions positively through programs that restore their livelihood during the execution of RAP.
- ▶ Some of the older trees pose risks to their lives, especially in the monsoon season and cyclones. They agreed for the removal of such trees to be compensated, as well and a plantation of trees should be undertaken as per the rules and regulations

6.5.1 DETAILS OF KEY INFORMANT INTERVIEW

212. A total of 7 KII were conducted from May 8 to May 21, 2024, at the Chachra intersection area Jashore under phase -1. The information regarding the project was briefly discussed in the consultation meeting. The improvement of the Chachra intersection will improve transport and connectivity in the south western and western regions of Bangladesh. Meetings were conducted with Ward Commissioners, Executive Engineers, Government Officials, Project Displaced Persons (PDP), Local Leaders, Transport workers, Businessmen, the Fisheries department, BADC (Sach), and other local people. The discussions and issues raised by the concern are given in details with pictures in (Annex 6-1)

OUTCOME OF KEY INFORMANT INTERVIEWS

a) Concerns:

- ▶ 240 business structures and households are affected
- ▶ Loss of livelihood
- ▶ Loss of rented-out commercial structures built on own land
- ▶ Displacement from land, which may cause landlessness
- ▶ Road updating will affect social and environmental conditions. People will lose land, structures, businesses, fruit trees, mosques, and other establishments
- ▶ Trees need to be cut down
- ▶ Loss of CPR (2 masjid) & Public toilet
- ▶ Long-term social and environmental effects will result from not acquiring the land and not relocating the local population in the circle area in Chachra Intersection
- ▶ There is no proper drainage system to drain out the monsoon water
- ▶ The low-lying land is submerged by the downward-sloping waters of the Bhairav River due to lack of adequate drainage due to the high land in the north
- ▶ Surrounding the circle area (Intersection) will be a cause of long-term effects on the residential

b) Expectations:

- ▶ Fair/adequate compensation for lost commercial land and structures
- ▶ A suitable, durable, covered drainage system must be installed
- ▶ People shall be trained to develop skills
- ▶ Engaging poor and marginalized people in project activities
- ▶ Adequate lighting and ventilation shall be provided inside the circle
- ▶ A SMP must be developed to manage the intersection
- ▶ There should be sufficient entry and exit points along the Chachra Intersection Circle to facilitate movement.
- ▶ Tree Plantation

c) Opinions/suggestions:

- ▶ Keep provision for underpass or foot over the bridge for crossing students and the people who come for prayer in the mosque regularly,
- ▶ Suggestion for an effective drainage system and necessary bridge over the pool and culvert

- ▶ Simultaneous plantations will be needed.
- ▶ In this part, the natural drain flows and drains the Mukteshwari River.
- ▶ The channel needs to be re-excavated and connected to the Mukteshwari River so that all water can flow out of it to prevent flooding.
- ▶ The disturbance to the current drainage systems will pose environmental and social risks and impacts.
- ▶ An appropriate and sustainable drainage system should be implemented to mitigate the problems
- ▶ The toilet blocks should be included in the engineering design to lessen the impact of the Chachra Intersection improvement on the one affected toilet block
- ▶ A suitable drainage system with enough capacity to drain the local catchment storm water and sewage.
- ▶ To drain the water in this area, a methodical, long-lasting drainage system connecting to the Mukteshwari River must be constructed, completed with a walkway and cover
- ▶ The current roadway shall be extended to facilitate vehicle traffic flow
- ▶ To ease the traffic bottleneck, turning point shall be made wider
- ▶ FOB and POP must be constructed in front of the bazaar, school, and college areas to ensure people's and students' safe mobility.
- ▶ The street should have an adequate lighting system.
- ▶ To prevent water logging during rainy seasons, the water must be drained using the proper drainage system
- ▶ There should be a noise barrier and retaining wall to mitigate the impacts due to project operation phase.
- ▶ There should be a footpath around the Chachra Improved section.
- ▶ Passenger shelter with separate restrooms for men and women
- ▶ Plant trees to reduce pollution and create a good landscape.
- ▶ Land acquisition will bring long-term benefits to the intersection
- ▶ It would be beneficial to clear space around the circle and add a green space or recreational area.

6.6 FOCUS GROUP DISCUSSIONS (FGDS)

213. Focus Group Discussions (FGDs) were carried out with the group of project's affected people, including different groups such as disadvantaged/vulnerable people, women-headed HHs, daily labourers, farmers, businessmen, etc. A summary of these discussion with different groups is presented in section 6.6.1.

6.6.1 SUMMARY OF FOCUS GROUP DISCUSSIONS

214. Five focus groups involving men and women participants were held in Notun para, Chachra more, Hotath para near Chachra Intersection, Paschim para, Mondolgati & northside of Pashim para. The participants included Project Affected Persons (PDPs), Project Affected Households (PAHs), Project Displace Common Property Resources (PDCPR) owners, and other affected individuals. The consultant gave them a standard briefing on the project's goal, advantages, social and environmental risks, and mitigating measures.

215. There were 145 participants, 81 men and 64 women, representing different groups. Through consultation with various stakeholders and local communities, the consultant shares the project's GBV risks with relevant parties and explores potential risks and ways to mitigate gender-based violence (GBV). It has been discussed that men commit most gender-based violence against women and girls. It was also said that during the construction phase, the Grievance Redress Mechanism (GRM) will be implemented to ensure that all complaints about GBV are received, recorded, and investigated at every level. The opinions were sought from the participants, and their opinions are as follows:

- ▶ The existing canal naturally drains storm water and wastewater to the Mukteshwari River.
- ▶ A hassle-free compensation package for their properties was what the beneficiaries' group demanded.

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- ▶ The attendees insisted on having a secure alternative route for their daily travel during the construction work
- ▶ The project's activities must not cause water logging in the areas where they live
- ▶ A sustainable drainage system and culverts need to be built to drain the flooded water
- ▶ During the construction phase, it is necessary to guarantee the safety and security of women workers.
- ▶ Participants who were women were asked to have a designated area in the passenger shed for nursing. Men's and women's toilets facing the opposite way
- ▶ Skill development training for the impoverished, etc., was demanded
- ▶ The attendees requested that overpasses and underpasses be built in the Bazar and school areas to prevent traffic accidents and facilitate easy crossing
- ▶ It is important to take road safety into account
- ▶ Employment opportunities for low-income and marginalized women need to be considered.
- ▶ Benefits for missed wages and payments before relocation
- ▶ Disposing of wastewater and sewage from residential households in the canal
- ▶ Noise barrier for noise pollution and regular water spray for dust pollution must be in place
- ▶ Equal wages for men and women.

216. The details of FGDs including photographs and participants list are given in **Annex 6-2**.

6.7 SITE VISIT OF THE AREA BEFORE STAKEHOLDER CONSULTATIONS

217. The team of environmental and social (E&S) consultants undertook site visits to assess the existing conditions and issues associated with the proposed project before conducting the meeting with the stakeholders.

6.7.1 OUTCOMES OF THE E&S CONSULTANT FIELD VISIT

218. The objectives of the field visit were to (i) observe an unconcealed drainage system along the Chachra Intersection area; (ii) explore whether any public toilets will be affected due to the construction of the Chachra Intersection and to undertake mitigation measures; and (iii) to hold and facilitate stakeholders' consultation meetings to disclose the relevant information about the proposed alignment of improvement of the Chachra Intersection from the Zero Point of the Chachra Intersection area. Details with pictures are presented in **Annex 6.3**.

6.8 STAKEHOLDER CONSULTATIONS

219. The stakeholder consultations were carried out between 8 May 2024 and 4 June 2024 at Chachra in the District of Jashore, along with the proposed Chachra intersection alignment. Total number of participants who attended the meeting was 81. Information on venue, date, and participation of stakeholders is presented in **Table 6-2**. The photographs of stakeholder consultations are shown in **Figure 6-4**

Sl.No	Venue	Date	Time	Participants
1.	Chachra Bazaar Committee	08/05/24	10.00 am	49
2.	Chachra Intersection (in the circle)	04/06/24	3.30 pm	32

6.9 DISSEMINATION OF PROJECT RELATED INFORMATION

220. The R&R Specialist briefed stakeholders about the purpose of the Chachra Intersection Project at a stakeholder consultation meeting held at the aforementioned venue. They provided information about the project's importance as it will be linked with Benapole Jashore/Khulna/Mongla Sea Port/Bagerhat/Barisal Highway, Bhanga Jashore Highway, and Jashore Jhenaidah Highway.

a) Land Acquisition Impacts and Issues:

221. The consultant briefed the meeting regarding the Chachra Intersection Project's land acquisition, impacts, and forced relocation. The Project will require the construction of 29.7838 acres of land, comprising 13.7735 acres of private land and 16.0183 acres of government land. In Paschimpara, the participants of the meeting were also informed that the government would not be purchasing the land inside the circle.

b) Social and Resettlement Impacts, Risks and Mitigation Measures:

222. Acquiring land in the Chachra Intersection area will impact individual buildings, homes, businesses, and other entities, such as community property resources (CPRs), two mosques, and one public restroom. The project's RPF, which was prepared and approved following WB's ESF and ESS5, will be used to determine compensation for affected land, homesteads, and waterbodies, including ponds, structures, trees, CPRs, etc.

223. The following information was disseminated in the consultation meeting:

- Briefed about the We CARE project and the Importance of the proposed development of the Chachra Intersection

- ▶ An integral portion of this highway is the Chachra intersection, which is situated in a key strategic location
- ▶ Chachra Check post provides easy access to Benapole and Bhomra land ports, Satkhira District Road, and Mongla. In addition, Jhenaidah, Kushtia, Pabna, Rajshahi, Sirajganj, Chalna Samudrabandar Road, Dhaka City Road, and Dhaka Road can be reached.
- ▶ The improvement of the Chachra intersection will improve transport and connectivity in south western and western regions of Bangladesh
- ▶ Development of Chachra Intersection will bring a positive social and economic benefit
- ▶ To ensure the security of individuals within the circle, a retaining wall will be built around it
- ▶ The ITS will provide the opportunity for authorities to take necessary action, such as the availability of ambulances within shorter time, police patrolling, etc.
- ▶ The traffic bottleneck will lessen if the road is widened
- ▶ The number of accidents will reduce significantly
- ▶ The government intends to refrain from acquiring the land inside Chachra West Para since it will be inside the circle.

6.10 LAND ACQUISITION IMPACTS AND ISSUES

224. It was discussed in these stakeholders' consultation meetings that there would be the acquisition of 25.456 acres of land for implementation of the Chachra Intersection as additional assignment in Phase 1 of the WeCARE program. Land acquisition will affect persons, households, businessmen, business enterprises, and some other entities, including Common Property Resources (CPRs), such as mosques, madrasahs, temples, schools, colleges, etc. Types of losses include the following:

- ▶ Loss of residential and commercial lands
- ▶ Loss of residential and commercial structures
- ▶ Impact on the two affected mosques (1. the Chachra Bazar Jame Mosques, and 2. the Jame Mosque at the Chachra Check Post)

a. Social and Resettlement Impacts, and Risks and Mitigation Measures:

225. Proper compensation will be paid to the landowner, homesteads, affected waterbodies, structures, trees, CPRs, etc., to be acquired. This disbursement will be made per the GoB rules and WB's ESS 5 on involuntary resettlement, as clarified in the project's Resettlement Policy Framework (RPF). The social development and resettlement consultant narrated the Regulatory Framework and Guidelines of the GoB and WB to the stakeholders. The affected persons and entities will be compensated for the losses they will incur due to the implementation of the project. The titled PAPs will be paid by the DC office, whereas that non-titled PAPs will be paid through RHD

226. For an efficient and proper disbursement of compensation money, the following papers/documents is to be produced to collect compensation money from the DC office

- ▶ A PAP-owned property by inheritance should produce the documents (i) Succession (warishan) certificate, (ii) Porchas, (iii) Khatian, (iv) Mutation (Namjari), (v) Tax token (updated) and DCR
- ▶ A businessman will be needed an up-to-date Trade License and e-TIN
- ▶ A businessman running his establishment in a rented land/structure must produce a "Deed of Agreement" with the owner in a 300-taka valued non-judicial stamp
- ▶ A PAP owning a building needs to submit the approved structural Design and Plan from the concerned authority
- ▶ The DC Office will assess the compensation money for the structure, and it will be based on the rules and regulations set by GoB (PWD schedule of rates)

b. Resettlement and Rehabilitation Specialist of E and S Consultant firm briefed that:

- ▶ Compensation will be paid by the concerned DC office to PAP for their incurred losses for the land, structures, business, ponds, crops, and that of schools, colleges, mosques, Madrasa, Mandir, and graveyards will be paid to the committee. This compensation contract will be paid as per the “Entitlement Matrix of RAP”
- ▶ A joint verification committee (JVC) will finalize the ownership, volume, and valuation of the affected properties
- ▶ The Property Valuation Assessment Committee (PVAC) will determine the Replacement Value (RV) of land, structures, trees, crops, etc.
- ▶ The Records of Rights (ROR), including all the documents for affected property ownership, must be updated before submitting the same to the DC Office for drawing compensation

6.11 ENVIRONMENTAL IMPACT ISSUES

a. Environmental Impact Assessment and Mitigation Measures

227. The consultant has included the following environmental issues in the updated ESMP.

- ▶ Steps to be taken to save the terrestrial flora and fauna and to uphold biodiversity in the locality
- ▶ Maintain occupational health and safety during the pre-construction and construction period
- ▶ Steps to be taken to mitigate environmental degradation

228. The following issues and their mitigation measures were discussed

- ▶ The intensity of sound level should be within the acceptable/tolerable limit during the construction period
- ▶ The dust generated from the vehicles and stone/brick crushers will be minimized. It will be done by spraying water. The crushing machine shall be located far from the locality
- ▶ Trespassing will be strictly prohibited through the construction site and yard. It will be done by fencing and deploying the guard
- ▶ Ensuring the occupational health and safety (OHS) measures by providing PPE, first aid box, sanitization, and sanitation. Supply of potable water and a separate latrine facility for men and women workers will be ensured at the labour shed. Gender-based violence (GBV) and sexual exploitation abuse and harassment will be strictly controlled through the measures suggested in RAP and updated ESMP
- ▶ To facilitate smooth drainage of storm water, a proper drainage facility will be provided along the side of the road
- ▶ Adequate hydraulic structure will be provided as and where necessary
- ▶ An Underpass and/or foot-over bridge will be provided to facilitate the movement of mass people together with the school and college-going students
- ▶ Prevent negative environmental effects to preserve biodiversity.
- ▶ Developing a strategy for managing biodiversity and establishing saplings
- ▶ Social Management Plan (SMP) for the circle area
- ▶ Enough exit and entry points,
- ▶ Double-guard the retaining wall to avoid accidents.
- ▶ Traffic Management Plan (TMP) preparation.

6.12 OUTCOMES OF THE STAKEHOLDERS' CONSULTATION MEETINGS

229. The consultant briefed the meeting regarding the Chachra Intersection Project's land acquisition, impacts, and forced relocation. The Project will require the construction of 29.7838 acres of land, comprising 13.7735 acres of private land and 16.01103 acres of government land. In Paschimpara, the meeting participants were informed that the government would not purchase the land inside the circle.

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230. An open forum was arranged where the stakeholders expressed their opinions and views. They also provided remedial suggestions on adverse environmental and social issues. The meaningful discussion such as were water logging, decreasing wastewater drains, including rainwater, and cutting down old trees. The details and list of participants are included in **Annex 6-4**.

6.13 VISIT TO HERITAGE

231. The consultants visited the Chachra Shiva Temple, Chachra Rajbari, Martyred Graveyard, and Child Development Center. Details are presented in **Annex 6.5**.

6.14 INFORMATION DISCLOSURE

232. Primarily, information on the project was disclosed verbally (without any formalities) during initial public consultations during the studies on safeguards. The E&S consultant and implementing agency RHD-PIU will conduct several public consultations and further hearings with the local affected people. Disclosure of information will be continued until the finalization of the whole project design. It is essential to continue this consultation process to ensure that the community remains supportive and fully informed of progress, particularly before and during the construction period. In addition, the community will be given information on the grievance redress mechanism, and regular meetings with the community will be held in the future. Once the project has been approved and a construction program has been defined, further community meetings must be held to provide details of the construction program and to give information on the grievance redress committee. Thus, the consultation process will remain integral to Project management and implementation.
233. **Disclosure of ESIA:** The approved EISA will be disclosed on RHD and World Bank external websites. Many of the community may not have access to the internet; therefore, face-to-face meetings and hard copies of the ESIA report and its summarized form in English and Bangla language must be made available to the local communities or other interested stakeholders. Both summarized reports will briefly present (i) the Project impacts, (ii) mitigation measures and entitlement matrix, (iii) grievance redress mechanisms, and (iv) the institutional framework for Project implementation.

7 ENVIRONMENTAL AND SOCIAL IMPACTS, RISKS AND MITIGATION MEASURES

7.1 GENERAL

234. The objective of identifying impacts and risks on the natural and social environment is to formulate mitigation measures against adverse impacts associated with project activities for effective implementation to help the sustainable development of the Chachra Intersection project. The interventions of the proposed project will have many impacts on the environment during the implementation stages. Construction is not an environment-friendly process by nature; construction and operations, directly and indirectly, impact the environment. The impacts on the natural environment (physical and ecological resources) and social environment (economic development and social and cultural resources) will be either adverse or beneficial. Some of the adverse impacts can be attributed to the construction activities in the projects, even though they are short-lived. The common parameters to qualify an impact are its duration of existence, spatial extent, and ability to reverse and mitigate. Potential negative and positive environmental and socioeconomic impacts are assessed in coordination with the Engineering Design Team. The impacts are defined based on the project activities for all phases of the project cycle, i.e., they will likely occur during the project's pre-construction, construction, and operation phases. These impacts may be direct, indirect, and cumulative.
235. This chapter deals largely with likely adverse impacts and the proactive mitigation measures to be implemented during the implementation stages. This approach is designed to make the project environmentally sustainable and friendly, reassuring stakeholders and instilling confidence in the project's sustainability.

7.2 IMPACTS AND RISK SCREENING

236. The environmental and social anticipated impacts are screened to determine their level of significance without mitigation during the project design and pre-construction phase, construction phase and operation phase based on the baseline condition of the project area

7.2.1 METHODOLOGY

237. The methodology of assessing environmental impacts from the project includes identifying the environmental components that will be impacted, type of impacts, assessment area where the impacts will be felt and defining the criteria for assessing the significance of each type of impact. After defining these aspects, a screening of project impacts during design and pre-construction, construction, and operation stages was carried out to identify the minor, moderate, and major impacts to guide the development of mitigation measures and ensure that there are no or minimal residual impacts. A detailed environmental and social management guideline has been incorporated in Chapter 10 (ESMP) of the ESIA.

- ▶ **Identification of Impacts:** The significant Valued Environmental Components (VEC) or Important Environmental Components (IEC) of the physical, biological and social environments have been identified as are at risk of being impacted by the project.
1. **Type of Impact on the VECs:** The type of impact can be described as:
 - ▶ Positive: - Improvement in the quality of the VECs because of the project,
 - ▶ Negative: - Degradation or reduction in the quality of the VECs because of the project and
 - ▶ Neutral: - No noticeable change in VECs
 2. **Area of Impact Assessment:** The area covered for assessing direct impacts is proposed RoW and 500 m Corridor of Impact (CoI) for assessing the indirect impact of the project This covers 250 m on either side of the centerline studied for direct impacts.
 - ▶ The significance of impacts is defined according to their severity, physical extent and effect duration as the following terms.

- ▶ **Impact Severity/Magnitude:** The severity or seriousness of an impact entails understanding the consequence or risks posed by the impact. This is a subjective criterion, which is defined as major or high, moderate or medium and minor or low.
 - Major = inability of the environment to recover from the damage, and degradation is permanent and fully degrading a habitat e.g., wetland filling, or clear cutting of trees/ Social permanent disruption
 - Moderate = recovery is slow with 40% recovery possible but taking >1 year
 - Minor = entire affected component recovers within one season/Social impact barely noticeable
- ▶ **Impact Physical Extent:** The area of impact entails the spatial scale of impact on one or more of the VECs. The terms limited, local and regional are used to describe the extent of impacts.
 - Major = negative impact can be measured at least 2 times distance beyond the immediate COI boundary
 - Moderate= impact extends beyond the immediate project area, but recovery is expected once work is done within one growing season; or for the social component, once compensation is delivered
 - Low or Minor= localized effect and recovery is very high
- ▶ **Impact Duration:** This indicates the time dimension of the impact on the VECs. The terms permanent, temporary and short-lived describe the duration of impact.
 - Major or Long Term= the impacts are felt throughout the life of the infrastructure. Highly destructive or extending through at least 1 life cycle if an indicator species affected
 - Moderate= impact not extending to one Lifecycle and not impacting reproductive cycle or life necessity or very intermittent
 - Minor or Short Term= Short term or Temporary but measurable change
 - Negligible= observed change but measurable impact lasts less than 24 hours, with impacts well within national standards or documented threshold for damage.

7.2.2 SCREENING OF THE ANTICIPATED IMPACTS

238. In this ESIA study, the anticipation and identification of the significant VEC parameters is carried out based on the existing environmental condition and following the existing policies, laws, and administrative framework applicable to the Chachra Intersection project and relevant environmental and social safeguards policies of the World Bank. The impacts are identified according to the development stages, namely the pre-construction, construction, and operation stages of the Project in compliance to the World Bank's Environmental Social Safeguard Standard as follows:

- ▶ Related to Assessment and Management of E&S risk and impact (ESS 1)
- ▶ Relating to Labor and Working Conditions (ESS 2)
- ▶ Relating Resource Efficiency and Pollution Prevention and Management (ESS 3)
- ▶ E&S risks and impacts relating to Community Health and Safety (ESS 4)
- ▶ Related to Land Acquisition/Involuntary Resettlement (ESS 5)
- ▶ Relating to Biodiversity & Living Natural Resources (ESS 6)
- ▶ Tribal/Indigenous Population (ESS 7)
- ▶ Related to Impacts on Cultural Heritage (ESS 8)
- ▶ Stakeholder Engagement and Information Disclosure (ESS10)

239. The anticipated environmental impacts are screened to determine their significance level without mitigation during the project design and pre-construction, construction, and operation phases are shown in **Table 7-1**. This screening was carried out based on the rating criteria identified by the significance of impacts (by the color of the cells in the last column of the table), those need to be mitigated during different implementation phases of the project. Major and moderate impacts have been given priority for identification of adequate mitigation measures to ensure that they are minimized or taken up with no residual impacts.

Table 7-1: Environmental and Social Impacts Screening During Project Implementation Phases as Without Mitigation Measures Sceneries

VEC	Impact/Activity	Project Stage	Duration	Area	Severity	Significance of Impact
1. Physical Environment (Compliance of WB's ESS 3-Resource Efficiency and Pollution Prevention Management and Bangladesh ECR 1997)						
1.1 Air Quality	Location of project road alignment	D	+ve, P	+ve, L	+ve, Me	+ve, Mi
	Dust, PM, emissions from construction equipment and vehicles, transportation and storage of materials,	C	-ve, T	-ve, L	-ve, Me	-ve, Mo
	Emissions from road traffic	O	+ve, P	+ve, R	+ve, Lo	+ve, Mi
1.2 GHG Emissions	Emissions from construction equipment and vehicles	C	-ve, T	-ve, L	-ve, Me	-ve, Mo
	Emissions from road traffic	O	+ve, T	+ve, R	+ve, Lo	+ve, Mi
1.3 Hydrology and Surface Water Quality	Alteration of rivers/streams for construction of cross structures and drains	D	-ve, T	-ve, R	-ve, Me	-ve, Mo
	Pollution from liquid and solid waste disposal from camps and construction activities, Extraction of water for construction works and use in camps	C	-ve, T	-ve, L	-ve, Me	-ve, Mo
	Siltation in receiving water bodies due to construction of bridges and culverts activities /earthworks	C	-ve, P	-ve, R	-ve, H	-ve, Ma
	Leakage of oil and grease from vehicles and equipment	C	-ve, T	-ve, L	-ve, Me	-ve, Mo
	Accidental oil spillage of vehicles	O	-ve, P	-ve, R	-ve, H	-ve, Ma
1.5 Ground Water Quantity	Pollution from liquid, solid waste from camps/construction activities	C	-ve, T	-ve, L	-ve, L	-ve, Mi
	Extraction of ground water for construction works and use in camps	C	-ve, T	-ve, L	-ve, Me	-ve, Mo
1.6 Land degradation/pollution	Opening of borrow area and quarries	D	-ve, P	-ve, L	-ve, Me	-ve, Mo
	Disposal of Solid waste from construction works and camps, muck disposal	C	-ve, T	-ve, L	-ve, Me	-ve, Mo
	Contamination of soil due to leakage/ spillage of oil, bituminous, and non-bituminous debris generated from demolition and road construction and non-bituminous debris generated from demolition and road construction	C	-ve, P	-ve, L	-ve, Lo	-ve, Mi
	Contamination of soil due to leakage/ spillage of oil due to road	C & O	-ve, P	-ve, L	-ve, Lo	-ve, Mi

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Table 7-1: Environmental and Social Impacts Screening During Project Implementation Phases as Without Mitigation Measures Sceneries						
VEC	Impact/Activity	Project Stage	Duration	Area	Severity	Significance of Impact
	accidents					
2. Biological Environment (Compliance of WB's ESS 6- Biodiversity-Conservation and Sustainable Management of Living Natural Resources and Bangladesh ECA 1995)						
2.1 Trees/Forest/ Terrestrial Vegetation	Removal of trees, shrubs and grasses	C	-ve, P	-ve, L	-ve, Me	-ve, Mo
	Growth of the compensated trees and additional plantation and development of grassland for improvement of GIB habitat	O	+ve, P	+ve, L	+ve, Me	+ve, Mo
2.2 Terrestrial fauna (Mammals, Birds, Insects etc.)	Accidents of wild mammals/birds/insects	D	-ve, P	-ve, L	-ve, Lo	-ve, Mi
		C	-ve, P	-ve, L	-ve, Lo	-ve, Mi
		O	-ve, P	-ve, L	-ve, Lo	-ve, Mi
2.3 Migratory birds and ecologically important areas	Habitat Loss and disturbance in feeding, breeding and migration of birds	C	-ve, T	-ve, L	-ve, Me	-ve, Mo
	None	O	N	N	N	N
3. Social Environment (Compliance of WB's ESS 5- Land Acquisition and Involuntary Resettlement)						
3.1 Private land and buildings	Location requiring removal of private structures/buildings	D	-ve, P	-ve, R	-ve, H	-ve, Ma
	Acquisition of private land. Demolition of private buildings. Possible complaints, opposition from disgruntled or unhappy affected persons	C	-ve, P	-ve, R	-ve, H	-ve, Ma
	Increase in value of land and property. Easier access to some areas and property.	O	+ve, P	+ve, L	+ve, H	+ve, Ma
3.2 Public property/infra structure/ utility structures	Location removal of public structures/buildings and utility structures	D	-ve, P	-ve, L	-ve, M	-ve, Mo
	Demolition of public buildings. Removal and shifting of utility structures. Possible complaints from local public due to disruption of utility services	C	-ve, P	-ve, L	-ve, H	-ve, Mo
4. Ethnic Group (Compliance of WB's ESS 7- Indigenous Peoples and Traditional Local Communities)						
4.1 Affected ethnic minority or indigenous people	Project will not have ethnic minority PAPs, thus no impact on indigenous peoples, their traditional culture, land resources and territories. It does not require to adopt FPIC process.	C & O	N	N	N	N

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Table 7-1: Environmental and Social Impacts Screening During Project Implementation Phases as Without Mitigation Measures Sceneries						
VEC	Impact/Activity	Project Stage	Duration	Area	Severity	Significance of Impact
5. Tradition, Culture and Ethnicity (Compliance of WB's ESS 8-Cultural Heritage and CRPs)						
5.1 Removal of cultural heritage	Cultural Heritage, Archaeology and CPRs	C & O	N	N	N	N
5.2 Noise	Location near residential areas, sensitive receptors (places of worship, hospitals, educational institutes, cultural/heritage sites etc.)	D	-ve, P	-ve, L	-ve, Me	-ve, Mo
	Disturbance caused to local residents from noise generated from construction activities, campsite activities using heavy equipment, movement of heavy-duty trucks during day and night time. Noise levels exceeding standards. Complaints from local residents near construction sites.	C	-ve, T	-ve, L	-ve, Me	-ve, Mo
	Noise levels exceeding baseline levels by more than 3dBA and causing disturbance to residents and sensitive receptors near project alignment	O	+ve, P	+ve, L	+ve, Lo	+ve, Mi
5.3 Vibration	Location near residential areas, sensitive receptors (places of worship, hospitals, educational institutes, cultural/heritage sites etc.)	D	-ve, P	-ve, L	-ve, Lo	-ve, Mi
	Vibration disturbance felt by local residents due to construction activities using heavy equipment and movement of heavy-duty trucks during day and night time.	C	-ve, T	-ve, L	-ve, Lo	-ve, Mi
6. Labor Management (Compliance of WB's ESS 2- Labor and Working Conditions and Bangladesh Labor Act 2006; Rules 2015)						
6.1 Occupational health and safety	Death, accident or injury of construction workers, due to poor safety standards. Illness of construction workers due to poor hygiene, health and sanitary facilities at the construction sites and camp sites.	C	-ve, T	-ve, L	-ve, H	-ve, Ma
	Accidents, injuries to operational staff	O	-ve, T	-ve, L	-ve, Lo	-ve, Mi
7. Community Awareness and HSE (Compliance of WB's ESS 4- Community Health and Safety and Bangladesh Labor Act 2006; Rules 2015)						
7.1 Public health and	Design of road safety features	D	-ve, P	-ve, L	-ve, H	-ve, Ma

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Table 7-1: Environmental and Social Impacts Screening During Project Implementation Phases as Without Mitigation Measures Sceneries

VEC	Impact/Activity	Project Stage	Duration	Area	Severity	Significance of Impact
safety	Dust and air pollution	C	-ve, T	-ve, L	-ve, H	-ve, Ma
	Accident/injury/death of local public living or moving near the project construction/camp sites due to poor safety standards. Illness of project construction/camp sites, mosquito breeding due to poor camp management, excessive dust/air pollution caused by project related activities. Traffic jams and accidents caused by project related activities.	C	-ve, T	-ve, L	-ve, H	-ve, Ma
	Accident, injury or death of public using the road. Health problems caused to people residing near road due to increased noise and air pollution	O	-ve, P	-ve, L	-ve, H	-ve, Ma
8. Stakeholder Management (Compliance of WB's ESS 10- Stakeholder Engagement and Information Disclosure)						
8.1 Stakeholder Disclosure	Assess stakeholders interest and support for project and ensure stakeholders' views to be taken into account in project design	D	+ve, P	+ve, L	+ve, Lo	+ve, Mi
8.2 Engagement of Local People	Promote and provide means for effective and inclusive engagement with project-affected parties throughout the project life-cycle	C	+ve, P	+ve, L	+ve, Lo	+ve, Mi

Note: +ve = Positive Impact; -ve = Negative Impact; H = High; Lo=Low; Medium = Me; AG = Above Ground; D = Design & Pre-Construction Stage; C = Construction Stage; O = Operation Stage; N = Neutral; PC = Pre-Construction; VEC = Valued Environmental Component; P = Permanent; T = Temporary; L = Localized/Limited; R = Regional; Mi = Minor; Mo = Moderate; Ma = Major.

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7.3 IMPACTS AND MITIGATION DURING DESIGN PRE-CONSTRUCTION PHASE

7.3.1 IMPACTS ON DESIGN CONSIDERATION

240. The design stage requires surveys, field investigations, meetings, and desktop work for designing the project. Thus, no major impacts on the existing environment are envisaged. Similarly, the pre-construction stage pertains to the mobilization of the Contractor, the Construction Supervision Consultant (CSC), the engagement of the NGOs to support RHD in the implementation of the Resettlement Action Plan, and Land acquisition work. However, before mobilization of the Contractor, RHD needs to undertake various activities to provide encumbrance-free alignment, which involves the demolition of structures, tree cutting, utility shifting, and compensation to be paid to the project-affected persons (PAPs), etc. Some of the activities do not require any specific mitigation, but some activities require mitigation measures.
241. **Project Design Specifications:** Design parameters and construction planning may negatively affect infrastructure operations, such as the degradation of natural systems like drainage, contamination caused by the mismanagement of construction waste, etc. Improper Project's geometrical improvement and pavement designs, realignment locations, sitting of construction/labor camps and other associated infrastructures, not the least of them being human waste draining into the river, construction methods applied can have significant impacts on the biophysical, economic, and socio-cultural environments of the project area at Chachra Intersection. The natural hazards and climate change risks are also concerns in designing due to damage of the pavement, like rutting, embrittling, softening road migration of liquid asphalt, thermal expansion in bridge joints, etc.
242. In addition, the project area's seismicity could significantly affect heavy infrastructures like VOP, POP, flyover, and drainage structures, particularly bridges. Therefore, the impacts on the design considerations are significant.

Mitigation Measures

- ▶ Considering the area's hydrology, adequate drainage structure will be provided.
- ▶ Culverts of adequate spans have been provided to meet the requirement of animal crossing
- ▶ Issues about Pedestrian safety and road safety measures have been addressed by providing vehicular underpass, pedestrian passes (POP), Flyovers, etc
- ▶ Ensure road design, embankment height, and Pavement design to comply with the relevant international and national approved design manual of RHD Geometric Design Standards Manual (Revised-2005); AASHTO "A Policy on Geometric Design of Highway and Streets" 2001, etc
- ▶ The Bangladesh National Building Code (BNBC) should be considered for designing of road infrastructures, particularly all building structures

7.3.2 ACQUISITION AND CLEARANCE OF PRIVATE STRUCTURES

243. The total amount of land to be acquired is 25.456 acres, out of which 9.4457 acres is Private Land and 16.01103²⁸ acres is RHD Land. According to the census, IOL, and socioeconomic survey conducted from March 2024 to April 2024, 1007 people belonging to the 237 households (HHs) will be affected.
244. Table 7-2 shows that total male population is 535, total female population is 472 and total population is 1007. Total affected HHs is 237.

Table 7-2: Household and Population Distribution			
Population			HHs No
Male	Female	Total	
535	472	1007	237

²⁸ Yet to finalize

245. The distribution of affected population and HHs losing 27 residential structures, 36 commercial structures and 33 residential- cum-commercial structures are presented in detailed in **Table 7-3** below.

Table 7-3: Contract Wise Total TH, NTH and Encroacher Households Losing Residential, Commercial and Residential-cum-Commercial Primary Structures												
HHs Losing Residential Structures				HHs Losing Commercial Structures				HHs Losing Residential-cum-Commercial Structures				Grand Total
Title Holder HHs	Non-Title Holder HHs	HHs identified as encroachers	Total	Title Holder HHs	Non-Title Holder HHs	HHs identified as encroachers	Total	Title Holder HHs	Non-Title Holder HHs	HHs identified as encroachers	Total	
25	2	0	27	25	8	3	36	32	0	1	33	96

Mitigation Measures

- ▶ Implement Land Acquisition Plan (LAP) and updated Resettlement Action Plan (RAP) of the Project prepared in compliance with the national Acquisition and Requisition of Immovable Property Act (ARIPA),1982, amended ARIPA, 2017.
- ▶ Payment of Cash Compensation under Law (CCL) to the PAPs by DC to compensate the impacts due to loss of lands, structures, ponds, trees, standing crops etc.
- ▶ Payment of compensation to Titled and Non-Titled households according to the entitlement matrix defined in the updated RAP by the RAP Implementing Non-Government Organization (INGO) on behalf of RHD
- ▶ Payment of Top UP (Replacement Value (RV)/Cost minus CCL where RV is higher than CCL) by RHD facilitated by INGO.
- ▶ Provide the resettlement benefits to the affected disadvantaged, marginalized, and vulnerable households to restore their livelihood by implementing the Livelihood Restoration Plan as documented in the updated RAP
- ▶ Proper compensation will be given for the loss of water bodies and trees by DC/RHD with assistance from INGO.
- ▶ Ensure adequate compensation will be provided to the Project Affected Persons (PAPs) on time and without any hassle.
- ▶ Affected HHs will be given cash compensation for the land and structures, as well as additional transfer grants for the relocation of each structure.
- ▶ The cash assistance will be provided, as per assessed value for dismantling and reconstruction.
- ▶ Vulnerable groups should be identified, and provisions made for social and economic development support, employment, and means of subsistence to improve their status/livelihoods.
- ▶ The project's Grievance Redress Committees (GRCs) will ensure participation and speedy, out-of-court settlement of as many disputes as possible.

7.3.3 ISSUES FROM STAKEHOLDER CONSULTATIONS

246. Two consultation meetings were carried out in the project-affected areas in the Jashore district. Participants raised their concerns about the adverse impacts that may arise due to i) land acquisition, compensation, relocation options, cutting of trees, etc., and whether any provision of resettlement and special benefits for the disadvantaged, marginalized, and vulnerable households and groups of the project is there or not. ii) anticipated environmental pollution like dust and noise generation, water pollution, etc. due to construction works iii) expected community exposure to water-borne, water-based, water-related, and vector-borne diseases, and communicable and non-communicable diseases, and COVID-19, which could result from project activities, iv) road safety at the major and minor roads intersections, bazar areas and sensitive structures, v) improper labor management, occupational health and safety, and their risks during construction works were the grave concerned.

247. In addition, the participants raised the adverse impacts on the communities residing alongside the project alignment due to sexual exploitation and Abuse (SEA), sexual harassment (SH), and Gender-Based Violence (GBV). The participants were concerned about the safety of the women passengers in the public buses during the project's operation if proper highway safety is not ensured by the competent authorities.

Mitigation Measures

- ▶ Different issues pertaining to compensation of land acquisition, loss of structures and assets as well resettlement and rehabilitations (R&R), etc. has been discussed in the meetings which are presented in detail in the RAP to be implemented in the projects
- ▶ It was ensured that the compensation for impacts on infrastructure will be provided in accordance with Entitlement Matrix of the Resettlement Action Plan (RAP).
- ▶ It was ensured that the proper designing of vehicle overpasses, pedestrian overpasses, foot overpasses, bus bays, etc. are considered by Technical Design Team, based on the outcomes of the consultations regarding the road safety.
- ▶ Mitigation measures for various impacts of the project shall be included in the CESMP which will have but not limited to the following:
 - Ensure implementation of mitigation measures suggested in ESMP (B4 through B6 and B13 through B-15 of Chapter 10) at site to control the environmental pollution.
 - Specific mitigation measures for risks and impacts which can be encountered by the laborer's are included in Labor Management Plan.
 - The Waste Management Plan will ensure sound environment.
 - Construction and Demolition waste, Liquid Waste Management Plan, and Hazardous Waste Management Plan shall be in place
 - Workers' Camp Management Plan, Community Health and Safety Plan, Traffic Management Plan and Training schedule of staff shall be in place
- ▶ Community Health and Safety
 - For community health and safety, the contractor shall plan activities in residential areas after having a discussion with the community
 - Locals shall be informed about the activities the contractor is taking up in their areas.
 - Excavated areas shall be properly barricaded.
 - Trespassing of construction sites/construction camps/labor camps shall be prohibited.
 - OHS Plan: the prevention and management of HIV/AIDS and other STIs as suggested in B-22 of Chapter 10, and COVID-19 Prevention Measures Plan shall be implemented
 - Contractors shall take all precautionary measures to prevent community exposure to water-borne, water-based, water-related, and vector-borne diseases and communicable and non-communicable diseases that could result from project activities.
- ▶ Control of accident
 - Trained drivers having valid licenses shall be allowed to drive construction vehicles/heavy equipment.
 - The speed and fitness of the construction vehicles/equipment shall be defined in the contractors' ESMP.
 - Vehicles/construction equipment need to be maintained and inspected/tested regularly,
- ▶ Highway Petrol / Police should be adequately deployed, particularly at night, to prevent the harassment of women passengers in the public busses on the project road during the operation of the project
- ▶ Last but not least, regular consultation with the community to determine the effectiveness of implementing mitigation measures at construction sites/camps shall be carried out.

7.3.4 ISSUES OF THE CPRS

248. The Inventory of Losses (IoL) survey identified 2 CPRs located alongside the existing road that require relocation. Relocating or partially damaging these structures and/or their premises will cause stress among the communities.

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249. The project alignment does not reveal any historical, cultural, or archeological resources during the IOL study; however, during site clearing and grubbing, excavation or digging for construction purposes may unearth chance artifacts. A rapid response procedure in assistance with officials of the Department of Archeology, Bangladesh, shall be prepared to protect and preserve artifacts if found by chance, minimizing the disruption to project activities.

Mitigation Measures

- ▶ There are 2 number of CPRs such as mosques/schools'/ temples/clubs etc. falling within the corridor of impact which need to be properly shifted.
- ▶ Implementation NGO (I-NGO) has been engaged to assist PIU/RHD in the overall resettlement and relocation process as well as to facilitate the CPRs shifting
- ▶ Payment of Cash Compensation under Law (CCL) for affected structures by DC for relocation of the structures
- ▶ Payment of Top up (Replacement Value/Cost minus CCL where RV is higher than CCL) for structures by RHD with the assistance from INGO.
- ▶ Compensation must be provided per guidelines specified in the RAP, as well as mutual understating between RHD and affected communities/committees.
- ▶ Affected CPRs must be rebuilt at the expense of RHD or payment of cash compensation in consultation with the affected communities.
- ▶ Affected communities will be given cash compensation for the land and structures and additional transfer grants according to the entitlement policy as defined in the RAP

7.3.5 REMOVAL OF TREE-CUTTING

250. During the pre-construction period, about 942 trees have been identified along the project corridor, which will likely need to be cut down/cleared for the construction works, construction yards, workers' camp, and project site offices, resulting in ecological, aesthetic, and economic loss. The construction of culverts and bridges will damage aquatic biology. According to IoL, about 942 are likely to be removed, as shown in **Table 7-4**. The trees include government as well as privately owned trees.
251. Of these, about 100 trees that fall along the corridor and will need to be cut have been considered for compensatory plantation. In RHD, three saplings will be planted for each tree; accordingly, 1500 trees are proposed to be replanted as compensation. For the remaining trees (mostly private), DC will pay compensation to titleholders, and RHD will disburse it to non-titleholders as per the RAP.
252. The loss of private trees affected by the cutting of huge trees and vegetation will cause psychological stress to the owners. The loss is of common species such as Rain trees, Mahagoni, Babul, Neem, Mango, Jackfruit, Debdaru, Deoa, Dumur, Gamari, Ipilipil, Jalpai, Jam, Kanthal, Khejure, etc. No endangered/threatened species are to be affected. The losses of nest/resting/feeding sites of birds are anticipated due to the cutting of huge trees and vegetation.

Table 7-4: Affected Trees within the Proposed RoW				
Nos. of Affected Trees				
Large	Medium	Small	Sapling	Total
195	346	308	93	942

Mitigation Measures

- ▶ Necessary permission from the concerned agency shall be obtained before cutting the trees.
- ▶ Identified/marked trees shall be removed
- ▶ No trees will be cut beyond the toe lines, if possible
- ▶ The tree plantation will be undertaken during the construction phase instead of the avenue of tree removal.
- ▶ It will be carried out in a 1:3 ratio, i.e., three (3) saplings for one tree cutting. Since 100 trees of common

species are listed in section 4 of this report, it is proposed that about 600 are to be planted under the project. It is proposed that 300 out of 600 trees can be planted as enhancement measures of Rajbari and temple and Graveyards located within 1500m of the proposed project.

- ▶ For private trees, compensation will be paid by DC to titleholders, and RHD will disburse to the non-titleholders
- ▶ A 95% survival rate shall be considered for the release of tree plantation.
- ▶ The contractor shall be responsible for six (6) years of maintenance of tree plantations.
- ▶ Shrubs Plantation on medians & its maintenance for six (6) years.
- ▶ Compensatory tree plantation shall be 40% done by PIU through a contractor and 60% done by the Forest Department under Social Forestation.
- ▶ Proper safety measures should be adopted during cutting and removing trees during clearing sites so that accidents of contractors' workers and local people can be avoided. All workers and project personnel should use the site's Personal Protective Equipment (PPE).

7.3.5.1 DECREASE IN CARBON SEQUESTRATION

253. About 100 roadside trees will likely need to be cut down to take up proposed development works. Removal of this number of trees will cause a decrease in CO₂ sequestration. As a result, the amount of CO₂ in the atmosphere will increase, and the local temperature will rise. The reduction of O₂ generation from the tree's photosynthetic process will cause an imbalance in local climatic conditions for a short time.

Mitigation Measures

- ▶ Tree plantation will be carried out by the Forest Department under social forestry and the Arboriculture Department of RHD.
- ▶ Watering of the tree plantation will be ensured.
- ▶ Necessary tree guards shall be provided to protect saplings.
- ▶ Cluster plantations need to be considered on community lands, such as ponds/mosques, or at other locations desired by the community.
- ▶ All realignments shall be enhanced with the tree plantation.
- ▶ Trees will be planted as an enhancement measure around the ponds or LGED link roads and vegetative noise barriers along the sensitive receptors in consultation with the stakeholders as required.
- ▶ Tree plantation around the monuments and other enhancement measures shall be undertaken.
- ▶ Fast-growing native trees will be planted to improve the carbon sequestration
- ▶ The contractor shall take reasonable precautions to prevent his workmen or any other persons from removing and damaging any flora and fauna.
- ▶ While clearing vegetation, it must be ensured that no faunal species, such as mongooses, foxes, squirrels, etc., are injured and/or die.
- ▶ When the tree is removed, if any endangered or endemic species is cited, the work shall be stopped immediately. The name of the species, etc., needs to be reported to the nearest forest department through RHD.

7.3.6 UTILITIES SHIFTING

254. Electric poles are to be shifted. A discussion meeting has been conducted between the utility providers, the PIU, and E&S consultants to shift the utilities falling within the corridor of impact. Increased pollution in ambient air quality due to heavy equipment operation and increase in ambient noise Levels due to excavator operation, concrete mix, and traction of electric lines will be carried out. Unsafe to the public while working near the residential/commercial areas and shifting of utilities like electric poles may require temporary power cuts, which may disturb the life of common local people in terms of commercial activities and domestic life. But the impact will be short-term and daytime only. Sometimes, during shifting, underground cable faults may be anticipated, which will cause a dangerous situation in the

locality. Generally, shifting optical fiber cables may create communication problems due to damage during relocation. In addition, shifting of utilities may block access to houses, business centers, and health centers. The erection of electric poles may cause inconvenience and block access to the residents, shopkeepers, students, and children. Possibilities of accidents and health hazards, if piled near houses on the roads, markets, schools and playgrounds, and parks without considering safety. Occupational and public safety issues of the workers, technicians, and residents are a serious concern during the shifting of the utilities.

Mitigation Measures

- ▶ The RAP details the corresponding mitigation measures for the risks mentioned above and impacts associated with Utility shifting.
- ▶ Well-maintained and in good working condition machines and equipment meeting the pollution board requirement shall be deployed at the site during the erection of electrical poles.
- ▶ Warning signboards shall be placed at visible locations.
- ▶ Proper safety measures should be adopted during the implementation of utility shifting so that accidents of workers, technicians, and local people can be avoided. All workers and project personnel should use PPE at the site.
- ▶ A Utilities Shifting Plan will be prepared by the contractor in consultations with the responsible agencies like – West Zone Power Distribution Company Limited (WZPDCL), Jashore Palli Biddut Samity (JPBS) and Bangladesh Telecommunication Company (BTCL) for relocation of the utilities. The concerned authorities, JPBS of Jashore, have already submitted a budget for utilities shifting to RHD.
- ▶ Utility shifting shall be done as per the agreed Utility shifting plan
- ▶ The contractor, in consultation with the responsible agencies and RHD, will inform the local people about the schedule of the utility shifting before the start of the work
- ▶ Any grievance/complaint shall be recorded and resolved by the competent authority as soon as possible.
- ▶ To reduce the impacts, shifting shall be carried out in phases
- ▶ Excavation/concreting for erecting the electric poles shall be planned so that it shall not disturb the movement of the local people and traffic.
- ▶ Installation of the electric poles and cable holders shall be done in such a way that it shall not disturb or be a concern of safety for the children playing in the park or going to schools
- ▶ Shifting shall not disturb access to religious places, community halls, municipal services, local water sources, etc., or tourist locations/spots.
- ▶ No material shall be so placed which may pose a risk or cause inconvenience to any person or the public.

7.3.7 DRAINAGE IMPACTS-MITIGATION MEASURES

255. One 11- to 13-meter-wide natural drainage canal is observed, which is very important in anticipated environmental and social risks, impacts, and issues. It was observed that the highway and the natural canal are located alongside each other. The canal was diverted under the Jashore-Jhenaidah highway, and further, the same canal was diverted to cross under the Benapole-Banga highway. After that, the canal flowed zigzag with gradual bending on the right-hand side until it met the Mukteswary River or Khal. This canal carries wastewater, including rainwater, into the Mukteswary River, or Khal, during the rainy (monsoon) season. Sand filling in the drainage canal obstructed draining out, resulting in waterlogging in nearby low-lying area.
256. The implementation of improvement to the Chachra Intersection may cause the existing drainage canal to be narrowed. It will impact by decreasing the draining of wastewater, rainwater, and flood water from an extended catchment area. Project development should ensure minimum disturbance of the natural drainage pattern.
257. The natural drainage flow in the area needs to be maintained, as well as its interconnection with other natural drains in the area; the drainage flow should also maintain existing connectivity to any water body along the alignment.

258. Impacts due to drainage diversions must be mitigated by providing engineering measures such as box/pipe culverts, cross-drains, bridges, etc.

Mitigation Measures

- ▶ Provision of adequate side drains to evacuate the rainwater/stormwater from the roadway and to ensure minimum disturbance to the natural drainage of surface and subsurface water in the area
- ▶ The drainage canal must be constructed of an adequate size and with the necessary number of manholes to ensure an optimal level of stormwater and wastewater flow. The manholes will be periodically cleaned and maintained to ensure the drainage system's effectiveness and efficiency.
- ▶ Stormwater drains shall be effectively designed and constructed to carry and dissipate the stormwater without causing any unwanted collection of water/water stagnation
- ▶ Dumping of waste in the storm drains shall be prevented
- ▶ It shall be ensured that soil and muck do not choke the drains, making it ineffective; drains should be cleaned before and after monsoon to ensure their proper performance
- ▶ As part of the project design measures, the construction of the concrete drainage canal with manholes and effective, efficient, and timely maintenance is proposed
- ▶ Bridges and culverts of adequate capacity have been provided in the design
- ▶ In general, the project design intends to install necessary culverts, bridges, and drainage lines so that the natural flow of water is undisturbed. Also, it will decrease the chance of flooding as it will provide better water channels to support excess rainfall incidents.

7.3.8 ENVIRONMENTAL MONITORING FOR BASELINE ESTABLISHMENT

259. Air, noise, soil, and water have been monitored at different locations within the project area. This will serve as a benchmark for monitoring during the construction and operational phases.

7.3.9 ROAD SAFETY ISSUES

260. The major bottleneck areas are identified based on social and engineering points of view in the project roads are the Hospital on Bhanga Benapole Road, the Factory Building on Chachra More, the BADC Building on Chachra More, Chachra More Intersection, Settlement on both sides of the road N7 and N706. Thus, appropriate countermeasures are required in the design of the project road. Poor road geometry and mixed Traffic, like fast and slow moving will cause vehicular accidents, inconveniences to road users, and pedestrian health hazards. Based on traffic and pedestrian demand, vehicular and pedestrian overpasses need to be provided.

261. Many side roads will join the Service Road, and if entry is not properly controlled, these points become a bottleneck.

Mitigation Measures

- ▶ Geometric improvement has been incorporated by the design engineer. Slow-moving vehicular traffic lanes, Bus bays, Vehicular Overpasses (VOP), Two (2) foot over bridge (FOB), one (1) pedestrians overpass (POP), one (1) pedestrian subway, and one (1) elevated flyover along with ramp is proposed. These are given as per the following details in **Table 7-5**.

Table 7-5: Proposed Road Safety Structures

FOB at 98+000 km, Jeshore City Bypass
FOB at 98+244 km, Jeshore near Jashore Benapole and Satkhira Bus stop
POP at 0+321
Subway at 98+550

- ▶ Compliance with International highway for curvature and grading and safety curve at all Grade, U-Turn and bridge approaches
- ▶ Sidewalks/pedestrian zones along the road near habitat areas, schools, hospitals, and religious places need

to be included in the design, which will be further reviewed by the EPC contractor

7.3.10 PERMISSION AND CLEARANCES

262. Smooth and safe construction work requires permission from different authorities before the Contractor commences civil works. Not fulfilling the requirement as said in the approved DoE's Environmental Clearance Certificate of the Chachra Intersection Project may be considered a violation of clauses and misconduct by the contractor. As few components/structures are added in the new design, DoE clearance is to be obtained incorporating these along with the cleared version of ESIA.

Mitigation Measures

- ▶ Contractor shall follow the requirement of Environmental Clearance Certification (ECC) and mitigation measures suggested in ESMP herein while establishing the construction campsites, crusher units, hot mix plants, concrete batch mix plants, WMM plants, and workforce camps.
- ▶ Consent to establish and operate construction campsites, crusher units, hot mix plants, concrete batch mix plants, WMM plants, workforce camps, etc., need to be obtained.
- ▶ Permission to Establish Construction camps
- ▶ Permissions for extraction of Groundwater, if required
- ▶ Layout approval for construction camps/labor camps
- ▶ Permissions for sourcing of water for construction activities (Surface Water), if required
- ▶ Contractor shall follow standard procedures as per Bangladesh Labor Act 2006 for labor recruitment

7.3.11 ORIENTATION TO CONTRACTORS

263. If proper orientation and training on the Environmental Assessment, ESMP implementation, and safeguard process of national and funding institutions are not conducted for the contractors and RHD, then the implementation of ESMP and its compliances cannot be realized efficiently and effectively. Without orientation and site induction training for Contractors, the objective of implementing the ESIA and its ESMP would be difficult to achieve.

Mitigation Measures

3. The orientation program for the contractor will be conducted by the RHD/PIU after the appointment to meet the requirements of ESMP and ESS of WB. The salient features of the program are as follows:
 - ▶ No works will be initiated by the contractor until the site induction training of workers/staff is carried out
 - ▶ Obligations under contract to submit and prepare of Contractor's Environmental and Social Management Plan
 - ▶ Regulatory compliance requirements
 - ▶ Grievance redress mechanism for both social and environmental issues
 - ▶ Various plans required under C-ESMP related to Occupations Health & safety, traffic and road safety, community health and safety, hazardous and non-hazardous waste, campsite management, emergency response, blasting, borrow area, muck disposal, restoration, etc.
 - ▶ Labor management procedures
 - ▶ Community health & safety aspects at the workplace and Reporting requirements etc., under the project
 - ▶ Stakeholder Engagement Plan Contractor shall appoint one Environmental safety and health Officer, Social-cum-Community Liaison Officer, and one Health and Safety Officer, both of whom shall solely be responsible for the implementation of all ESMP provisions in close co-ordination/consultation with Environmental and Social Specialists in the RHD
 - ▶ Training includes discussion and review of ESMP and ESMoP detailing how specific environmental risks associated with their scope of work, legal compliance, inspection and audits, and progress tracking and reporting
 - ▶ Individual Environmental Consultants under the Project Implementing Unit of RHD will monitor and supervise all training sessions and provide training modules

7.4 IMPACTS AND MITIGATION DURING CONSTRUCTION PHASE

264. Construction stage activities require careful management to avoid environmental impacts. Activities that trigger the need for environmental measures to be followed include:

- ▶ Implementation of site-specific mitigation/management measures
- ▶ Monitoring the quality of the environment along the construction sites (as air, noise, water, and soil & Sediment)

265. Several other environmental issues have been addressed as part of good engineering practices, which have been accounted for in the engineering costs. They include roadside drainage improvement, soil erosion prevention measures, etc. Therefore, these mitigation measures shall be included in the contract document of the contractor for its implementation by the contractor and the sustainable development of the project

266. To implement it properly, it is suggested that non-compliance shall be considered a major lapse from the contractor for which they need to be penalized. All lapses on the clearances/NOCs obtained by the contractor shall be deemed as major non-compliance. They must ensure all these approval/NOCs are valid throughout the construction stage/liability/maintenance period. The contractor needs to follow the conditions stipulated in the environmental clearance (EC), consent to establish (CTE), and Consent to operate (CTO) other approvals given by the regulatory authorities

7.4.1 SITTING HOT MIX PLANT/WMM/BATCHING PLANT/CRUSHERS

267. Poor siting of Hot mix, Wet Mix Macadam (WMM), Batching Plant, and Crushers will cause (i) air pollution, (ii) fugitive Dust Emission, (iii) Noise Pollution, Surface water pollution in case nearby water body /water logging, (iv) drainage problem and (v) Safety Hazards for electrical and other safety risks for the workers. Thus, pre-requisite consideration and measures should be taken care of by the contractor for siting the construction equipment.

Mitigation Measures

- ▶ For installing different plants, the constructor shall obtain the necessary permission from the competent authorities
- ▶ A hot mix plant shall be installed on the downwind side and 1000m from the residential area.
- ▶ Batching plants/WMM shall be installed 1000m from the residential area on the downwind side.
- ▶ These plants shall be 500m from the water bodies or rivers/canals.
- ▶ No batching plant /labor camp/construction camps shall be allowed to be established on the banks of the river/canal.
- ▶ To prevent water logging in the batching plant, drainage, and sump shall be provided and cleaned regularly.
- ▶ Hot mix plant shall be fitted with pollution control devices, Bag filters, etc.
- ▶ The stack height shall be at least 10m above the ground.
- ▶ The premises shall be enclosed, and trespassing shall not be allowed.
- ▶ The contractor shall submit the detailed layout plan for approval from the Engineer before getting into a formal agreement with landowners to set up such site.
- ▶ Actions by the Engineer and PIU against any non-compliance shall be borne by the Contractor at his own cost.

7.4.2 LABOR CAMP/CONSTRUCTION CAMPS

268. A CoC and GBV Action Plan has been prepared separately with provisions to comply with the construction/labor camp management. A Labor-Management Plan (LMP) has been prepared to take necessary action when the construction camp and labor camp are established. A provisional aspect of GRMs is also incorporated in the labor-management plan and ESMP to construct a sustainable construction camp for the proposed project. Improper and poor layout of worker's camp may cause loss of agricultural produce if (i) visited on cultivable land, (ii) health hazard to workers and nearby

community, (iii) surface water pollution in case sited near water bodies, (iv) local drainage problem (v) wear and tear to haul routes if material is transported via village roads, and (vi), fire, electrical and other safety risks. The camp siting for construction workers is important as they may significantly impact health and possible hazards on sensitive environmental receptors or existing infrastructures of nearby communities.

269. Though identification of the location and setting of the worker's camp, construction yard with machinery layout, storage of construction materials, and other facilities are in the scope of the Contractors' arrangement, the location, layout, and basic facility provision of each labor camp will be submitted to CSC and PIU before their construction.

Mitigation Measures

- ▶ Labor camps shall be located at least 500m away from residential areas and waterbodies, such as the Mukeshwari River, Nabaganga River, Chitra River, Bhairab River, Begobati River, and wetland or any Beels or Baor.
- ▶ A detailed layout plan for all such sites shall be submitted for approval from the CSC.
- ▶ Contractors shall prefer the non-productive lands with access to the existing roads.
- ▶ The contractor must make an agreement with the land parcel owner along with the photographs of the original land.
- ▶ Rooms of the labor camps must be properly ventilated.
- ▶ Hygienic conditions must be ensured in the labor camps
- ▶ To prevent soil erosion, the construction/labor camps shall not be established on the banks of river or waterbodies.
- ▶ No timber or wood shall be used for cooking purposes
- ▶ No illegal tree-cutting shall be allowed.
- ▶ Mobile toilets or toilets with septic tanks shall be provided.
- ▶ Either a canteen facility or cooking gas shall be provided.
- ▶ Labor/construction camps shall be properly fenced, and an informatory board as well as project details shall be displayed at the entrance and exit of the camp.
- ▶ Pre-requisite consideration and measures should be taken care of by the contractor for siting the camps and other facilities.

7.4.3 POTABLE WATER AND SANITATION FACILITIES

270. Inadequate supply of potable water, unsanitary toilets facilities and washing areas can lead to water borne/Faecal diseases outbreaks in the workers camps. Poor sanitation may result to transmission of communicable diseases among the workers and the host community. Unsafe potable water facilities and washing areas can lead to water borne disease outbreaks.

Mitigation Measures

- ▶ Potable water shall be provided by the contractor in the construction camps/labor camps/construction sites.
- ▶ Water quality shall be tested to check its portability to meet the requirement of drinking water quality standards
- ▶ Drains shall be provided.
- ▶ Proper lavatory facilities for male and female workers shall be provided as shown in **Table 7-6**.
- ▶ Proper hygienic conditions must prevail in such facilities.
- ▶ The mobile toilet shall be periodically replenished with fresh water
- ▶ Wastewater from ablution purposes shall be emptied through suction tankers and carried to the nearest municipal sewage treatment facilities or soak pits shall be provided.
- ▶ Untreated liquid waste shall not be allowed to discharge in to surface water bodies.

Table 7-6: Recommended Sanitary Toilets, Drinking Water and Bathing facilities

Sl. No.	Sanitary Unit	For Male Personnel	For female Personnel
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Joint Venture of



STUP Consultant Pvt. Ltd.
 On July 1st, 2021, STUP was acquired by Assystem and rebranded as Assystem STUP.



BCL Associates Limited, Bangladesh

Table 7-6: Recommended Sanitary Toilets, Drinking Water and Bathing facilities

Sl. No.	Sanitary Unit	For Male Personnel	For female Personnel
1.	Water Closet	1 for every 10 persons	1 for every 1-10 persons
2.	Ablution Taps	One in each W.C	One in each W.C.
3.	Urinals	1 for 6-20 persons 2 for 21-45 persons 3 for 46-70 persons 4 for 71-100 persons	--
4.	Washing Taps with the draining arrangement	One for every ten persons or part thereof	
5.	Drinking Water Fountains	One for every 30 persons	
6.	Baths preferably Showers	As required	

Note:

- i) One water tap with a draining arrangement shall be provided for every 50 persons or part thereof in the vicinity of the water closet and urinal or part thereof
- ii) Crèches, where provided, shall be fitted with water closets (One for ten persons or part thereof), wash basins (1 for 15 persons or part thereof), and drinking water taps with a drinking arrangement for every 50 persons or part thereof.
- iii) Toilets must have a ventilation system and proper lighting arrangements.
- iv) Men and Women toilets shall be clearly demarcated as “For Men Only” or “For Women Only” along with symbols etc.

Source: National Building Code, India

7.4.4 SOLID WASTE MANAGEMENT

271. A wide range and substantial volumes of waste may be generated during construction works, including gravel, concrete, miscellaneous structures such as poles and cables, steel, and organic materials. Construction camp wastes are often poorly managed, leading to chronic pollution of surface and groundwater and soil contamination. Construction work creates areas of water stagnation during monsoons or heavy rain. These water ponds will be ideal places for mosquitos to breed but can also cause malaria and dengue. This includes storage for outdoor equipment, empty construction material drums, and used tyres.

Mitigation Measures

- ▶ Contractor shall segregate waste at source.
- ▶ Biological waste from the labor camp/construction camps/or other contractor facilities shall be collected for composting for gardening purposes.
- ▶ Intermingling of waste shall not be allowed.
- ▶ Municipal waste shall be disposed of at the approved landfill sites only, or the contractor shall make necessary arrangements with the municipalities/Zila Parishad.
- ▶ Construction and demolition (C&D) waste shall be disposed of at identified and approved locations.
- ▶ C&D waste shall not be dumped into the water bodies.
- ▶ About 40% of the sacrificed material shall be reused in the sub-base preparation. The contractor shall store the usable material properly impervious to prevent mixing with the earth.
- ▶ Contractor shall prepare a waste management plan
- ▶ Open burning of solid wastes, whether hazardous or nonhazardous, shall not be allowed.
- ▶ E-waste shall be collected properly and disposed of by approved vendors only.

7.4.5 HAZARDOUS MATERIAL MANAGEMENT

272. Oils, fuel, grease, chemicals from plants, equipment, vehicle servicing, and construction camps are the potential sources of hazardous waste at the construction site. These are often poorly managed, are the potential sources of surface water, groundwater, and soil contamination. The Contractor will adopt the following mitigation measures.

Mitigation Measures

- ▶ Oil/fuel shall be stored per the approved design and safety protocol applicable in the country, e.g., The Petroleum Act. 2016, The Petroleum Rules 2018, The Explosives Act. 1884, The Explosives Rules 2004
- ▶ If there is any spillage of hazardous waste, the contractor will sort it out immediately.
- ▶ An area shall be assigned for storing the oil/oily waste or any flammable material.
- ▶ Smoking shall be prohibited in such areas.
- ▶ Drip trays shall be provided at DG sets/below the nozzles to fuel the construction vehicles and equipment.
- ▶ Used oil or hazardous /flammable material shall be collected in the drums and stored on the impervious platform sloped or beamed to contain a minimum of 25 percent of the total storage volume.
- ▶ It shall be disposed to the authorized/approved vendors per the DOE norms.
- ▶ Tires shall be stored properly under the shed and disposed of by approved vendors.
- ▶ The transfer of hazardous materials from vehicle tanks to storage shall be carried out on impervious surfaces to avoid environmental risk and impacts; the surface shall be sloped to a collection or containment structure. This shall not be connected to the municipal wastewater/stormwater collection system.
- ▶ To the extent feasible, secondary containment for components (tanks, pipes) of the hazardous material storage system shall be provided.
- ▶ Periodic (e.g., daily or weekly) reconciliation of tank contents and inspection of visible portions of tanks and piping for leaks shall be undertaken.
- ▶ Inform the employees about the hazards presented by their work
- ▶ Warning signboards shall be displayed at such locations.
- ▶ Awareness training shall be given to workers by the contractor's environmental safety health officer.
- ▶ Material Safety Data Sheets (MSDS) shall be compiled.
- ▶ Standard operating procedures (SOPs) for fueling/storing or other operations about the hazardous material shall be prepared
- ▶ Contractor shall prepare a Hazardous Waste Management Plan

7.4.6 WATER RESOURCES AND WATER QUALITY

273. Uncontrolled dumping of wastes, sewage, excavated materials, and accidental spillage of fuels and chemicals into the water bodies may greatly pollute them. Disposal of sewage and wastes from the construction camps to surface water bodies without treatment will deteriorate the water quality. The seasonal ponds are unlikely to be affected by construction activities. In addition, there will be spillage oils, fuel, grease, and chemicals from plant, equipment, and vehicle servicing. However, the pollution of perennial water bodies can adversely affect their aquatic population. The dumping of waste, sewage, and excavated materials should be done at a particular place, and accidental spillage from vehicles can be checked by maintaining active surveillance of vehicles in operation.

Mitigation Measures

- ▶ The proper compensation will be given by DC/RHD with assistance from INGO for the Loss of the water body.
- ▶ Contractors shall ensure that construction materials like earth, stone, and ash do not block the flow of water of any water course and cross drainage channels.
- ▶ No waste shall be allowed to be dumped in ponds. Any accidental spillage shall be reported to the project authorities for necessary action, such as clearing and disposing of the spilled material safely
- ▶ Workers will not be allowed to pollute the water body.

- ▶ No illegal excavation shall be allowed from the bunds of water bodies.
- ▶ The water flow will be restored soon after completion of the work.
- ▶ No waste will be dumped into the water bodies.
- ▶ Oil and grease separators shall be provided near the vehicle washing area/maintenance workshop.
- ▶ Drains shall be provided in labor camps/construction camps/workshops and other contractors facilities along with soak pits.
- ▶ Silt fencing at the mouth of the water body shall be provided.
- ▶ Waste, sewage, and excavated materials should be disposed of at an approved location. Accidental spillage from vehicles can also be checked by maintaining active surveillance of vehicles in operation.
- ▶ Waste shall not be allowed to be dumped in ponds. Any accidental spillage shall be reported to the project authorities for necessary action, such as clearing and disposing of the spilled material safely.
- ▶ Water Quality shall be monitored during the baseline survey. During construction activities, contractors will undertake water quality monitoring as per the environmental monitoring program.

7.4.7 CLEARING AND GRABBING

274. Clearing and grabbing at the project site will cause fugitive dust emissions and the removal of fertile topsoil. The top 12-15cm soil is normally rich in organic soil and microorganisms, which is a source of good fertility. The loss of organic matter can alter the soil's physical properties, especially soil density. Higher clay content at the surface can reduce topsoil infiltration, reducing soil recharge and thus reducing water availability to plants.

Mitigation Measures

- ▶ Clearing and grabbing shall be restricted to the working area within the toe line.
- ▶ Further activities shall be planned/ started immediately to prevent fugitive dust emission and soil erosion during monsoon.
- ▶ Top (15cm) soil shall be preserved to redevelop the areas as required.
- ▶ Revegetation/turfing shall be started immediately after completion of the work.

7.4.8 BORROW AREAS

275. To procure the earth, borrow areas will be open during the construction stage. The fertile soil will be removed from the agricultural cultivated lands, and the owners of the borrow pits area will be affected due to the loss of their produce. In addition, dust will be generated if the pits are dug at a shallow level. Erosion will occur, which is risk to the nearby habitation, trees, and other vegetation.

Mitigation Measures

- ▶ Only identified and approved borrow areas shall be used by the contractor
- ▶ Borrowing of earth from the cultivable land shall not be allowed.
- ▶ When borrowing the earth from the cultivable lands, the depth of borrowed earth shall not be more 45cm.
- ▶ The top 15cm soil shall be removed and stored separately. Thereafter excavation shall not exceed 30cm and topsoil shall be spread over the land.
- ▶ Borrow areas shall be dug at least 800m away from the habitation. If unavoidable, the depth should not be more than 30cm and should be properly drained.
- ▶ Borrow pits shall not be dug continuously but should be dug according to necessity of construction work.
- ▶ The borrowing of earth shall be used only after having an agreement between the contractor and land parcel owner and must include the photographs of original land.
- ▶ The haulage of borrowed earth will be maintained dust free by sprinkling water.
- ▶ The borrow areas shall be 500m away from the toe line of the road.
- ▶ If trees are there, it should be protected by providing slopes in 1:2 around them while borrowing the earth.
- ▶ Side slopes of 1:4 shall be maintained in the borrow areas.
- ▶ A redevelopment plan shall also be prepared and agreed to by the land parcel owner and approved by the CSC.

- ▶ To reduce earth requirement, scarified material shall be reutilized in the subbase material as far as possible.

7.4.9 LOSS OF TOPSOIL

Mitigation Measures

- ▶ The topsoil (15cm) shall be removed and preserved for reuse for redevelopment purpose.
- ▶ Topsoil shall be preserved outside drainage lines, and stockpiles should be protected from erosion by silt fencing and diversion channels.
- ▶ Use stripped topsoil to cover all disturbed areas along the proposed tree plantation sites.
- ▶ Limit equipment and vehicular movements within the approved construction zone.
- ▶ Topsoil shall be distributed free to local people who need it for their own purposes.
- ▶ The residuals shall be reused to form the ground around the interchanges, the areas along the road within the acquired land
- ▶ To recover the vegetation in some affected areas due to the road project.
- ▶ The material stockpile sites shall be 500m away from surface water bodies and areas prone to surface runoff.
- ▶ Loose materials shall be bagged and covered.
- ▶ An open ditch shall be built around the stockpile sites to intercept wastewater. If necessary, retarding basins shall be constructed to remove sand and other solids in the stormwater before it reaches the downstream rivers.
- ▶ During rainstorms, open stockpiles of construction materials (e.g., aggregates, sand, and fill material) of more than 50 m³ shall be covered with tarpaulin or similar fabric.
- ▶ Measures shall be taken to prevent the washing away of construction materials, soil, silt, or debris into any drainage system.
- ▶ At the start of site establishment, perimeter cut-off drains to direct off-site water around the site shall be constructed, and internal temporary drainage works and erosion and sediment control facilities shall be implemented

7.4.10 SOIL EROSION

276. The project corridor is along relatively plain terrain. Soil erosion is not envisaged as a major concern in the development. However, as per the site requirements, depending on the soil types or composition of soil structure different techniques will be applied for slope stabilization in the different part of the project road, as found necessary. As needed, the contractor will prepare detailed stabilization techniques for various soils. Soil erosion may take place near cutting areas, at steep and un-compacted embankment slope, bridge locations and wherever vegetation is cleared. Soil erosion may have cumulative effect like siltation, embankment damage, bridge pier damage, drainage problem etc. Loss of soil due to runoff from earth stockpiles may also lead to siltation. Gully erosion along the exposed track slope during rainy season may damage mother field crops in adjacent areas.

Mitigation Measures

- ▶ The contractor shall reuse excavated soil as much as possible unless the soil is considered not suitable for filling.
- ▶ The Contractor shall plan his works as to minimize surface excavation works during the rainy season where practicable
- ▶ Immediately after completion of work on bridges or high embankments, the slope stabilization measures such as turfing etc. shall be done.
- ▶ Excavation or similar activities will not be undertaken during the monsoon period.
- ▶ Construction and demolition waste shall not be stored near the bridge construction sites; it shall be disposed of to approved landfill sites.
- ▶ Ground clearance area shall be minimum

- ▶ Approach road shall be provided in construction facilities to reduce soil erosion.
- ▶ Exposed earth areas shall be completed and revegetated as soon as possible after earthworks have been completed.
- ▶ If excavation of soil is unavoidable during the rainy season, or at any time of year when rainstorms are likely, exposed slope surfaces shall be protected by temporary drainage measures.
- ▶ Working area shall be clearly marked to restrain the activity within the demarcation area only.
- ▶ Ensure that dredge materials do not contain heavy metals exceeding the international standards by testing prior to using.

7.4.11 SOIL QUALITY

277. The soil may be compacted due to movement of construction vehicles, machineries and equipment, and due to siting of construction camps and workshops. Soil may get contaminated due to inappropriate disposal of liquid waste, like lubricant and fuel spills; washing effluent from vehicles and equipment) and solid waste (fuel filters, oily rags) likely to be generated from repair and maintenance of transport vehicles, construction equipment and machinery. Soil may also get contaminated due to inappropriate disposal of domestic solid waste and sewage from construction camps.
278. In addition, subsoil contamination may also be attributed to scarified bitumen wastes, operation of the emulsion sprayer and laying of hot mix, storage and stockyards of bitumen and emulsion, excess production of hot mix and rejected materials.

Mitigation Measures

- ▶ Fuel or other petroleum product shall be stored on the impervious platform.
- ▶ The movement of construction vehicles, machinery and equipment shall be restricted to the corridor or identified route.
- ▶ Soil contamination by bitumen, fuel and chemical storages shall be prevented by storing them on an impervious base
- ▶ Any spillage of hazardous material shall be removed and disposed to identified and approved sites.
- ▶ Soil quality monitoring shall be undertaken as per ESMP

7.4.12 AIR POLLUTION

279. Dust emission is one of the issues in the construction phase of a road project. The dust emission/ air pollutant emissions due to movement of construction vehicles/plants during construction and the gaseous air pollutant emission from vehicular exhaust during operation phase will have impact on the existing air quality within the project area. The air quality of the area will be affected due to the transport of materials, quarry/borrow operations, movement of vehicles on haul roads/construction yards and fugitive emissions from the construction sites/plant sites. Construction activities that contribute to air pollution include land clearing, operation of diesel engines, demolition, loading and unloading of construction materials, movement of material transporting vehicles, and operation of hot mix plants. Construction sites generate dust emission. Construction dust is classified as PM10 - particulate matter less than 10 microns in diameter. The construction phase impacts due to vehicle movement and operation of hot mix plant have been worked out using mathematical equations in the following sub sections.

7.4.12.1 AIR POLLUTION FROM OPERATION OF HOT MIX PLANTS/ BATCHING PLANTS CRUSHER

Pollution from Hot Mix Plant Operations

280. The following assumptions have been made to work out the emission of air pollutants from Hot Mix Plant (HMP). Emissions rates of air pollutants from hot mix plant stack are as follows:
- ▶ PM10 emissions = 0.09 g/sec, (EPA, AP-42 methodology)
 - ▶ CO Emissions= 3.8 g/sec (EPA, AP-42 methodology)
 - ▶ NOx Emissions = 1.11 g/sec (EPA, AP-42 methodology)

- ▶ SO₂ Emissions = 0.008 g/sec (IS Specifications)
- ▶ VOC Emissions = 0.00059 kg/sec = 0.59 g/sec (EPA, AP-42 methodology)

The following assumptions have been made to work out the pollution emission:

- ▶ Capacity of HMP = 75 tph (assumed)
- ▶ Bulk density of hot mix (Ref workbook) = 2.19 tones/m³
- ▶ Max duration of operation = 12 hrs.
- ▶ Height of Stack = 10m
- ▶ Efficiency of bag house filters/wet scrubbers = 99.5%
- ▶ Exit gas velocity = 15 m/sec²⁹
- ▶ HMP Stack diameter = 1.2 m
- ▶ S in Furnace oil = 50 mg/kg [Source: IS:1460-2005-Bharat Stage (IV)]
- ▶ Consumption of fuel oil (as per manufacturer literature) @ 350 liters per hour

281. Using the above data and Screen 3 model of Lakes environment was employed to determine the maximum concentration will be at distance of 300m - 450m from the HMP. Thus, a safe distance of 500m away in downwind of from the residential areas has been recommended for establishing the HMP.

Mitigation Measures

282. Construction phase environmental impacts on air pollution will be short term and localized. It can be mitigated by adopting the following mitigation measures.

- ▶ HMP shall be installed on the downwind direction at 1500m away from the environmental/ecologically sensitive areas.
- ▶ HMP shall be installed at least 500m away from the nearest residential areas on the downwind side of prevalent wind direction.
- ▶ Low emission construction equipment, vehicles and generator sets shall be used at site.
- ▶ Transportation vehicles shall be covered by tarpaulin, if required.
- ▶ Pollution control monitoring of construction vehicles shall be carried out and fit certification must be valid for all equipment and vehicles.
- ▶ With adoption of regular sprinkling of water on the unpaved surfaces as well as covering the raw material and hot mix laden trucks with tarpaulin, the fugitive particulate generation can be brought down by about 70%.
- ▶ Adequate dust suppression measures such as regular water sprinkling on unpaved haul roads, borrow area vulnerable areas of the construction sites. Special attention during summer season shall be considered.
- ▶ The air pollution will also be greatly reduced by erecting wind screens of galvanized iron sheets cordoning off the construction sites to a height of about 5 meters from ground surface.
- ▶ Wind shields shall be provided around the periphery of the HMP area to a height of 5m to reduce the impact of fugitive dust emissions.
- ▶ HMP shall be fitted with pollution control devices (Wet Scrubber for stack emission)
- ▶ Wind shields shall be provided around the wet mix macadam (WMM) plant, stock yard and batching plants to prevent fugitive dust emissions.
- ▶ Diesel generator shall be provided with proper stack height as per Department of Environment requirement.
- ▶ Ambient Air Quality Monitoring shall be carried out as per the Environmental Monitoring Program suggested in the ESMP.
- ▶ The stack height of the Hot Mix Plant shall be at least 10m from the ground.
- ▶ Regular maintenance of construction vehicles and equipment/plants shall be undertaken.

²⁹Technical Support Document for The Asphalt Plant (Portable and Stationary) General Order, Department of Ecology, State of Washington, 2011

- ▶ The construction vehicles/machinery/equipment shall use only designated routes.
- ▶ DG sets shall be complied with the requirement of department of environment.
- ▶ The construction machinery/equipment shall use only designated sites.

7.4.12.2 MOVEMENT OF CONSTRUCTION VEHICLES (AIR POLLUTION)

a. Impact due to Vehicle Movement

283. The impact on air environment due to movement of hot mix laden trucks, raw materials such as cement, steel, fine and coarse aggregates, bitumen, and earth/over burden soil carrying trucks and tippers. It further depends on various factors like haulage capacity, condition of haul roads, dust suppression measures adopted and duration of operation & maintenance of vehicles and content of silt and fine dust on the unpaved and barren surfaces.
284. To work out dust emission, the road surface is assumed to be unpaved. The fugitive particulate generation due to vehicular wheels will be totally uncontrolled without adopting control measures on the unpaved haul roads.

b. Movement of Construction Vehicles for transportation of construction materials

285. The following assumptions have been made to work out emissions due to haulage of materials (wheel-based fugitive dust) on unpaved roads.

- ▶ Length of road for influence of fugitive dust = 20 km (10 +10)
- ▶ Total number of trucks in operation = 50 trucks per day
- ▶ Cumulative distance travelled by the trucks:1000km (Assumed about 20km in a day)

4. Emission Factor to be worked out using the following formula as per EPA, AP-42²

$$E = \frac{K \times \left(\frac{S}{12}\right)^A \times \left(\frac{W}{3}\right)^B}{\left(\frac{M}{0.2}\right)^C}$$

286. E= emission factor, lb/VMT (pounds per vehicle mile traveled); k=empirical constant 2.6 lbs/VMT for PM=10µm; A, B, C are empirical constants respectively 0.8, 0.40, 0.3Error! Bookmark not defined., S =Silt=5%, W=weight of vehicle=20 tonnes, M=moisture=0.75%

287. Based on the above, emission factor from the movement of construction vehicles on the unpaved roads has been worked to be 0.713 lb/vmt which is equal to 201.04 g/vkt. Fugitive dust generation = 201.04 x1000 =201040 g per day =2.33 g/sec. It is further assumed that the maximum 10 number of construction vehicles in an hour will move over the unpaved haul roads. The particulate matter concentration from the movement of construction vehicles on the unpaved haul roads have been worked using Cal3QHC of CalRoads view of Lakes Environment which is given in **Table 7-7**.

Sl. No	Distance from haul road in (m)	Increment Concentration (µg/m3)
1.	50	123.8
2.	100	73.5
3.	200	40.5
4.	300	28.1

288. Highest incremental concentration of 123.4 µg/m³ is near the road at 50m whereas it is getting reduced and at 300m the incremental concentration is 28.1 µg/m³. Thus, it is suggested that sprinkling of water shall be routinely carried out on haul roads to keep the incremental concentration low.

Mitigation Measures

- ▶ Water sprinkling using sprays shall be done on the unmetallic haul roads
- ▶ Water sprinkling shall also be carried out on the construction sites where the earthwork is unattended for

four (4) day especially in summer season

- ▶ Construction vehicles/equipment shall comply with national standards
- ▶ Routine maintenance of emission to control the pollution
- ▶ Low emission construction equipment, vehicles and generator sets shall be used at site.
- ▶ Only those construction vehicles shall be used which have valid fitness certificate.
- ▶ Vehicles transporting construction material shall be covered by tarpaulin.
- ▶ Speed of construction vehicles will be identified in contractors ESMP which will be approved the CSC.

7.4.13 NOISE ENVIRONMENT

289. Noise associated with construction phase is discussed in the following subsections.

Construction Camps/Yards/Construction Site

290. Operation of equipment/machinery or other activities such as piling, excavation etc. at construction site/camp will be the main source of increased sound levels in and around the area. The noise levels from the construction equipment depends on different factors such as type of equipment, condition of equipment, the operation which are undertaken at site, duration of the operation of equipment and specific model of the equipment³⁰. The equivalent sound level (Leq) of the construction activity also depends on the fraction of time that the equipment is operated over the time of construction. Diesel engines are the main source of noise from the equipment when used without protection. The construction equipment is expected to produce noise levels in the range of 74 - 101 dB (A) at construction site, as presented in Table 7-8.

Equipment	Typical Noise Level (dBA) 50 ft from Source	Equipment	Typical Noise Level (dBA) 50 ft from Source
Air Compressor	81	Pile-driver (Impact)	101
Backhoe	80	Pile-driver (Sonic)	96
Ballast Equalizer	82	Pneumatic Tool	85
Ballast Tamper	83	Pump	76
Compactor	82	Rail Saw	90
Concrete Mixer	85	Rock Drill	98
Concrete Pump	82	Roller	74
Concrete Vibrator	76	Saw	76
Crane, Derrick	88	Scarifier	83
Crane, Mobile	83	Scraper	89
Dozer	85	Shovel	82
Generator	81	Spike Driver	77
Grader	85	Tie Cutter	84
Impact Wrench	85	Tie Handler	80
Jack Hammer	88	Tie Insertter	85
Loader	85	Truck	88
Paver	89		

291. With a point source of a strength of 95 dB (A) at a reference distance of 2m, the noise produced will not exceed 45 dB (A) beyond 250 m from the boundary of the construction yard (the drop-off rate will be 6 dB (A) for doubling the receptor distance from a point source).

³⁰ Transit Noise and Vibration Impact Assessment, FTA

Mitigation Measures

5. The following mitigation measures shall be adopted to reduce the intensity of impacts.
- ▶ Construction camp/yard shall be located away at least 500m from the inhabitant/sensitive areas.
 - ▶ Silencers and mufflers shall be fitted and regularly maintained on construction equipment.
 - ▶ Servicing of all construction vehicles and machinery/plants shall be done regularly and during routine servicing operations, the effectiveness of exhaust silencers needs to be checked and if found defective shall be replaced.
 - ▶ Well maintained vehicles and machinery/equipment shall be deployed at site.
 - ▶ Work shall be scheduled in such a way that high noise levels generating activities shall not be done simultaneously and such activities shall be restricted to daytime only.
 - ▶ Use of low noise generating equipment or construction vehicles near the sensitive receptors such as health centers/schools etc.
 - ▶ Contractors shall hold meetings with neighborhood champions/locals/school or college management before the start of high noise generating activities, for example piling etc.
 - ▶ Truck loading, unloading, and hauling operations shall be so scheduled as to minimize noise impact near sensitive locations and neighborhood communities.
 - ▶ Placards shall be displayed near high noisy areas.
 - ▶ Earmuffs/Earplugs shall be made mandatory for workers working in high noise areas
 - ▶ Construction equipment and vehicles shall be maintained regularly.
 - ▶ ‘No honking’ board shall be placed near sensitive receptors
 - ▶ Noise quality monitoring as suggested in the Environmental Monitoring Plan as ESMP.
 - ▶ The Contractor shall abide by the provisions of the Specifications of Contract regarding environmental protection and DoE regulations (≤ 60 dB levels at mosque, school, populated area and other sensitive sites).
 - ▶ Noise generating equipment/plants shall be provided with dampeners.
 - ▶ No noisy construction activities will be permitted around educational institutions/health centers (silence zones) up to 100 m distance from the sensitive receptors
 - ▶ Diesel Generating must be enclosed with soundproof acoustic enclosures to meet the Noise standards.
 - ▶ Construction vehicles/equipment must be fitted with silencers
 - ▶ Routine maintenance of equipment and construction vehicles shall be carried out.
 - ▶ Low noise generating equipment/construction vehicles shall be used.
 - ▶ Noise monitoring shall be undertaken as per the Environmental Monitoring Program
 - ▶ Workers working in the noisy areas shall be provided with the PPEs and shall wear earplugs
 - ▶ No workers shall be allowed to work near equipment generating more than 90 dB (A) noise for more than 8 hrs
 - ▶ Contractors’ facilities will be sited away from the residential areas/sensitive receptors as mentioned above.
 - ▶ Near sensitive receptors such as schools/mosques/hospitals noise generating activities shall be carried out after consultation with the management committee or low noise generating equipment shall be used only.
 - ▶ In residential areas, hospitals etc. noise generating activities shall be prohibited and work shall be scheduled in consultation with neighborhood champions.
 - ▶ Reducing construction vehicles through the residential area in consultation with the local champions
 - ▶ Vegetative noise barriers in the sensitive receptor
 - ▶ Any issue shall be resolved through a grievance redressal mechanism (GRM) developed by the contractor.

7.4.14 BIO-DIVERSITY AND LIVING NATURAL RESOURCES (ESS 6)

7.4.14.1 TERRESTRIAL FLORA

292. The proposed activities on the project will remove vegetation and fell roadside and private trees, including the complete destruction of herbs, shrubs, climbers, and aquatic plants in the project area, as there is no record of rare, endangered, or threatened species in the project area.

293. However, the impact of such ecological disturbance will be less severe considering there are enough trees in other areas just out of the site. The potential impacts are loss of avenue trees falling along the existing project alignment, temporary loss of feeding, nesting and resting site of wildlife. In addition, the land filling loss of ground flora, homestead shifting loss of homestead flora, labor gathering, pressure on firewood from local flora, local plant species loss, Reduce the aesthetic values of habitats/ecosystems. Pollution in both water and terrestrial environment, aquatic ecosystem will be hampered, river training will eliminate riverbank flora.

Mitigation Measures

- ▶ It is proposed that about 40% of the trees will be planted by the RHD through contractor and 60% of the trees will be by the forest department under social forestry.
- ▶ Trees shall be planted in the available space in between as per CSC directions.
- ▶ Compensation shall be provided to the owners of those trees.
- ▶ Free distribution of seedlings/saplings shall be done among the re-settlers according to RAP.
- ▶ A few nurseries shall be developed along the road containing local timber, fruits, medicinal and ornamental species.
- ▶ Limit the construction works within the designated sites allocated to the contractors.
- ▶ No illegal tree felling shall be allowed at construction site/borrow areas/construction camps/ labor camps. (Refer to B-8 and B-9 of Chapter 10)
- ▶ The construction activity shall be restricted to only identified areas.
- ▶ Hot mix plant/construction camps/labor camp/stockyards shall be located away at safe distance (500m away from the water bodies)
- ▶ Awareness program shall be undertaken to make people understand the value of different plants and also about tree plantation.
- ▶ Some small gardens can be established along the project if space is available.
- ▶ Provide alternate to firewood
- ▶ No untreated waste shall be allowed to discharge into the water bodies.
- ▶ Construction camps/labor camps etc. shall have proper drainage system
- ▶ Plants management program should be undertaken, awareness program can be created among the local stakeholders to care plants and increase plantation programs
- ▶ Nursery can be developed using native plants under plantation program
- ▶ Purification of all hazards before discharging, Compensation plantation should be done apart from the river training area, gardens can be established in both construction and damping yards

7.4.14.2 AQUATIC FLORA

294. Filling of the seasonal wetlands, ponds and ditches along the roadside, bridge construction, piling, riverbank training etc. will have some impacts on the aquatic flora. The potential impacts will be that the common aquatic vegetation will be removed, and water will be polluted due to project activities. Flow can be damaged, pollution may occur, sound and vibration will be produced. The production by primary producers may be hampered due to pollution.

Mitigation Measures

- ▶ If possible, rare aquatic flora shall be relocated to the nearest wetlands.
- ▶ Creation of artificial water bodies, if space is available. The aquatic species can be relocated there.
- ▶ Both solid and liquid pollutants shall be purified before discharging in the aquatic habitat.
- ▶ Invasive Alien Species (IAS) such as water hyacinth shall be destroyed completely.
- ▶ Without treatment, no pollutants shall be discharged in water.
- ▶ No blockage to the flow shall be created.
- ▶ Solid and liquid debris shall not be discharged in the water.
- ▶ Muddy water formed during piling shall be assigned to a designated place instead of flowing it to the river

water directly.

7.4.14.3 TERRESTRIAL FAUNA/ WILDLIFE

295. Wildlife sanctuary, National Park, pristine habitats, natural wetlands with luxurious growth of aquatic vegetation, bats colonies, nesting bush etc. had not observed along the project corridor
296. In case of fauna, some IUCN concerned species IUCN concerned species such as Herpestesaur opunctatus, Prionailurus viverrinus, Varanus flavescens. Naja naja, Varanus bengalensis, Felis chaus and Vulpes bengalensis were mentioned in the district literature. But practically, the survey team didn't observe any such species along the roadside. Though occasionally, these species come to the roadside, the road side is not their permanent habitat. So, ultimately these faunal species will not stay in the project site, rather they will return to their original habitats (may be Majdiya Baor, Marjat Baor) which are out of the impact zone of the project. Apart from the mentioned seven species in the literature, species under Red List categories of IUCN (Threatened, Endangered, Critically Endangered, Vulnerable, and so on), species protected by laws including CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), and species protected by Wildlife Protection & Security Act, 2012 were not recorded. So, the construction of the new road will not cause any harm to them, significantly. However, some impacts are anticipated during the temporary or long-term Project camp and construction yard preparation for the workforce, site clearance. The potential impacts include losing original habitat, wildlife can search for new habitat, disturbances to the wildlife (hunting, catching, torturing etc.) by the road constructors and laborers, losing original habitat, disturbance of migratory birds, etc.

Mitigation Measures

- ▶ The sites shall be well bordered, protected and well-lit to prevent the entry of wild fauna.
- ▶ No one shall be allowed to keep pet to avoid attracting prey animals.
- ▶ No killing and torturing of wildlife animals by the road constructors.
- ▶ No disturbance should be caused to them while passing through the road.
- ▶ Workers shall remain calm and quiet, should silently pass them in case of their sighting.
- ▶ Strict guidelines regarding the treatment of the wildlife by the authority should be made.
- ▶ Hunting, trapping, poaching shall be strictly prohibited during constructed works.
- ▶ Nearby Wildlife Office of Forest Department shall be informed in case of rescuing any wildlife.
- ▶ Awareness program shall be undertaken to sensitize the workers and other relevant stakeholders to make them aware about the importance of wildlife such as birds, mammals, amphibians etc. animals. Poster and signs using animal image shall be hanged along the road alignments to make people conscious.

7.5 SOCIOECONOMIC ENVIRONMENT

7.5.1 COMMUNITY HEALTH AND SAFETY

297. The risks and adverse impacts on the community's health and safety are expected during construction activities like excavation, earth working, dismantling the existing structures, pavement works, sitting of construction camps/labor camps, water logging, accidents, etc. at residential and commercial areas alongside the project roads.

Mitigation Measures

- ▶ For community health and safety, the contractor shall plan activities in residential areas after having discussion with the community.
- ▶ Local shall be kept informed about the activities which the contractor is taking up in their areas.
- ▶ Excavated areas shall be properly barricaded.
- ▶ Tress passing of construction sites/construction camps/labor camps shall be prohibited.
- ▶ Occupational Health and Safety Plan as well as Community Health and Safety (CHS) Plan shall be prepared
- ▶ The prevention and management of HIV/AIDS and other STIs as suggested below in B-22 of Chapter 10.

- ▶ Contractors shall take all precautionary measures to prevent community exposure to water-borne, water based, water-related, and vector-borne diseases, and communicable and non-communicable diseases that could result from project activities.
- ▶ Water logging shall not be allowed at construction site and minimize areas of standing water by providing effective drainage in construction areas to prevent vector borne disease such as malaria etc.
- ▶ Trained drivers having valid license shall be allowed to drive construction vehicles/heavy equipment.
- ▶ Speed of the construction vehicles/equipment shall be defined by the contractor in the contractors' ESMP.
- ▶ Vehicles/construction equipment need to be maintained and inspected/tested regularly,
- ▶ Drivers must have appropriate government licensing or certification and be provided with proper training.
- ▶ Last but not least, regular consultation with the community to know the effectiveness of the implementation of mitigation measures at construction sites/camps

7.5.2 INFLUX OF LABOR

298. It is expected that around 200-250 skilled/non-skilled laborers during the peak period will be engaged, and mostly locals will be encouraged to engage in the project. There are certain social and environmental impacts due to the influx of outside population/workforce at the project site, such as social conflicts, illicit behavior, and crime, the influx of additional population, communicable diseases, inflation of prices, pressure on accommodation and rents, unhygienic conditions, waste discharge, etc. It has already been mentioned in public consultations that matters and issues related to the anticipated project impacts on Sexual Exploitation and Abuse (SEA)/Sexual Harassment (SH) and Gender Based Violence (GBV), Labor Health and Safety; Occupation Health and Safety, are grave concern due to influx of labor. There would be impacts on local economy like, such as an increase of rented houses/accommodations, significant increase in demand for goods and services due to labor influx, which may lead to local price hikes and/or crowding out of community consumers

Mitigation Measures

- ▶ Trespassing to the contractors' facilities/construction camp/labor camps will be strictly prohibited.
- ▶ Contractor camps/construction camps/facilities will be located 500m away from residential areas.
- ▶ Any issue shall be resolved through a grievance redressal mechanism (GRM) developed by the contractor.
- ▶ Contractors shall be encouraged to recruit local skilled/unskilled workers.
- ▶ The Labor Management Procedure is given in Chapter 8.
- ▶ Install generator for power supply for meeting the emergency power requirement.
- ▶ Contractor will arrange either canteen facilities or gas for cooking to prevent illicit cutting of the trees;
- ▶ Arrange purchase of commodity from district level market or set up special shops for labor;
- ▶ Contractor will prepare a labor management plan in C-ESMP as per updated ESMP of the ESIA.

7.5.3 CHILD LABOR

299. The contractor should follow the code of conduct or term of reference for hiring or recruiting the workforce into the project. In keeping with internationally recognized standards, the project will make a distinction between child labor and young workers. The project will not tolerate child labor under any circumstances. The employment of young workers, i.e., minors aged from full 15 years to under 18 years who have reached the minimum age of employment and completed compulsory schooling, will be allowed under strict conditions and in compliance with requirements of internationally recognized standards and local relevant laws and regulations. The risk of child labor will be mitigated through Certification of laborers and will be confirmed by using the legally recognized documents such as the National Identification Card, and Birth Certificate.

Mitigation Measures

- ▶ Bangladesh labor Act 2006 section 34 prohibits engagement of the child labor in any of activity of project.
- ▶ According to Section 44, anyone under 14 years is considered as child & between 14 and 18 age is considered as adolescent.
- ▶ It is recommended that people under 16 years of age should not be employed in any type of work and shall

be encouraged to go to schools.

- ▶ People between 16- and 18-years of age persons can be employed for lighter works/office works for 6 hours only with prior approvals.
- ▶ Company policy on the labor engagement rules shall be displayed at prominent locations such as contractor camps/labor camps/contractor office etc.
- ▶ Between 16- and 18-year of age child shall not be deployed at any hazardous works such as painting/or other construction activity.
- ▶ To ensure the age, contractor must refer to Certification of laborers' age/National Identification Card/Birth Certificate etc.

7.5.1 PUBLIC SAFETY AND ACCESS

300. Temporary access and diversion, with proper drainage facilities

Mitigation Measures

- ▶ The contractor shall provide adequate warning signboards in local and English language.
- ▶ Flagmen shall be deployed to control the traffic during tree felling or removal/erection of electric poles.
- ▶ Locals shall be kept informed about the activities which the contractor is taking up in the residential areas.
- ▶ Contractor shall provide temporary access to the local/religious place/schools/nursing home in consultation with the local champions.
- ▶ Excavated areas shall be properly barricaded.
- ▶ Tress passing of construction site shall be prohibited.
- ▶ Traffic management plan shall be prepared as per the activity schedules which will be approved CSC/RHD.
- ▶ Trained drivers having valid license shall be allowed to drive construction vehicles/heavy equipment.
- ▶ Speed of the construction vehicles/equipment shall be defined by the contractor in the contractors' ESMP.
- ▶ Grievance redressal mechanism shall be adopted, which need to be approved by the CSC, at site to address the issue at site.

7.5.2 HIV AND STD³¹

301. Due to influx of workers in the Project area, AIDS/HIV may spread in local community. Different type of diseases related to communicable diseases needs to be controlled.

Mitigation Measures

- ▶ Awareness campaigns on HIV/AIDS/STD
- ▶ HIV/STD voluntary counselling, testing, and treatment.
- ▶ Ensuring that construction workers have access to condoms
- ▶ Provision of vending machines at identified location
- ▶ Monitoring of outcomes, in collaboration with National HIV/AIDS Authorities

7.5.3 LABOR MANAGEMENT

302. GRM with GRCs related to (i) Labor Health and Safety will facilitate smooth labor management through redressing any complaint/grievance raised by laborers/against any laborer, (ii) Gender Based Violence (GBV) related grievances will be redressed by GRC related to Sexual Exploitation and Abuse/Sexual Harassment (SH). Roles and functions of these GRC are presented in section 7.6.1 in this ESIA.

Mitigation Measures

- ▶ Contractor shall follow the national legislation

³¹ FIDIC | HIV-AIDS in the Construction Sector | International Federation of Consulting Engineers

- ▶ The Labor License from the Department of Inspection and Factories Establishment (DIFE) under MoLE shall be obtained by the contractor.
- ▶ Condition stipulated therein the license shall be followed by the contractor on labor management, workplace safety and health, and protection.
- ▶ Pooled transportation facilities, as may be required, shall be provided by the contractor.
- ▶ Contractors' company policy on prohibition of Child Labor shall be displayed at the construction camps/labor camps etc.
- ▶ All basic facilities like water supply, cooking gas facility, sanitation facilities including provision of mobile toilet (of adequate capacity for men and women separately) shall be provided within the labor camp.
- ▶ Crèche for female works to be made.
- ▶ Compensation, leave, working schedules etc. for different types of workers will be ensured following the Bangladesh Labor Rules 2015 and other related laws.
- ▶ A specific chapter (Chapter 8) of this ESIA has been induced on Labor Management Procedures (LMP) to clarify every aspect on the labor management and their facilities.

7.5.4 OCCUPATIONAL HEALTH AND SAFETY ASPECTS

- 303.** Without Occupational Health and Safety (OHS) procedures, workers are in risk of temporary and sometimes permanent physical injury such as hearing and sight loss, a damage to limbs, etc. Due to continuous exposure to activities like lifting of heavy tools and tackles, construction equipment; cabling of electrical wires, the workers may suffer from various physical problems, stresses and risks, such as carpal tunnel syndrome, tendonitis, back pain, muscle soreness and nerve damage, chest pains, etc. These risks could create long-terms impacts for the health and safety of the construction workforce.
- 304.** Lack of safety training by contractors can lead to accidents and lost productivity. Construction workers need training on general health and safety matters and on specific hazards of their work.

7.5.4.1 PERSONAL SAFETY

- ▶ Safe work systems and administrative or institutional control measures shall be followed by the contractor.
- ▶ Measures such as job rotation, training safe work procedures, lock-out and tag-out, workplace monitoring, limiting exposure or work duration, etc. shall be adopted.
- ▶ No employee shall be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day without hearing protection.
- ▶ In addition, no unprotected ear shall be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C). Workers working in noisy area shall be provided with earmuffs
- ▶ Exhaust ventilation, isolation rooms, machine guarding, acoustic insulating, etc. shall be provided as per the direction of CSC.
- ▶ The Contractor shall always take all reasonable precautions to maintain the health and safety of the contractor's personnel
- ▶ In collaboration with local health authorities, the contractor shall ensure that medical staff, first aid facilities and ambulance service are always available at the site.
- ▶ Protective footwear such as safety boots/gumboots, helmets and protective goggles shall be used by the workers.
- ▶ Welders shall use protective eye-shields or safety goggles, all electric wire must have proper insulation
- ▶ Lifesaving jacket shall be used by the workers and flagmen.
- ▶ Fall prevention and protection measures shall be implemented for the worker working at more than 2m height.
- ▶ Safety belts shall be provided and used by the workers working at heights (more than 2m) and use of ladders and scaffolds by the trained workers.
- ▶ Necessary lightening having proper illumination shall be provided if required to work site during

nighttime.

- ▶ Potable water supplies to the workers, and water supplied to areas of food preparation or for the purpose of personal hygiene (washing or bathing) shall meet drinking water quality standards
- ▶ Induction training to the workers and subsequent training on safety aspects.
- ▶ Trained workers at hot mix plants/batching plant/Wet Mix Macadam (WMM) shall be deployed.
- ▶ Toolbox training to the workers
- ▶ Workers working in the dusty area shall be provided with nose mask.
- ▶ Sufficient fresh air shall be supplied for construction camps/labor rooms and confined workspaces.
- ▶ Construction/labor camps must receive natural light and be supplemented with sufficient artificial illumination, if required.
- ▶ Emergency lightening arrangement of proper illumination shall be installed at identified locations
- ▶ Eating areas such as canteen must be cleaned, and kitchen waste must be collected as per measure suggested above.
- ▶ Hand, knee, and foot railings shall be provided on stairs, fixed ladders, platforms, ramps or loading bays etc.
- ▶ Covers should, if feasible, be installed to protect against falling items.
- ▶ First aid box shall be provided at identified locations.
- ▶ Tie-up with local hospitals shall be maintained and ambulance facility shall be reserved for emergency purpose only.
- ▶ OHS training to all new workers and refresher training to the old workers/drivers shall be arranged by the contractor.
- ▶ Regular health check-up will be undertaken at construction camps/labor camps etc.
- ▶ Visitors such as CSC engineers or employer's official visiting the construction sites/camps shall use the helmets of approved color.
- ▶ Fire extinguishing devices shall be installed at the identified areas.
- ▶ Arrangements with the local firefighting department shall be made.
- ▶ The contractor shall prepare and get approved an emergency response plan and shall provide training to workers accordingly.

7.5.4.2 MEASURES FOR LABOR, MATERIALS HANDLING AND PAINTING ETC.

305. The use of chemicals (e.g., paint, thinner and solvents) in the fabrication and finishing of the Bridge may be carcinogenic, or detrimental in other ways e.g., the use of industrial solvents can cause anemia, liver and kidney damage, cardiovascular diseases and neurological disorder. Benzene, phenols, and carbon tetrachloride are examples of products widely used, but which are also dangerous to health. Other health problems can be caused by inhalation of exhausts gases from vehicles and machinery, which can impact lungs, eyes and skin, etc.

Mitigation Measures

- ▶ The Contractor shall always take all reasonable precautions to maintain the health and safety of the contractor's personnel
- ▶ In collaboration with local health authorities, the contractor shall ensure that medical staff, first aid facilities and ambulance service are always available at the site.
- ▶ Induction training on construction material handling and storing to the workers and subsequent training on safety aspects.
- ▶ Trained workers at hot mix plants/batching plant/Wet Mix Macadam (WMM) shall be deployed.
- ▶ Toolbox training to the workers
- ▶ OHS training to all new workers and refresher training to the old workers/drivers shall be arranged by the contractor.

7.6 GENDER BASED VIOLENCE (GBV)

306. The gender-based violence (GBV) and sexual exploitation and abuse/Sexual Harassment (SH) risks may increase to some extent within local communities when there are large influxes of male workers from outside the area. In addition, the new risks (outlined in the SEA/SH mitigation plan) with activities under the project which may compound the broader contextual risks present at community level. The gender disparity can be attributed to structural barriers including women's domestic burden, employer discrimination, restricted mobility, limited access to trainings, lack of female friendly facilities at sites, sexual harassment at work, limited childcare provisions. Generally, the female employment tends to be more concentrated in low-paid and low-productivity occupations. Increasing women's labor force participation and improving the quality of female employment will require more significant support for women's access to employment opportunities and high-quality skills development programs.
307. Usually, the outsider workers come without their families and have large disposable incomes relative to the local community and can pose a risk in terms of sexual harassment, violence and exploitative transactional relationships. The risks will be higher where workers come into close contact with the local community, for example on access routes or when living together in remote areas. During the construction phase, female workers are also vulnerable to various forms of harassment, indiscriminate of wage rate exploitation and abuse, aggravated by traditionally male working environments. Mostly the labor hiring companies do not have proper training on code of conduct and company policy on the GBV free work environment for all workers including skilled and non-skilled workers. Moreover, the contractors have lack of experience in management of GBV issues and there are currently limited awareness raising programs on GBV/SEA/SH in communication sector in Bangladesh.
308. In addition, the gender based violence may occur during payment of the compensation money and resettlement benefits of this project due to i) discrimination in sharing of compensated money between man and woman shareholders, (usually brothers are always depriving their sisters from parents property), ii) widow of the PAP sometime will not get actual share of compensation cash and resettlement benefits, iii) Female HHs may get exploitation and harassment to get compensation by middleman / Brokers during collecting money from DD offices and RHD, etc.

Mitigation Measures

- ▶ Implementation of a GBV-free work environment shall be maintained by the contractor, RHD-PD Office, PIU site offices and concerned safety regulatory organizations.
- ▶ A Gender Based Violence Preventive Plan should be followed as presented in Annex 7-1. The purpose of this action plan is to identify the issues, stakeholders, possible service providers and assess their capacity that aid in accessing Grievance Redressal. The action plan has action, activities, indicators, responsibilities and risk management focus on some corresponding mitigation measures; sensitizing the communities and other stakeholders, strengthening the institutional capacities to mitigate project related potential risk of GBV in the project affected population
- ▶ Gender-based discrimination shall be strictly prohibited and monitored.
- ▶ Any type of sexual harassment shall be dealt strictly with as per local law of the country and employee shall be terminated immediately from his duties.
- ▶ Training on code of conduct and company policy on the GBV free work environment shall be organized to all workers including skilled and non-skilled workers.
- ▶ It shall be ensured that above mentioned training has been attended by all including managers/engineer and other workers.
- ▶ Code of Conduct Preventing Gender Based Violence and Violence against Children/female workers shall be signed by the workers/managers/other staff. A sample Labor Code of Conduct (CoC) of the contractor covering the GBV/SEA/SH related risks during construction period is presented in Annex 8-1.
- ▶ A signed copy of the code of conduct shall be documented physically as well as scanned version shall be stored in computer.
- ▶ Company policy on GBV free work environment and code of conduct which was signed by the worker shall be displayed at labor camps/canteen and other contractor facilities.

- ▶ During the recruitment process, the RH Specialist of contractor must undertake diligent reference checks of candidates who have a documented history of prohibited conduct are not hired.
- ▶ A Labor Management Procedure (LMP) shall be followed at site as presented in Chapter 8 of this ESIA to control the risks at site.
- ▶ Staff shall be encouraged to report suspected or actual GBV.
- ▶ Grievance redressal mechanism shall be established at site to address the issues immediately for GBV related to getting the compensation money and resettlement benefit
- ▶ During construction period of the Chachra Intersection project, it is expected that ESMP will be effectively followed which will ensure keeping/maintaining a low-risk environment for Gender-Based Violence (GBV) affecting community members, workers and service users and any other relevant sections of public.

7.6.1 GRIEVANCE REDRESS MECHANISM (GRM)

309. PIU, RHD will establish two separate Grievance Redress Committees, such as GRCs related to (i) Sexual Exploitation and Abuse/Sexual Harassment (SH) and (ii) Labor Health Safety. Details are presented in the Updated RAP. The GRC of SEA/SH has been presented in the following **Table 7-9**.

Table 7-9: GRC Members Related to SEA/SH		
Sl. No.	GRC Composition at the Field Level	Members of the GRC
1.	Concern Project Manager (PM), WeCARE: Phase-1	Convener
2.	Resident Engineer of construction supervision consultant	Member
3.	Gander and SEA/SH Specialist in the PIU	Member Secretary
4.	Project Manager of the contractor	Member
5.	Concern Deputy Project Manager, WeCARE: Phase-1	Member

7.6.1.1 THE SCOPE OF WORK AND THE TERMS OF REFERENCE (TOR) FOR THE GRC RELATED TO SEA/SH

- ▶ The GRC shall review, consider and resolve grievances related to SEA/SH issues received from the various stakeholders of WeCARE: Phase-1 and ensure confidentiality
- ▶ Pay attention to the grievance of the victim
- ▶ Register his/her allegation
- ▶ Ensure the victim that GRC is the right place to get remedy
- ▶ The GRC will attend those cases where the perpetrator and the victim both are associated with the project work. In other cases, they will be advised/assist to lodge complain with the concerned competent authority
- ▶ All complain will be resolved following the “survivor centric approach” giving priority to the victim’s opinions
- ▶ Strict confidentiality of the victim’s identity and related information will be ensured by the RHD/PIU
- ▶ The GRC/PIU will designate a SEA/SH focal person and all related grievances will be received by him/her. The focal person will (i) verify and investigate the matter, (ii) provide support to the survivor, if necessary, by drawing support from external sources such as, police, qualified NGOs for psycho-social counseling, specialized health experts/establishments for treatment of SEA/SH victims, etc. (iii) investigate the genuine of the allegation (iv) implement sanction to the perpetrator (v) And finally solve the matter
- ▶ GRC will monitor and evaluate the total scenario and report it to the PIU

7.6.1.2 STEPS TO BE FOLLOWED

- ▶ Allegations may be received from the survivor/Kin/others orally, over phone or in a written form.
- ▶ Follow the “survivor centric approach” giving priority to the opinions of the victims.
- ▶ Maintain strict confidentiality of the identity and other related information of the victims
- ▶ Register the allegation/case with detailed information

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- ▶ Ranking the case as major or minor
- ▶ Depending on the nature of the case, sending the victim to a nearby medical center or to a law enforcing agency as soon as possible
- ▶ Assistance should be reached to the victim/s within 24 hours
- ▶ Decision should be taken up within 7 days, through an internal committee meeting
- ▶ Collection of necessary evidence within 10 days
- ▶ Legal assistance if required
- ▶ Final settlement of the case within 15 days

310. ESS2 on labor and working conditions requires the setting up of a complaints and grievance mechanism for project workers separate from the project wide-grievance redress mechanism (GRM). The GRC of SEA/SH has been presented in the following **Table 7-10**.

Table 7-10: GRC Members Related to Labor Health and Safety		
Sl. No.	GRC Composition at the Field Level	Members of the GRC
1.	Concern Project Manager (PM), WeCARE: Phase-1	Convener
2.	Resident Engineer of construction supervision consultant	Member
3.	Individual Labor Safety & Health Expert from PIU	Member
4.	Project Manager of the construction contractor	Member
5.	Concern Deputy Project Manager, WeCARE: Phase-1	Member Secretary

7.6.1.3 THE OBJECTIVES OF ESS2

- ▶ To promote safety and health at work
- ▶ To promote the fair treatment, nondiscrimination and equal opportunity of project workers
- ▶ To protect workers which includes vulnerable workers such as women, persons with disabilities, migrant workers, contracted workers, community workers and workers through contract supplier
- ▶ To prevent the use of all forms of forced labor and child labor
- ▶ All types of legitimate demands of the workers will be fulfilled and their grievances will be addressed as per the prevailing national labor law

7.6.1.4 STEPS TO BE FOLLOWED FOR THE IMPLEMENTATION

- ▶ Labor Health and Safety (LHS) aspects will be explained to the workers, both at the labor camp and at the work site to aware them.
- ▶ Enforce the worker's Code of Conduct as adopted in the contractor's ESMP (C-ESMP). This is prepared with reference to the project ESIA/ESMP, LMP and SEA/SH Action Plan.
- ▶ Be aware laborer about the health and safety issue and the precautionary measures to be taken by them to uphold a congenial and healthy atmosphere at the site.
- ▶ Ensure the availability of a "First Aid Box" both at the labor camp and at the work site. Inform the laborer and keep the laborer acquainted about its use, as and when required. Emergency drugs, gauge and bandages etc. must be available in this "First Aid Box".
- ▶ Firstly, the availability of PPE is to be ensured. The laborer will be made acquainted with its use.
- ▶ A proper demonstration will be held about the technique of PPE use at work.
- ▶ Ensure the availability of separate latrines for both male and female workers, potable water, a waste disposal system, and a well-ventilated and well-illuminated labor camp through regular monitoring.

Mitigation Measures

- ▶ Implementation of a GBV-free work environment shall be maintained by the PIU/RHD and the contractor. The role and functions of GRM have been mentioned above, which will ensure mitigation measures as per ESMP
- ▶ Gender-based discrimination shall be strictly prohibited and monitored

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- ▶ Any sexual harassment shall be dealt strictly with as per local law of the country, and the employee shall be terminated immediately from his duties
- ▶ Training on the code of conduct and company policy on the GBV-free work environment shall be organized for all workers, including skilled and non-skilled workers
- ▶ It shall be ensured that the training mentioned above has been attended by all, including managers/engineers and other workers
- ▶ Code of Conduct Preventing Gender-Based Violence and Violence against Children/female workers shall be signed by the workers/managers/other staff
- ▶ The code of conduct needs to be get signed by each worker every six months
- ▶ Signed copy of the code of conduct shall be documented physically and as scanned version shall be stored in the computer
- ▶ Company policy on GBV free work environment and code of conduct, which was signed by the worker, shall be displayed at labor camps/canteen and other contractor facilities
- ▶ Staff shall be encouraged to report suspected or actual GBV
- ▶ Grievance redressal mechanism shall be established at site to address the issues immediately

7.6.2 COVID-19

311. Minimizing the spread of COVID-19 has become a top priority for all workers and project personnel to the construction projects. The contractors of the Chachra Intersection project may face many challenges in coping with the effects of the COVID-19 pandemic on the economy and the construction work environment if they avoid or ignore the COVID-19 preventive measures to be taken at construction sites, camps and offices.

Mitigation Measures

- ▶ Contractors must apply or comply with the government guidelines in line with WHO to contain the outbreak of the infection at sites.
- ▶ Installation of dispensers for hand sanitizers in labor camps/construction and other prominent location.
- ▶ Distribution of N95 mask etc. to labor.
- ▶ Awareness campaigns
- ▶ Contractor shall prepare COVID-19 preventive action plan as per WHO norms for implementation
- ▶ Regular health check-up
- ▶ RHD will employ a consultant to prepare a COVID-19 prevention plan at the construction site.

7.6.3 TRAFFIC DIVERSION AND DETOURING

312. Traffic generated by project-related activities can significantly inconvenience or disturb local community who reside near the areas adjacent to construction works. Movement of heavy vehicles for carrying construction materials and equipment will add congestion to existing traffic and increase the risk of traffic accidents. Disruption of access to infrastructure or social resources due to construction activity will cause nuisance. It will also pose risk of accidents for drivers at night if these blockage and disruption are not clearly demarcated. In addition, there are serious accident risk for pedestrians during crossing the road at sensitive receptors, like schools, mosques, temples, hospitals etc., and other CPRs.

Mitigation Measures

- ▶ To avoid disruption of the existing traffic due to construction activities, a comprehensive Traffic Management Plan (TMP) will be drawn up by the contractor and submitted to Authority Engineer for approval before the commencement of construction
- ▶ The traffic control plans shall contain details of diversions, traffic safety arrangements during construction safety measures for nighttime traffic
- ▶ Temporary diversions shall be provided as per the requirement
- ▶ Detailed “Traffic and Road Safety management Plans” shall be prepared by the Contractor and submitted to CSC for approval

- The traffic management and control plans shall contain details of temporary diversions, traffic safety arrangements for construction under traffic, details of traffic arrangement after cessation of work each day, Safety measures for night-time traffic and precaution for transportation of hazardous materials and arrangement of flagmen

7.7 IMPACTS AND MITIGATION DURING OPERATION PHASE

313. Periodic environmental monitoring of terrestrial ecology, water resources, water quality, air, noise, etc. shall be undertaken. The client will monitor and evaluate the effectiveness of the ESMP/RAP through PIU during the project tenure and onward through the Environmental and Social Division of RHD.

7.7.1 TERRESTRIAL ECOLOGY

314. The shrubs and trees to be planted on the median and along the road are to be maintained. The shrubs shall be trimmed regularly.

7.7.2 WATER RESOURCES AND WATER QUALITY

315. Side drains will be regularly cleaned before the onset of the monsoon, and water quality monitoring will be undertaken.

7.7.3 IMPACTS ON AIR ENVIRONMENT DURING OPERATION PHASE

316. During operation the activity of the proposed development will be only vehicular movements on the newly developed flyover/bridge infrastructure. Vehicular emissions will be the principle source of pollution during the operation stage. However, this development will provide a mode to decongest traffic in the overall project area. As such proposed development is not envisaged to have adverse impacts on air quality during the operation. Hence, the proposed development can be seen as a measure to help reduce pollution issues as well as the corridor will help decongest existing traffic and provide better riding conditions to the road users.

7.7.4 IMPACTS ON NOISE ENVIRONMENT DURING OPERATION PHASE

317. Motor vehicles are inherently noisy, and noise impacts are inevitable in any road development regardless of scale or character³². The noise sources during the operation of road projects are namely, vehicle noise, friction between vehicles and road surface, driver behaviour, and maintenance of the road. Vehicles noise³² is generated from engine, transmission, suspension, acceleration, stop and go traffic conditions and rough roads. Poor vehicle conditions are also one contributing factor³².
318. During operation stage, rise in noise level will likely arise due to increase in traffic. However, this development will provide a mode to decongest traffic and thereby will help to reduce impacts due to increased noise levels.
319. Composition of Traffic and Growth: Based on traffic survey the composition of traffic is Car / Jeep / Utility Van, Auto Rickshaw, Motorcycle Mini Bus/Micro Bus Large Bus Small Truck Medium Truck Heavy Truck Non-Motorized. The composition of traffic on the existing road at different Automatic Traffic Classified Count (ATCC) is summarized in **Table 7-11**.

Survey Location	ATCC 1, Near Petrol Pump, Jashore City Bypass (N7)	ATCC 2, New Akij LPG Fuel Station, Jashore Banapole Hwy (N706)	ATCC 3, Saymon Fish Farm, Jashore City Bypass (N7)
Car / Utility	8	5	3
Utility/Microbus	3	2	2
3 wheeler (Passenger)	16	21	16
Mini Bus/Micro Bus	1	0	2
Large Bus	6	3	5

³² Roads and Environment a Handbook, The World Bank, 1997

Table 7-11: Average Percentage Composition of Traffic (%)

Survey Location	ATCC 1, Near Petrol Pump, Jashore City Bypass (N7)	ATCC 2, New Akij LPG Fuel Station, Jashore Banapole Hwy (N706)	ATCC 3, Saymon Fish Farm, Jashore City Bypass (N7)
Small Truck	7	3	4
Medium Truck	10	5	11
Heavy Truck	2	1	2
Non-Motorized	20	30	29
2W	27	30	27
MAV (4 to 6 Axles)	0	0	0
Tretractor	0	0	0
Tractor with Trailer	0	0	0
Total Exempted	0	0	0
Total	100	100	100

6. The traffic composition on the existing road is presented graphically in **Figure 7-1**.

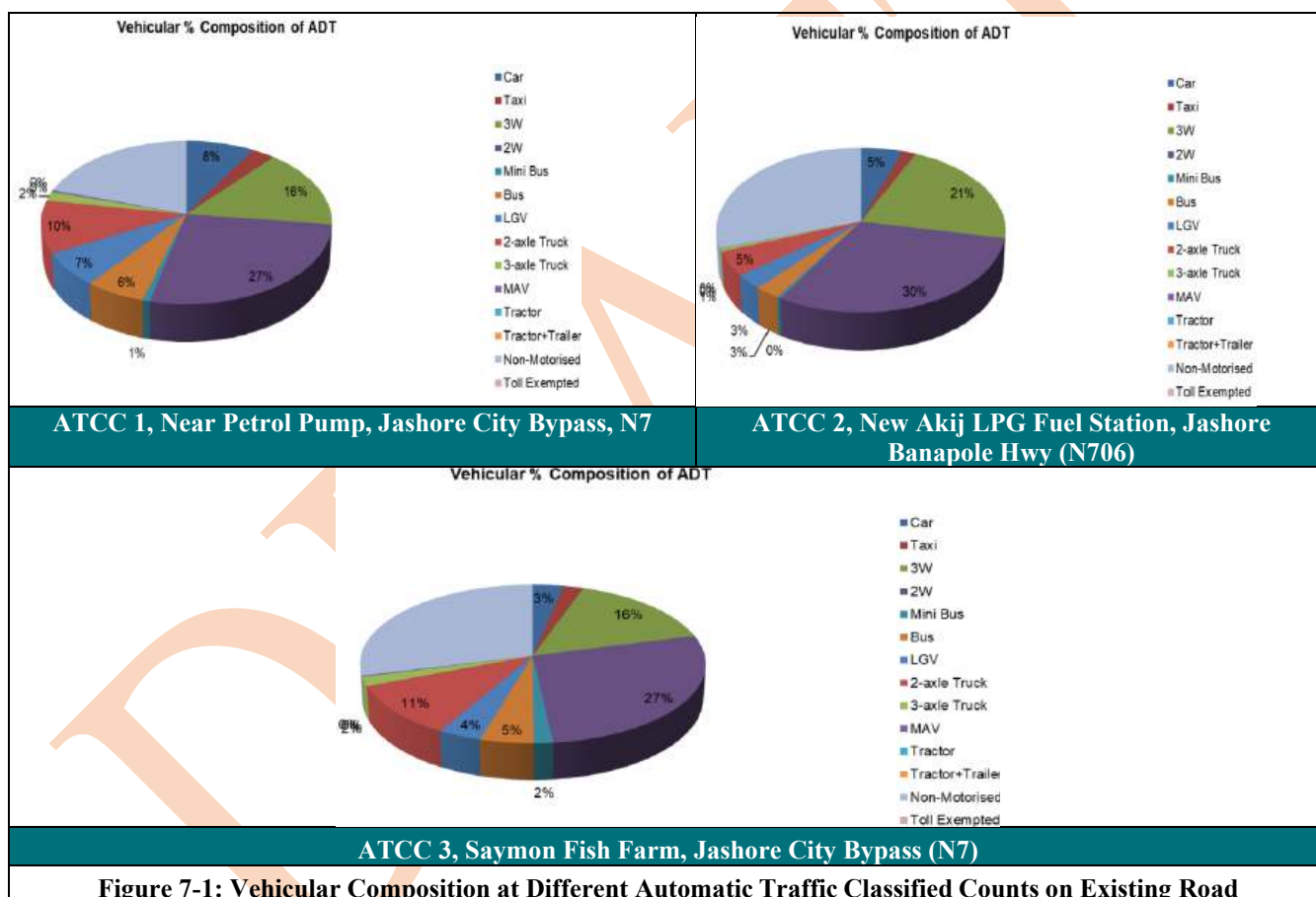


Figure 7-1: Vehicular Composition at Different Automatic Traffic Classified Counts on Existing Road

320. The growth rate of the projected traffic in percentage year on year base for every year has been estimated and is presented in **Table 7-12**.

Table 7-12: Forecasted GSDP in % in YOY every 5 years of period

Up to 2023 from Previous Data	2024- 2029	2029- 2034	2034-2039	2039-2044	2044- 2049	Beyond 2049
6.60%	6.50%	6.83%	7.23%	6.51%	5.86%	4.98%

Source: ICT

Mitigation Measures

- Vehicular noise and horn use need to be controlled through law enforcement and public awareness.

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Vehicles should be ensured to use proper horns as per norms to keep noise within permissible limits.

- ▶ Pressure horns shall not be allowed.
- ▶ Silence zones need to be demarcated, and road signs prohibiting horns honking will be displayed in residential areas, sensitive locations, and silence zones. No honking signboards shall be placed near the sensitive receptors
- ▶ Noise barriers using tree plantation shall be done along the corridor, especially along sensitive receptor sections such as schools, hospitals, etc.
- ▶ Regular monitoring of noise level will be carried out as per the environmental monitoring plan suggested in Section ESMP of this report.

7.7.5 SOIL AND SEDIMENTS

- ▶ Any Spillages or Accidental Vehicles Shall be Removed Immediately.

7.7.6 ROAD SAFETY

- ▶ Road furniture as provided in the operation phase need to be maintained properly
- ▶ Potholes or any other damages shall be rectified immediately after post monsoon
- ▶ Highway Petrol/ Police deployment sufficiently at the project road in operation to the overseeing, monitoring and enforcing traffic safety compliance on roads and highways as well accident investigation and sexual misconduct, particularly women SH in the public buses during night

7.8 CUMULATIVE IMPACT

321. The improvements of Chachra Intersection are assessed to have no significant cumulative impacts as developments are mainly within the existing road and in an area that has already been altered, fragmented and highly disturbed for many decades as result of Population growth, agricultural and aquaculture development, encroachment and establishment of new settlements along the highway, land transformation and other associated development.
322. There is currently no major on-going project on the Chachra Intersection and the cumulative impact of the project is likely to be during construction stage. Positive cumulative impacts, however, are expected to outweigh any negative cumulative impacts as once the project is completed the region is likely to be economically transformed. The environmental and social risk clauses emphasize on the requirements for environmentally sustainable and responsible construction and specify the need for the contractor to apply the mitigation and monitoring measures as defined in the ESMP.

8 LABOR MANAGEMENT PROCEDURE

- 323.** The social-economic condition assessment was carried out by conducting a primary survey in March-April 2024. Based on primary data collected from the field, the following subsections discuss the existing socioeconomic conditions in and around the Chanchra intersection.
- 324.** This Labor-Management Procedure (LMP) has been prepared to ensure that the project complied with the Bangladesh Labor Act of 2006, as well as the World Bank's Environmental and Social Framework (ESF), Environmental and Social Standard 2: Labor and Working Conditions (ESS2), and Environmental and Social Standard 4: Community Health and Safety (ESS4). In Bangladesh, the LMP took into account the use of nationally adopted health and safety norms. For civil and construction work, the project will require both direct and contractual employees. The LMP applies to all direct workers, contracted workers, and major supplier workers who will be working on the project.
- 325.** This section explains the labor-management approach for project aspects while taking into account national and international norms. The labor laws are governed by the Bangladesh Labour Act 2006 as amended in 2010 and 2013 and Labour Rules 2015. Some of the national and international laws regarding occupational health and safety that are relevant to this project are presented below in **Table 8-1**.

Table 8-1: Summary of National and International Laws

Sl. No.	Acts	Objectives/Description
1.	Bangladesh Labor Act 2006 (Amendment 2013)	Provides safety for the workforce during the construction period. The act guides the employer's extent of responsibility and the workmen's right to compensation in case of injury caused by an accident while working
2.	Bangladesh Labor Rules 2015	Provides guidelines on Employment Policy/Service, Registration of Manpower supply agency, Establishment Organogram, Appointment Letter, Various Register, Misconduct and punishment, two festival bonuses, Provident fund elaborated, Holiday, Health and fire safety, Wages, etc.
3.	Water Supply and Sewerage Authority Act 1996	The act calls for ensuring water supply and sewerage system to the public, preservation of system, and other related health and environmental facilities for the community.
4.	Labor Relations Under Labor Laws, 1996 (revision to scattered Acts and Ordinance to formulate the unified code)	The general concern during the project implementation state that the project manager must recognize labor unions
5.	Public Health Emergency Provisions Ordinance, 1994	Calls for special provisions concerning public health. In case of emergency, it is necessary to make special provisions for preventing the spread of disease, safeguarding public health, and providing adequate medical services, and other services essential to the health of respective communities and workers during construction-related work.
6.	Bangladesh Factory Act, 1979	Workplace provisions: these Act and Labor Laws require medical facilities, first aid, accident, and emergency arrangements, and child care services to be provided to the workers at the workplace.
7.	The Employees State Insurance Act 1948	Health, injury, and sickness benefit should be paid.
8.	The Employees Liability Act, 1938	Covers accidents, risks, and damages concerning employment injuries.
9.	Maternity Benefit Act 1950	Framed rules for female employees, who are entitled to various benefits for maternity.
10.	The Equator Principles (III) 2013	Provide guidelines on environmental and social standards with considering project manpower and other stakeholders.
11.	International Labor Organization Rules and Guidelines:	
12.	Convention 029 (1930)	Guidelines on Forced or Compulsory Labor;
	Convention 098 (1949)	The Application of the Principles of the Right to Organize and to Bargain Collectively;
	Convention 100 (1951)	Equal Remuneration for Men and Women Workers for Work of Equal

Table 8-1: Summary of National and International Laws

Sl. No.	Acts	Objectives/Description
		Value
	Convention 111 (1958)	Discrimination in Respect of Employment and Occupation;
	Convention 138 (1973)	Minimum Age for Admission to Employment;
	Convention 182 (1999)	The Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labor

326. To address the following points, the contractor will take necessary steps during the construction period according to the national laws relating to the labor-management procedures (occupational health and safety-relevant) as well as World Bank's (WB) Environmental and Social Framework (ESF), specifically Environmental and Social Standard (ESS2) and Community Health and Safety (ESS4) is presented respectively.

8.1 SELECTION AND LAYOUT OF CONSTRUCTION CAMP

327. Selection of labor camps and construction camps before starting the road construction depends on a few things including size, dimension, and time length of the project. The assigned contractor or responsible authority will select a certain location alongside the project area considering government-owned free land, barren land, river banks, etc. which have no consequence of environmental and social obligation. In terms of selecting the construction camp, it's recommended to avoid any specific land that could be socially or environmentally critical. A tentative construction camp layout has been drawn for specifying the temporary infrastructure establishment (**Figure 8-1**). Hot mixed plant, stockyard, stone crusher, batch plant, maintenance workshop, laboratory, etc. will be placed in the opposite direction of the maximum yearly wind flow in a certain place. All necessary temporary infrastructure will be well established or well-decorated considering the project requirement. The contractor will follow or comply with the tentative layout with proper procedure. The selection criteria for the construction camps can be presented below-

- ▶ **Land Selection:** Barren land, government free land, khas land, char land, etc. Avoid agricultural land, private land, vegetation area, public place, recreational area, forest area, sensitive area etc.
 - ▶ **Layout Placement:** Place environmentally or socially corrosive infrastructure (hot mixed plant, stockyard, stone crusher, batch plant, maintenance workshop, laboratory, etc.) far from the residential area, labor camps, office area, etc.
328. Selecting or drawing the construction camps in a certain place there have a few things that should be considered to maximize the productivity, reduce areas needed for temporary construction, and maximize utilization, such as-
- ▶ **Safety:** Ensuring the selected construction camp location is safe from any natural, social, regional, or environmental hazards.
 - ▶ **Site Accessibility:** Giving priority to easily accessible areas for selecting as construction camps that will be feasible to prevent any emergency easily.
 - ▶ **Security:** The selected location should be secure from any national, or regional conflicts or any other insecure activities.
 - ▶ **Environmentally Sound:** The selected location should be considered as any barren land or free land that has a lower impact on the surrounding environment.
 - ▶ **Socially Feasible:** Avoid the socially crowded place where there has no chance to affect any local community.
 - ▶ **Economically Sustainable:** In the selection of the construction camp location, it is mandatory to meet up the economic aspects to borrow or buy the land.

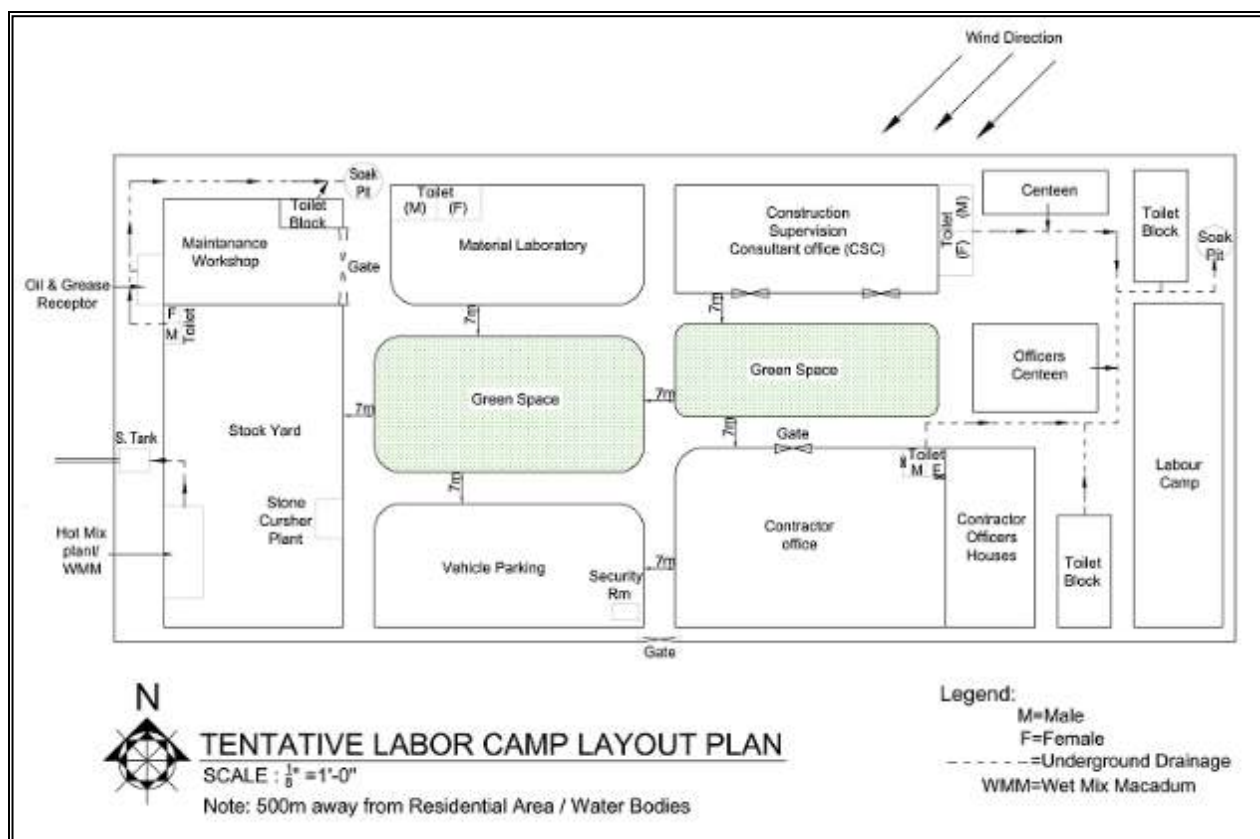


Figure 8-1: Tentative Layout of the Construction/Workers Camp

8.2 HIRING AND RECRUITMENT PROCEDURE

329. Hiring and recruitment of workers, staff, engineers, consultants, etc. will be depended on the project dimension and time scenario. According to the WeCARE program description, dimension, and length the contractor will have to appoint or recruit direct workers, contracted workers, primary supply workers, and also migrate workers on basis of expertise requirements. The whole process of hiring and recruitment will be conducted considering the standard procedure of Bangladesh Labor Act 2006, Labor Rules 2015, ILO Convention, World Bank's ESS2, and also ESS4. All of the procedure will be undertaken by following the CoC of the contractors which presented Annex 8-1. The LMP applies to all project workers whether full-time, part-time, temporary, seasonal, or migrant workers. There will be provisions to avoid the use or employment of children and forced labor at any level of the project. The major procedure of hiring and recruitment of workers has been depicted here as-

- ▶ **Selection of Workers:** The contractor will select skilled, non-skilled, semi-skilled, and armature workers, engineers, staff, consultants, etc. for engaging them in the various dimension of project activities following the proper code of conduct and standards.
- ▶ **Source of Workers:** Depending on the type of work the contractor will procure properly for sourcing the workers. Direct workers, contract workers, supply workers, and migrant workers will be engaged by the contractor before starting the project activities or when needed with the proper application of ILO, Bangladesh, and World Bank Standard.
- ▶ **Appointment of Workers:** The contractor has full independency to appoint full-time, part-time, contractual, or intermittent workers depending on their workload and activities. The contractor will appoint workers on a contract basis, probation basis, or permanent basis by enforcing the Labor Act 2013, Labor Rules 2015, ILO Convention, and also ESS2 & ESS4.
- ▶ **Contract Documentation:** Contract documentation means the agreement paper between the workers and

the contractor providing proper guidelines on the term of references, period, probation time, wage, benefits, compensation, penalty, termination, and conclusion. Human resource personnel on behalf of the contractor will prepare the proper documentation and supply it to the workers before the appointment for better understanding.

- ▶ **Probational Period:** A fixed probation period will be included in the contract document by following the guidelines of proper standards at the national or international level.
- ▶ **Services and Facilities:** The contractor will aware of the prospective workers about their services and facilities before processing any recruitment or hiring and also the workers will agree to obey the rules and regulations as well as commit to provide proper services to the project execution.
- ▶ **Conclusion of Probation:** The contractor may have the authority to monitor, evaluate, and conclude the probation period of every worker after completing the fixed probation period. According to the services from the workers the contractor will decide on permanent/contractual appointment or termination as following the Labor laws, rules and regulations.
- ▶ **Wage Adjustment:** After permanent/contractual appointment the contractor will adjust the worker's wages, benefits, services, and facilities as per standard rules, regulations, and laws which adopted for this project.
- ▶ **Project Execution:** The contractor will be the most prominent authenticated body to complete the project work following the supervision of the project owner, lender, and consultation organization. After executing the primary recruitment process (though the recruitment may run during the whole project lifetime) the contractor will properly execute the project work by compiling labor laws, standards and regulations. The contractor will maintain the workers' profiles for any avoiding unwanted situations (Annex 8-2).
- ▶ **Local Recruitment:** The preference for project employment will be given to local people, those who have been directly affected by Project-related displacement, and/ or those who have completed specific skills training under various programs offered and managed. To implement the local recruitment, a local recruitment process will be developed by the contractor including the following activities:
 - Collect and finalize the information for recruitment from the contractor and its subcontractors (e.g., type of position, number of positions, job description)
 - Conduct public disclosure of a summary of upcoming recruitment (both skilled and unskilled positions) and the process for application at the project area and nearby communes;
 - Collect the data of candidates who have applied or registered in seeking employment including personal background, contact information, expected position, training, and update of involvement;
 - Communication with the project's stakeholders and beneficiaries shall be clear to manage expectations.

330. The contractor should follow the below-explained code of conduct or term of reference for hiring or recruiting the workforce into the project-

- ▶ **Child Labor:** In keeping with internationally recognized standards, the project will make a distinction between child labor and young worker. The project will not tolerate child labor under any circumstances. The employment of young workers, i.e., minors aged from full 15 years to under 18 years who have reached the minimum age of employment and completed compulsory schooling, will be allowed under strict conditions and in compliance with requirements of internationally recognized standards and local relevant laws and regulations.
- ▶ **Forced Labor:** The Project defines forced labor in line with the ILO Convention as any work or service extracted from a person under threat or penalty, which includes penal sanctions and the loss of rights and

privileges, that the person has not offered him or herself voluntarily. It includes slavery and abduction, misuse of public and prison works, forced recruitment, debt bondage, domestic workers under forced labor situations, and internal or international human trafficking.

- ▶ **Probation:** The probation period shall be negotiated by the contractor and candidates based on the candidates' jobs. Only one probation period is applied for a job. A copy of the probation contract will be provided to the candidate which outlines the working conditions and term of employment of the candidate during the probation period.
- ▶ **Labor Contract:** The labor contract is an agreement between the contractor and an employee on a paid job, salary, working conditions, rights, and obligations of each party in the labor relations. The labor contract is also a legally binding agreement between the contractor and an employee, which is the first basis to resolve conflicts and disputes arising in labor relations.
- ▶ **Termination of Labor Contract:** An employee and the Project shall have the right to unilaterally terminate the labor contract, however, notification shall be given to each other in advance.
- ▶ **Harassment:** The Project prohibits harassment of any kind, including sexual harassment, and will take all appropriate measures to promote a harmonious work environment and to protect personnel from exposure to any form of prohibited conduct through preventive measures and the provision of effective remedies when prevention has failed. During the recruitment process, the HR Specialist must undertake diligent reference checks of candidates to ensure that individuals who have a documented history of prohibited conduct are not hired.
- ▶ **Non-Discrimination and Equal Opportunity:** Employees must be treated equally about gender, age, race, religion, disability, nationality, political beliefs, membership in unions, ethnic origin, religious beliefs, as well as sexual orientation. Equality in employment shall mean the absence of any form of discrimination, direct or indirect, for reasons specified as mentioned above. The Project builds its equal opportunity policy to ensure fairness in all aspects of employment, including hiring, training, evaluation performance, compensation, and benefits, as well as the termination of employment.
- ▶ **Compensation for Damage:** An employee who causes damage to equipment or otherwise damages the employer's assets shall have to pay compensation by enabling the laws. The contractor has the right to conduct a wage deduction from the employee's salary every month to make up for the loss. An investigation shall be conducted when an employee causes damage to the company equipment or assets (Annex 8-3).
- ▶ **Trade Union/Workers' Organizations:** The below requirements shall be followed when establishing a Trade Union/Workers' organization at the project. In the event of any practices that fall out of the requirements in this section, the Bangladesh Labor Rule 2015 and Trade Union Law shall be applied accordingly. Employees have the right to freely establish, associate, and participate in Trade Union or other Workers' Organizations at the workplace. The workers' organizations in the project can be Trade Union or other workers' organizations which has been established according to Bangladesh's labor regulations.
- ▶ **Wage:** Employees will be paid based on their performance and skills regardless of employees' characteristics such as gender, age, race, religion, disability, nationality, political beliefs, membership in unions, ethnic origin, religious beliefs, as well as sexual orientation. The base monthly salary shall be determined according to the wage scale and shall not be lower than the regional minimum wage.
- ▶ **Benefits:** The statutory benefits include medical examination, social security, and childcare assistance shall be ensured by the contractor.
- ▶ **Hours of Work and Breaks:** The regular working hours of all employees at the Project are 8 hours per day and/or 48 hours per week. Employees are entitled to have at least four (4) days off per month. Female employees who are in their 7th-month of pregnancy and who are nursing a child under 12 months of age

will only work 7 hours per day but will be compensated for 8 hours.

- ▶ **Overtime Arrangements and Overtime Compensation:** The legal requirement on maximum overtime allowed shall be followed as not to exceed 4 hours per day, 40 hours per month, and 300 hours per year. The overtime premium shall be paid following the local regulatory requirements of Bangladesh.
- ▶ **Leaves:** The breaks and leave include statutory holiday, public leave, marriage leave, maternity leave, sick leave, work injuries leave, personal leave, bereavement leave, and annual leave
- ▶ **Retrenchment:** Retrenchment means the elimination of several positions or the dismissal or layoff of several workers by an employer, generally because of a plant closing or for cost savings. In the Project, retrenchment refers to a consequence of adverse economic circumstances or because of a reorganization or restructuring, it does not cover isolated cases of termination of employment for cause or voluntary departure.

8.3 FACILITIES AT WORKERS' CAMPS

331. According to the national and international labor laws, the contractor will ensure numerous facilities in the labor camps for good practices of environmental and social norms. A list of facilities in the worker's camps is listed below-

- ▶ **Lodging Facilities:** For all workers, the contractor will provide an adequate accommodation facility. Separate accommodations needed to be arranged for different caste and ethnic groups. A distinct location of the accommodation is required for men and women considering social security. The temporary campsite will not be located at a roadside to avoid/ minimize the danger of road accidents.
- ▶ **Drinking-Water Supply:** The availability and proper storage of potable water is also the responsibility of the contractor. The quality of water must be maintained by proper treatment and testing periodically. Water consumption by the site workers should not endanger the water right of the local population.
- ▶ **Sanitation and Waste Disposal:** The contractor is supposed to provide adequate sanitary facilities to the workers on site. There must be an adequate number of toilet and bathing facilities for all workers. A separate toilet and bathing facility for the women workers is mandatory. The proper outlet of wastewater is required to maintain the hygiene of the camp as well as workers. The camp should have a treatment facility for the wastewater to maintain public health.
- ▶ **Fuel Use:** The contractor will make fuel arrangements for cooking, lighting, and heating. Fuel usage from a public supply source should not affect its availability or cost to the local population. For environmental reasons, the contractor shall not use firewood for cooking and heating except legally authorized sources.
- ▶ **Fire Prevention Facilities:** Fire is a major cause of damage on construction sites. So, fire extinguishers are basic requirements for a construction project.
- ▶ **Medical Services:** The contractor must arrange first aid facilities and primary treatment facilities with a well-equipped medical room, ambulance (24/7) facilities, a trained doctor, nurse, OHS personnel, etc. The contractor will also ensure regular health checkups of the workers.
- ▶ **Construction Safety Clothing:** Basic safety supplies like safety shoes, hard hats, gloves, and goggles must be provided by the contractor for workers for the entire project time.
- ▶ **Food Supply/Kitchen or Dining Facilities:** The contractor will ensure proper food supply for the workers and a responsible person will be employed to monitor.
- ▶ **Information Signs:** Site maps should locate details of the project, and be displayed in the office of the site superintendent or project manager and posted at the entrance gate. Traffic regulatory signs should be displayed in every important location of the campsite. Labor relations policy and safety rules will be displayed to award the workers their responsibility.
- ▶ **Security:** It is necessary to have a proper guard entrance to the site provided by a booth. Also, it is

necessary to keep track of all visitors to the project. It is necessary to have a standby generator to maintain site lighting. The boundary should be fenced off from a security point of view.

- ▶ **Offices:** The offices should be close together, close to the site, and in a safe area. Also, provide the offices with proper office equipment. The offices at the site may include job offices, general contractor offices, and sub-contractors and consultants Offices.

8.4 RECORD KEEPING AND MAINTENANCE

332. The control of documents and records related to labor management shall be conducted following the document control procedure of the contractor. The project owner, the contractor, and subcontractors shall retain the following documents and records-

- ▶ Employees' details information
- ▶ Internal Labor Regulation;
- ▶ Collective Bargain Agent (CBA) and other Trade Union/Workers' Organization's documents (minutes of Labor Conference, Social Dialogues, Trade Union/ Workers' Organization's Fund, records of Trade Union/ Workers' Organization's activities);
- ▶ Labor Contracts;
- ▶ Wage scale and pay slip;
- ▶ Documents on occupational accidents and diseases;
- ▶ Grievance documents;
- ▶ Training records;
- ▶ Discipline records;
- ▶ Monthly/Quarterly/Semi-Annual self-audit report of contractors, their subcontractors, and primary suppliers' performance
- ▶ Monthly performance report of subcontractors/ primary suppliers
- ▶ Quarterly/Semi-Annual report of the Project' Labor and Working Conditions Management
- ▶ Quarterly Reports on Utilization of non-local workers; and
- ▶ Annual Labor Compliance Self-Assessment Report.

333. All documents and records are required to be filed for at least five years or as per regulatory requirements, whichever is more stringent and kept in safe storage accessible only to authorized personnel. Records shall be made available for inspection and audit by the contractor and the project owner or its agents upon request.

8.5 MONITORING, AUDITING, AND INSPECTIONS

334. Monitoring and implementation follow the requirements are critical components to prevent issues from becoming problems in the first place and to ensure that action plans are implemented, and procedures are being followed. The monitoring program related to the LMP is presented in **Table 8-2**. Any major non-compliance (e.g., issues that could lead to a significant failure of structures, fatal accident, major injuries, authorities' notice/prosecution, or delay in project schedule) shall be corrected within one working day. Minor non-compliance issues (e.g., issues that do not lead to a breach of statutory requirements, bodily injuries/damage to properties, the environment, and surrounding communities) shall be corrected within one week. All checklist for monitoring is presented in Annex 8-2 to Annex 8-9.

Table 8-2: Internal Monitoring Program

Action	Performance Indicators	Monitoring Protocol	Responsibilities	Monitoring Records
Internal Monitoring	The number of child labor; Number of forced labors; Number of Trade Union/Workers' Organization members and activities; Number of Trade Union/Workers' Organization dialogues and no. of issues raised; Number of employees who sign the labor contract; Number of employees paid under regional minimum wage; Number of employees registered with social, health, and unemployment insurance; Type, number, and compensation of occupational accidents and diseases. Type and number of grievances; and Type and number of instances of disciplinary actions.	Quarterly	Contractor' Personnel; and HR Specialist.	Employees' information; Internal Labor Regulation; CBA and other Trade Union/Workers' Organization's documents (minutes of Labor Conference, Social Dialogues, Trade Union/Workers' Organization's Fund, records of Trade Union/ Workers' Organization's activities); Labor Contracts; Wage scale and pay slip; Documents on social, health, and unemployment insurance payments; Documents on occupational accidents and diseases; Grievance documents; and Discipline documents.
	Number of local people (separated by gender) working at the Projects	Quarterly	Contractor' Personnel; and HR Specialist.	List of local people (separated by gender)
External monitoring	Performance indicators listed above; and Labor Audit Report; Other indicators upon request by Lender.	Quarterly	HR Specialist	Upon request by the Lender

8.5.1 INTERNAL AUDIT

335. Apart from daily inspection, internal audits at planned intervals will be scheduled to ensure appropriate preventive actions are being taken as planned, and corrective actions are being carried out on a timely basis. The internal auditing program is shown in **Table 8-3**.
336. The contractor' personnel shall conduct internal labor and working condition management audit quarterly during the construction phase and semi-annually during the operation phase to ensure the performance of the project complies with the applicable standard. The template of the audit checklist is presented in **Table 8-3**.

Table 8-3: Internal Auditing Program

Sl. No.	Audit/Inspection	Responsibilities	
		The Project Owner/Lender	The Contractor/ Subcontractor/ Primary Supplier
1.	Monthly inspection		x
2.	Quarterly self-audit		x
3.	Quarterly audit of Subcontractor/Supplier Management (during the construction phase)	x	
4.	Semi-annual Labor Compliance Self-Assessment (during construction and operation phases)	x	

8.5.2 REPORTING

► Internal Reporting

337. Internal reporting is defined as communication between the project owner, the contractors, subcontractors, and primary suppliers. The internal reporting during construction shall include, but is not limited to:

- Quarterly self-audit report of contractor and primary supplier performance, including subcontractors' performance.
- Annual report of contractor/primary supplier management; and
- Annual report of the project's labor and working conditions management.

338. HR specialists/contractors and primary suppliers shall be responsible for the implementation of corrective actions for issued identified during the audits and assessments. A report on corrective actions implementation status shall be prepared and submitted to the contractor's personnel/HR specialist in the next audits

8.6 GRIEVANCE REDRESS MECHANISM

339. The contractor will assist and take necessary steps for collecting written complaints on behalf of the PIU and coordinate responses to all complaints. Both verbal and written complaints are to be entered into a Grievance Complaint Log as addressed when receiving a complaint all employees shall refer the complainant to the PIU or the resident engineer. The process of GRM is sorted out below-

- The person receiving a complaint shall ensure that the Grievance Complaint Log is completed.
- The form shall then be forwarded to the PIU expert who will assign it a number.
- The PIU expert shall ensure that all actions are made to close out the complaint.
- Information on proposed corrective action sent to complainant (if appropriate); the date the complaint was closed out; and Date response sent to the complainant.
- All complaints shall be responded to in writing, though a verbal response will be provided as well if this is more appropriate in the circumstances (e.g., where the complainant cannot read).
- All complaints must be responded to within two weeks of being received, even if the response is just a summary of what is planned and when it is likely to be implemented.
- Further correspondence should be given once the complaint is closed out.
- The PIU expert through the contractor will be responsible for providing a monthly report detailing the level of complaints and any outstanding issues to be addressed.
- Monthly reports will include an analysis of the type of complaints, levels of complaints, and action taken to reduce complaints.

340. The PIU expert shall file all documentation related to complaints in a file in his office.

8.7 CLOSURE OF THE CONSTRUCTION SITE AND CONSTRUCTION LABOR CAMPS

341. The contractor will hand over the borrowed land to the individuals or government after completing the entire project activities while with complying national or international standards. The closure of the construction site and construction labor camp will be done considering the below aspects-

- The temporary infrastructure should be demolished considering the baseline environmental aspects after completing the project time;
- Materials, scarps, debris, etc. should be relocated or vacuumed as per the standard procedure;
- All of the machinery, vehicles, and equipment should be relocated without hampering the existing

environmental features;

- ▶ The land should be handed over by making its natural state like before borrowed;
 - ▶ The labor camps should be ensured empty before demolition and safe exit of the workers will also be ensured;
 - ▶ Environmental and social assessment should be conducted after or during the closure of the construction site and construction labor camps to avoid any environmental and social hazards.
342. Remain wastes from the construction camps should be properly dumped into a designated dumping yard during the closure of the labor.

DRAFT

9 EMERGENCY RESPONSE PLAN AND DISASTER MANAGEMENT

9.1 INTRODUCTION

343. Accidents or unforeseen risks to the workforce, local populations, and the environment may occur during project construction. As a result, proper planning from the inception is critical to ensuring a system of coordinated action between contractors, and local governments. Aside from giving emergency direction, unrecognized hazardous situations can exacerbate an emergency, and an emergency response plan can help eliminate them. The planning phase identifies prospective problems that can be addressed before an emergency arises. Furthermore, an emergency response plan raises safety awareness and demonstrates the contractors and sub-contractors' commitment to worker, community, and environment.

9.1.1 PURPOSE

344. The purpose of this Document is to describe the emergency response and crisis management system of project and to provide clear guideline to the Management Team and the Site construction Team for the response to and control of any emergency or crisis associated with company activities. This document is to comply with Jhenaidah-Jashore Road Section (Phase-1) For Western Economic Corridor and Regional Enhancement (WECARE) Program, RHD by implementing a visible management commitment and support in preventing all accidents.

345. The Emergency Response Plan (ERP) is an outline of the procedures to be followed by all workers, employees and visitors at the project area in the event of an emergency which include

- ▶ Control or limit the effect of a range of potential emergency incidents that may occur within the project area;
- ▶ Ensure safe, efficient and orderly evacuation of all persons if deemed necessary;
- ▶ Ensure the safety and well-being of all personnel on the premises at the time of an emergency incident which will include assigning responsibilities for specific actions;
- ▶ Outline the procedures to be followed including communication protocols to ensure all vital information is communicated to relevant stakeholders as soon as possible;
- ▶ Contain and control an emergency incident, so as to minimize the effects on people, property and the natural environment so that normal operations can be resumed; and
- ▶ Define & record emergency training requirements and emergency plan review.

9.1.2 SCOPE

346. This Emergency Response Plan (ERP) will be applicable for all workers, employees and visitors involved in the road construction activities.

9.1.3 REGULATORY FRAMEWORKS AND SAFEGUARDS

347. The relevant provisions under following regulations and guideline will be applicable towards the implementation of the Emergency Response Plan and these are placed in **Table 9-1**.

Table 9-1: Related Provision and Acts	
Reference	Full Title
National Labor Laws	Bangladesh Labor Rules 2015
National Labor Rules	Bangladesh Labor Act 2006

9.2 ROLES AND RESPONSIBILITIES

9.2.1 INCIDENT COMMANDER (IC) - PROJECT MANAGER

- ▶ The Project Manager is the first person in charge of project safety, taking the overall and leading responsibility to manage the safety production works of the Contractor;
- ▶ According to the occupational health & safety plan, combining the actual situation of this project, the Project Manager will establish a sound project organization, perfect the distribution of resource required by this project, and constitute the responsibility system of occupational health & safety production.
- ▶ The Project Manager will ensure the implementation and improvement of safety & health plan/guidelines, also ensure the fulfillment of the related Act, laws and regulations and obligations required by the approved safety & health plan, taking the overall responsibility to the occupational health & safety accident.

9.2.2 SITE EMERGENCY CONTROLLER (SEC) – DEPUTY PROJECT MANAGER

- ▶ Overall control of personnel and resources.
- ▶ The EMT will support and advise the Site Safety Supervision as necessary.
- ▶ Serves as public relations spokes persons, or delegates to some staff member the responsibility for working with news media regarding any disaster or emergency. Also assure proper coordination of news release with appropriate corporate staff or other designated people.

9.2.3 SAFETY ADVISOR- PROJECT SAFETY SPECIALIST

- ▶ The Project Safety Specialist will take charge of the establishment, operation and supervision & inspection of health & safety management plan in the relationship of the Project Manager.
- ▶ The Project Safety Specialist will be in charge of the leading & directing works to occupational health & safety production in project site, taking the direct leadership responsibility to the production, organization and mobilization.
- ▶ The Project Safety Specialist will be in charge of the implementation and realization related to the occupational health & safety management.
- ▶ The Project Safety Specialist will organize training about occupational health & safety management and occupational health & safety knowledge, to enhance the employee's awareness to occupational health & safety, and to enrich the employee's knowledge about occupational health & safety, finally to promote the development of occupational health & safety management.
- ▶ The Project Safety Specialist will be in charge of the compilation and implementation of Safety Management Plan, preparation of monthly security reports, and safety inspection & assessment work in site.
- ▶ The Project Safety Specialist will be in charge of the investigation and settlement to health & safety accidents.

348. An important key to effective emergency response is a communications system that can relay accurate information quickly. To do this, reliable communications equipment must be used, procedures developed, and personnel trained.

9.2.4 SITE EMERGENCY RESPONSE TEAM (SERT)

- ▶ The SERT is an initial response team to any emergency incident onsite and comprises of personnel responsible for firefighting, rescue operations and first aid as specified in the applicable regulatory requirements. The role of the SERT is to:

- ▶ Provide immediate response.
- ▶ Assess the alert level.
- ▶ Make the initial notifications.
- ▶ Secure and contain the site.
- ▶ Co-ordinate with the SEC, Construction Area Supervisors and arriving off-site emergency response personnel.
- ▶ Respond to distress calls and assist in rescue and evacuation;
- ▶ Administer first aid as required and if required, arrange for medical evacuation and other back up as needed;
- ▶ Keep an accurate log of all treatments given and times; and
- ▶ Maintain the response until the situation is resolved.

9.2.5 CONSTRUCTIONS MANAGER

- ▶ To provide support to IC, SEC and SERT;
- ▶ To manage and task additional resources to support construction team;

9.2.5.1 SITE ENGINEERS:

- ▶ Initiate initial response actions if they are the first person on the scene;
- ▶ Restrict access to the incident scene and surrounding area as the situation demands. Take any other steps necessary to minimize any threat to health and safety;
- ▶ Request medical assistance, if necessary;
- ▶ Verify substance released and obtain Safety Data Sheets, as necessary;
- ▶ Coordinate further response actions with Constructions Manager, Site Emergency Controller and Emergency Response Team (SERT).

9.2.5.2 SECURITY COORDINATOR

- ▶ Manage the project security of the onsite workers, employees and visitors;
- ▶ Provide ongoing monitoring of the context and the risks during the emergency;
- ▶ Proactively adapt procedures and policies to the situation in hand;
- ▶ Monitor entry and exit of personnel into and out of premises;
- ▶ Provide security briefings to site workers and employees on a regular basis.

9.2.5.3 LOGISTICS COORDINATOR

- ▶ Coordinate logistic request and material request arrangement;
- ▶ Advises SEC and SERT on logistic issues;
- ▶ Make arrangement for requested transportation; and
- ▶ Coordinate arrangement of domestic requirement – food, refreshments etc.

349. The organogram of the Site Emergency Response Team (SERT) has been presented in **Figure 9-1** and Emergency Action Procedure in **Figure 9-2** below with the contact details of the SERT has been presented in Annex 9-1.

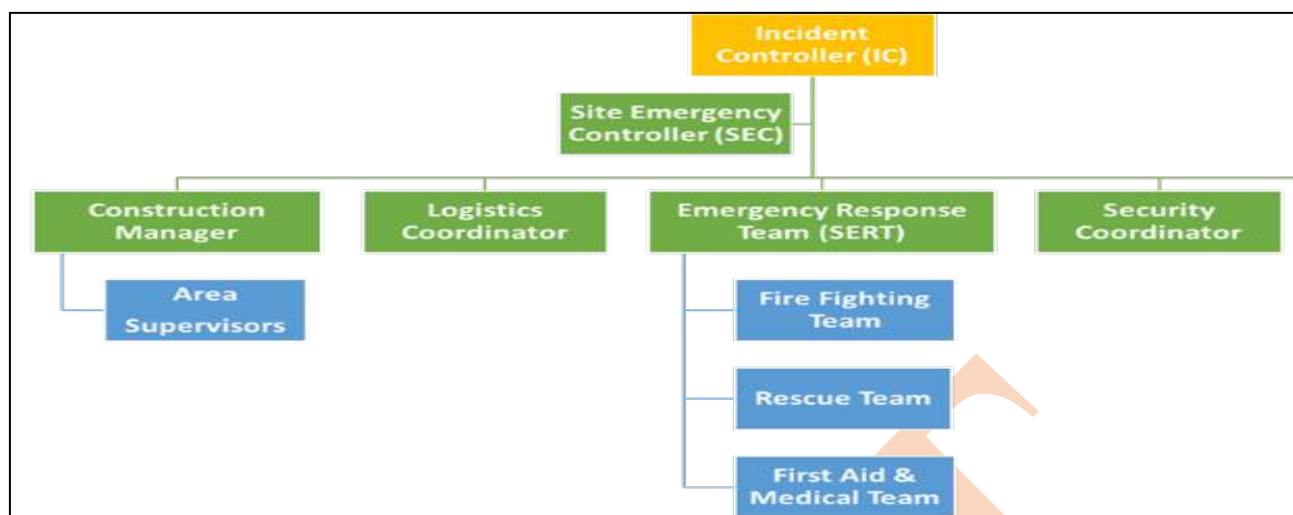


Figure 9-1: Organogram of the Onsite Emergency Management Team (EMT)

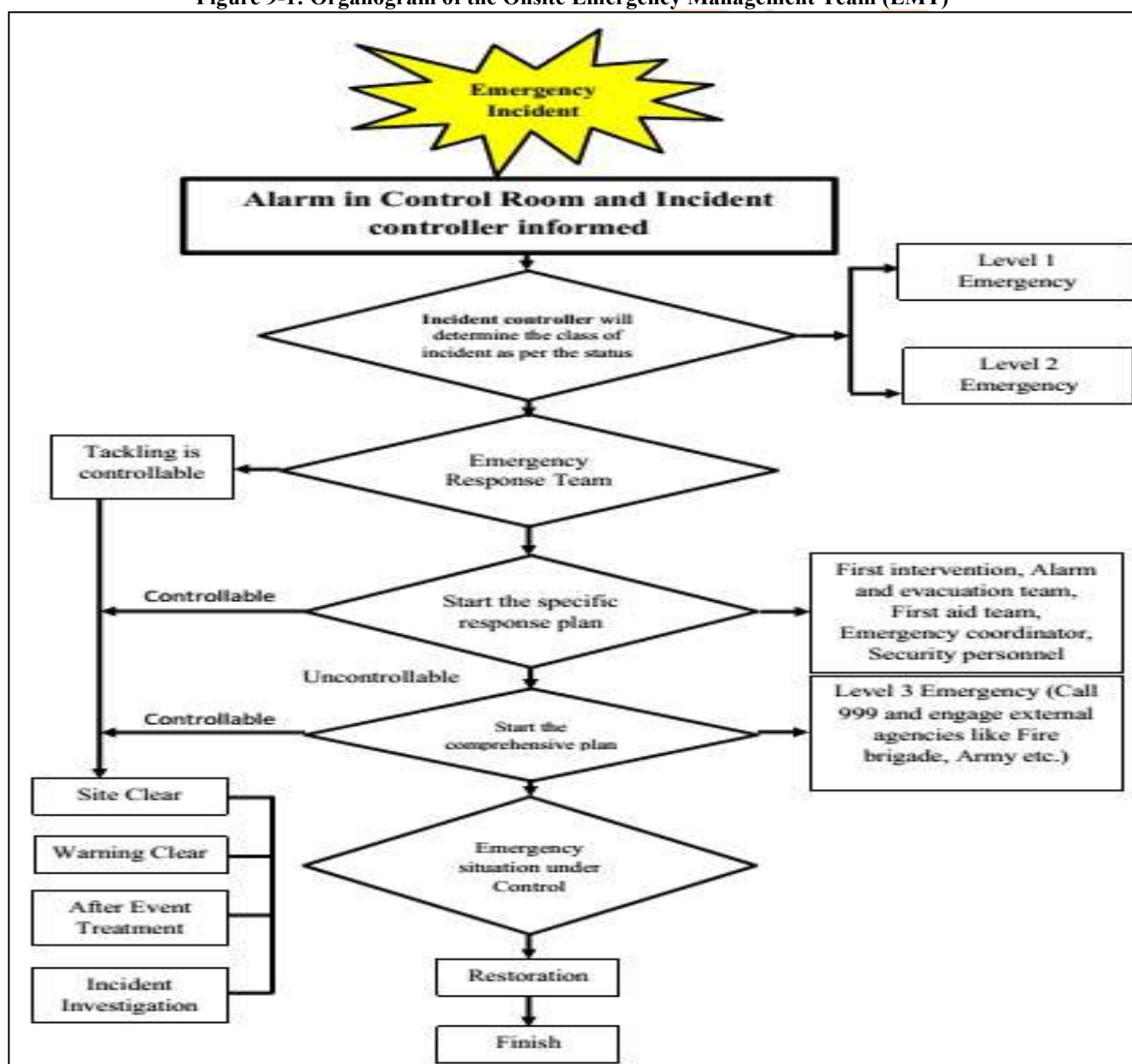


Figure 9-2: Emergency Action Procedures

9.3 PRE-EMERGENCY PLANNING

350. This section provides the potential emergency scenarios that has been identified during site risk assessment exercise and can be faced by sites supervisor/ managers. Based on the working activities and likelihood, approximate emergency scenario has been presented in Annex 9-2.

9.4 EMERGENCY CLASSIFICATION

351. Jhenaidah-Jashore Road Section (Phase-1) For Western Economic Corridor and Regional Enhancement (WECARE) Program, RHD project has differentiated the types of on-site emergency scenarios based on the magnitude and severity of the emergencies being considered in the earlier section. The same will be extended for the Chachra Intersection project as well. The site has categorized three broad levels of emergency scenarios namely:

- ▶ **Level 1:** The emergency is confined to the area of occurrence and can be effectively and safely managed by the emergency equipment and available resources; Site emergency team (SET) will active during this emergency. SET team information presented in Annex 9-3.
- ▶ **Level 2:** The emergency has occurred and has spread to a small area but can be managed by the emergency equipment and resources available at site. Management of head office will involve during this level 2 emergency. SERT team information presented in Annex 9-3.
- ▶ **Level 3:** This is an emergency or an incident which:
 - Cannot be effectively and safely managed or contained at the location of occurrence by available resource and emergency equipment;
 - Additional external support is required as it has the potential to exert effect beyond the site boundary and can be of catastrophic nature;
 - This level of incident and emergency is likely to affect the neighboring population, industries, property and environment outside of the site boundary.
 - The management and control of this emergency scenario requires active support and involvement from country level and district administration.
 - External agency will involve during this level 3 emergency. External agency team information presented in Annex 9-3.

9.5 LEVEL OF PRIORITY

352. The level of response required shall depend upon the seriousness of the incident. For any crisis or emergency occurrence, response priorities shall ensure the protection of:

- [1] First Priority: People
- [2] Second Priority: Environment
- [3] Third Priority: Assets
- [4] Fourth Priority: Contractual and/or commercial arrangements
- [5] Fifth Priority: Project and Partner reputation

353. The Incident Commander (IC) and Site Emergency Controller (SEC) will decide upon the level of emergency and deployment of external emergency responders during emergency scenario. The external agencies as identified by the site are:

- ▶ Fire Service & Civil Defense Station, Jashore
- ▶ Rapid Action Battalion (RAB) unit – 06;
- ▶ Jashore Police Station;
- ▶ Jashore General Hospital.

9.6 EMERGENCY NOTIFICATION & EVACUATION PROCESS

9.6.1 NOTIFICATION

354. The Project Manager must be informed of any incidents on site by the quickest possible means. The Project Director shall be notified of any incident with actual or potential significant off-site impacts on people or the biophysical environment within 12 hours of the Applicant, or other relevant party undertaking the development, becoming aware of the incident. Full written details of the incident shall be provided to the Project Director within seven days of the date on which the incident occurred. The Project Director may require additional measures to be implemented to address the cause or impact of any incident, as it relates to this consent, reported in accordance with this condition, within such period as the Project Director may require. The emergency contact numbers have been furnished in the Annex 9-1 and Annex 9-3.

9.6.2 EVACUATION

- ▶ Any kind of emergency, evacuation must take place.
- ▶ All personnel and workers shall act in accordance with directions given by Site Supervisors and SERT personnel to evacuate the construction site immediately.
- ▶ All shall move calmly to the nominated assembly area and shall not leave the said area until the all clear has been given by the Site Emergency Controller (SEC) and SERT.
- ▶ If a clear danger exists, emergency services will be called by the Site Emergency Controller (SEC).
- ▶ The Incident Commander, Site Emergency Controller, Site Construction Manager and SERT may reassess the situation for immediate actions to take place.
- ▶ If the designated assembly point becomes endangered, or the evacuees need to remain outside the premises for an extended period, personnel will be relocated to a suitable alternate assembly point at the direction of the IC and SERT.

355. The whole process of evacuation has been depicted in **Figure 9-3**.

9.6.3 HEAD COUNT

- ▶ After evacuation, all persons on site including visitors and contractors shall assemble at the assembly point.
- ▶ The SERT will conduct a roll call to ensure all persons are accounted for including visitors and workers. The muster roll and visitor register needs to be maintained by the contractor and these will be made readily available to SERT after an emergency.
- ▶ Missing persons list shall be advised to the Site Emergency Controller, who will then advise the Emergency services for their rescue and further action as necessary.
- ▶ No personnel shall undertake search and rescue for missing persons in endangered areas except for the specialized and trained SERT personnel along with external emergency services, if any.

9.6.4 RE-ENTRY

- ▶ Re-entry to the site will not take place until advised by the Emergency Services to do so. This will be relayed to all personnel by the Site Emergency Controller.

9.6.5 EMERGENCY MUSTER POINT

356. The emergency muster point of the Site in different location of the construction site. During an emergency, the personnel of the contractor/sub-contractor workers will be assembled at this emergency muster point. The following safety precautions will be taken with respect to the emergency muster point:

- ▶ The entry of goods vehicles will be stopped during an emergency to minimize exposure to the secondary emergency scenario such as accident owing to traffic movement near emergency muster point.
- ▶ The Site will use physical road barriers to separate this area from any internal traffic movement during an emergency;
- ▶ The SERT will assists the Site personnel (which includes visitors) to reach at the emergency muster point;
- ▶ The security guard at the main entrance will manage the movement of traffic on the site access road during emergency to prevent traffic congestion that may occur by the goods vehicle plying in and out of construction area.



Figure 9-3: Evacuation Process Flow Char

9.6.6 PUBLIC COMMUNICATION DURING EMERGENCY

357. The following safety precautions will be taken with respect to the emergency which demand protection to public:

- ▶ Immediately block the public road for outside the factory and allow the emergency vehicle only.
- ▶ Continuously announce by mike in the nearest community for evacuation if necessary due to the severity of the emergency
- ▶ Call external govt. authority (Fire service & Civil defense, Union perished, Police etc.) to take control on the community according to govt. protocol.

9.6.7 ASSEMBLY POINTS

- 358.** In case of emergency such as fire, non-essential persons and injured persons are evacuated from affected area to the safest area, i.e., at the assembly point. Assembly point is the least affected by down wind direction and near to the road. The senior officer will be the in charge of this point. The total capacity of 04 assembly points is to accommodate about 300 persons.
- 359.** Non-essential personnel shall assemble at Emergency Assembly Point as announced by Site Incident Controller. During handling the emergency if more work forces required then from assembly point non-essential person will be call as per the requirement, it will be decided by SMC. All the assembly Points should be identified with the suitable signage which is presented in **Figure 9-4**.



Figure 9-4: Signage of Emergency Assembly Point

9.7 EMERGENCY RESPONSE FOR TYPICAL EMERGENCIES IDENTIFIED

- 360.** This section describes the emergency response procedure that needs to be implemented during typical emergency situations. The emergency contact number, agency, equipment and training etc. are presented Annex 9-1 to Annex 9-6.

9.7.1 FIRE

- 361.** During any fire incident, the site needs to follow the following instructions to ensure resurrection of the safe working condition:
- ▶ The person who recognizes the fire must activate the nearest fire alarm or inform the construction Area Supervisor;
 - ▶ The IC will declare the emergency and activate the Emergency Response Team (SERT);
 - ▶ The SERT will assess the alert level and co-ordinate with the SEC, construction Area Supervisors and arriving off-site emergency response personnel;
 - ▶ Apart from the trained fire fighters, no other personnel will be allowed at the place of incident. The fire fighters must ensure that they have wear essential PPEs such as safety suit, safety helmet, self-containing breathing apparatus (SCBA) based on the requirement and magnitude of the fire;
 - ▶ Disconnect utilities and equipment unless doing so jeopardizes site safety;
 - ▶ The fire will be isolated by removing the surrounding inflammable material. This will be done without compromising safety of the fire fighters to the extent possible;
 - ▶ The small fires will be extinguished by using appropriate fire extinguisher (based on the class of the fire);
 - ▶ The fire hydrant system and on-site fire tenders will be used for the extinguishing the big fires. Storm water lock gate should be remained closed during use of fire hydrant system to prevent exit of water used for fire extinguishing purpose;

- ▶ Rescue and attend the injured personnel and call the medical emergency number, if required.

362. The fire extinguishers to be used based on the types of fire has been enumerated in **Table 9-2**.

Sl. No	Causing Agent	Classification of Fire	Type of Extinguisher
1.	Combustible Packing Material	Class “A” Fires	Dry Chemical Powder & Water
2.	Petroleum oil	Class “B” Fires	Foam Type
3.	Gas	Class “C” Fires	CO ₂
4.	Metal	Class “D” Fires	Dry Chemical Powder
5.	Electrical Panel	Class “E” Fires	Dry Chemical Powder
6.	Cooking Fire	Class “K” Fires	Wet Chemical Type

9.7.2 FUEL AND CHEMICALS SPILLAGE

363. In case a large chemical Spill has occurred:

- ▶ Immediately notify the designated official such as construction Area Supervisor;
- ▶ The IC will declare the emergency and activate the Emergency Response Team (SERT);
- ▶ The SERT member must wear adequate PPEs prior starting of the spill management procedure;
- ▶ Secure the area and alert other site personnel. If required initiate an emergency evacuation process;
- ▶ No person will be allowed to involve in spill containing activity unless they are trained to do so;
- ▶ Contain the spill with available equipment (e.g., pads, booms, absorbent powder etc.). In case of acid spillage spray, dilute sodium carbonate and plenty of water. In case of caustic spillage spray, dilute citric acid and plenty of water. In case of oil spillage try to stop its flow, close the main valve of the storage tank or isolate the pipeline (in case of leakage from flanges) by blinding. Collect the spilled chemical in container by use of spill kit;
- ▶ Do not allow the flow of spilled chemicals in the storm water drain. Channelize it to Waste water treatment plant through connecting drains after treatment send to ETP.
- ▶ Attend the injured personnel and call the medical emergency number, if required;
- ▶ Dispose of the spilled chemicals in environment friendly manner. If require, consult to the Department of Environment (DoE) Bangladesh in this regard.

364. In case a small chemical Spill has occurred:

- ▶ Immediately notify the designated official such as construct Area Supervisor;
- ▶ If toxic fumes are present, secure the area (with caution tapes or cones) to prevent other personnel from entering;
- ▶ Deal with the spill in accordance with the instructions described in the SDS.
- ▶ Small spills must not be handled without wearing the proper PPEs.

9.7.3 LEAKAGE OF GAS

365. The following procedure will be followed in case of leakage of gas:

- ▶ The person who smells the gas odor or identify the gas leak immediately inform the construction Area Supervisor or directly to IC or SEC; or automatic gas detectors installed in the process areas will activate the alarm automatically after detection of any gas in the process area.
- ▶ An emergency will be declared;
- ▶ Construction Area Supervisors will initiate the evacuation of the workers from the incident scene through

safe exit in a disciplined manner. Workers will be instructed to calm and not to be panicked;

- ▶ The SERT will assess the alert level and co-ordinate with the SEC, Area Supervisors and arriving off-site emergency response personnel;
- ▶ For LPG Gas Leakage from the LPG cylinders:
 - Any LPG cylinder which develops a leak should be promptly removed to an isolated open place away from any source of ignition;
 - Cylinder with valve leakage needs must be capped immediately and tagged by mentioning the defect;
 - In case of leak from the LPG pipe, the cylinder regulator knob/ valve needs to be close;
 - Do not try to repair the appliance or any part of the system when pipe line or appliance in use;
 - Use adequate PPEs;
 - Do not use naked lights to detect the leak;
 - In case of heavy Leak, stop all ignition sources in the vicinity and evacuate all the people to a safe area;
 - In case of outbreak of fire, trigger the firefighting procedures as specified in previously.
 - Call first aid team and get medical attention as quickly as possible. In case of any accident such as burn and asphyxiation send the affected people to the OHC and hospital.

366. Risks of hazardous spills and uncontrolled pollution due to the plant's effluents of Construction, phase the mitigation impacts of a hazardous spill's information presented in Annex 9-6.

9.7.3.1 FOR NATURAL GAS LEAKAGE

- ▶ The person who smells the gas odor should inform the concern person;
- ▶ Do not use mobile phone or switch on electrical installation as this could cause an explosion.
- ▶ Evacuate the people from gas leakage surrounding area and send them to a safe area;
- ▶ Immediately contact respective operators who are handling the unit;
- ▶ Instruct operators to close all shutoff and isolation valves and identified the leakages;
- ▶ In case of outbreak of fire, trigger the firefighting procedures as specified in previously.
- ▶ Call first aid team and get medical Attention as quickly as possible in case of any accident such as burn and asphyxiation;
- ▶ Coordinate with the Emergency management team and take action as per their guideline

9.7.4 MEDICAL EMERGENCY

367. In case of any medical emergency

- ▶ If the person cannot walk, then call the emergency phone number for ambulance and assistant. Inform construction manager
- ▶ Provide the following information:
 - ▶ Nature of medical emergency;
 - ▶ Location of the emergency (building, area);
 - ▶ Name of the person, department.
- ▶ Do not move victim unless absolutely necessary.
- ▶ Call the personnel trained in CPR and First Aid to provide the required assistance prior to the arrival of the ambulance
- ▶ In case of rendering assistance to personnel exposed to hazardous materials, consult the Safety Data Sheet

(SDS) and wear the appropriate personal protective equipment. Attempt first aid ONLY if trained and qualified

► Do remember:

ES 37) In case of first and second-degree burn, exposed the affected area under cold water for 15-20 minutes. Do not put any chemical such as toothpaste etc. on the affected area and do not apply synthetic clothing on the burnt surface;

ES 38) Do not use water in case the person is exposed to water reactive chemical;

ES 39) In case of electrocution please follow the following steps to revive the person suffered from electrical shock:

- Ensure that the source of electrocution is de-energized if the victim is still in contact with the source of electrocution. Do not touch the victim until the source has been removed or disconnected.
- Apart from the trained first-aiders, do not allow any other person to go near to the victim.
- Conduct a head-to-toe physical examination of the victim, which will include identification of the different contact points and thermal burn. Burn injuries caused by an arc or thermal wave must be managed as burn injuries.
- Check if the victim is able to communicate and if he/she is able to talk then ask for if the victim is experiencing any pain or able to move.
- Assess for any fractures and neurological deficits caused by the shock. Do not move victim in case of any neurologic deficit such as spinal injury; keep the person in lying position unless medical help arrives.
- In case victim is not able to communicate, then monitor victim's cardiac rhythm. Provide respiratory support to the victim if he/she is not able to breathe properly (asphyxiation).
- Monitor the cardiac rhythm of the victim and if required start cardiopulmonary resuscitation (CPR) to the victim. The CPR must be given by trained first-aiders.
- Based on the impact of the injury transfer the person to the nearest hospital on priority basis

9.7.5 TERRORIST ATTACK OR BOMB THREAT

14. For terrorist attack and bomb threat

- The person perceiving the attack should immediately call emergency numbers of the police department as provided in the Annex 9-3.
- Upon receiving such information, the IC will initiate a short meeting with SERT, security and other department. All types of security aspect and safeguards, individual roles and responsibility will be discussed
- Strengthen security in all entrance along with arms.
- Prevent any associate from entering the factory.
- Tell the labors and visitors not to engage with any terrorists.
- Instruct general workers and management personnel not to touch any suspicious item.
- Inform SERT, area supervisor or security personnel about presence of any suspicious item.
- Weapons of mass destruction likely to be employed by terrorists. Do not try to remove, deactivate or detonate any explosive or bomb.
- If the source of the threat is outside, the SERT will:
 - Reverse-evacuate all people into pre-identified safe location i.e., all the Site personnel will be moved inside of the buildings near of the project (as the conditions inside the buildings are safer than outside)
 - Close all doors leading into such safe location to prevent entry of terrorist;
 - Shut down all utility systems to the building (gas and electricity are the priorities);
 - All people assume the duck, cover, and hold position on the ground;
 - Allow personal and staff to leave at their own discretion once cleared to do so by public safety, emergency management, or military authorities;

- ▶ If the source of the threat is inside the plant the SERT will:
 - ▶ Evacuate site personnel to a safe distance outside of building if possible;
 - ▶ Follow the primary fire drill route, or the alternate route if the primary route is too dangerous;
 - ▶ Instructors and managers take roll after evacuating;
 - ▶ Immediately notify the IC of any missing people;
 - ▶ No one may re-enter the building(s) until entire building(s) is declared safe by public safety, emergency management, or military authorities.
- ▶ Inform security supervisor about the required safety measures and communicate the same to down the level.
- ▶ Inform local police station and administrative officer immediately and take all types of help required.
- ▶ Call on administrative office of neighboring factory and request for help by providing additional security. Phone numbers are available in emergency contact diary.

9.7.5.1 WORKERS AND LOCAL COMMUNITY AGITATION

- ▶ The person who discovers the unrest should dial the emergency contact number and notify the IC or SEC;
- ▶ IC must warn the site personnel of the unrest and mobilize SERT.
- ▶ The SERT will ensure the safety of labor and site personnel in the immediate vicinity.
- ▶ IC will instruct to seal off the affected area, if possible.
- ▶ The IC will instruct the site security personal to isolate the agitated workers.
- ▶ In case the agitation caused by the local community, the security will close all the entry gates and prevent entry of outsiders inside the site.
- ▶ Based on the magnitude of the issue, IC will call the Jashore Police Station for help.

9.7.5.2 MALICIOUS ACT SUCH AS THEFT AND VANDALISM

15. If MGI receives any information on the malicious act or vandalism caused by the worker (s) then:
- ▶ The worker (s) involve in such activity will be identified and the site security, area supervisor and respective contractor agency must be informed.
 - ▶ The designated department will issue a show cause notice.
 - ▶ A formal hearing process inclusive of self-pleading will be conducted in presence of IC and other designated personal.
 - ▶ If a person is suspected of carrying a weapon to site:
 - ▶ The person who believes someone has a weapon should immediately dial emergency number;
 - ▶ The person who believes someone has a weapon should immediately notify the IC and/or area supervisor and nearest security person.
 - ▶ If suspect threatens another person with a weapon, do not engage to disarm them and remain calm;
 - ▶ The security person will dis-weapon the worker in case they are carrying any weapons if possible;
 - ▶ In case of any fight among workers:
 - ▶ The person who witnesses an assault or fight should dial emergency contact;
 - ▶ Notify the incident to Commander (IC);
 - ▶ IC will initiate emergency response and security and SERT will be deployed to diffuse the situation;
 - ▶ The security and SERT should seal off area where assault/fight took place, if possible;
 - ▶ The SERT will document all activities and ask victim(s)/witness (es) for their account of incident, including details such as weapon use, physical injury causing substantial pain or impairment of physical condition.
 - ▶ Based on the magnitude of the issue the local police station will be involved and involved person may be handed over to them.

9.7.6 COVID-19 SITUATIONS

16. Coronavirus disease 2019 is a novel (new) strain of coronavirus that was first identified in Wuhan, Hebei Province, China. According to the updated clinical and epidemiological features of the emerging virus, the novel coronavirus is considered to be very similar to many coronaviruses that are typically transmitted from animals to humans. However, this novel virus is reported to have been transmitted from human to human with a course of illness that ranges from mild to moderate symptoms in the majority of people with the infection. Nevertheless, severe symptoms and complications or even death may occur in people who suffer chronic diseases and lowered immunity.

17. Official names have been announced for the virus responsible for COVID-19 (previously known as “2019 novel coronavirus”) and the disease it causes.

9.7.6.1 SYMPTOMS

18. The following symptoms may appear 2-14 days after exposure*

- ▶ Fever
- ▶ Cough
- ▶ Throat Sore
- ▶ Running nose
- ▶ Shortness of breath/ difficulty in breathing

*This is based on what has been seen previously as the incubation period of MERS-CoV viruses

9.7.6.2 MONITORING

368. Once the workers reach the construction site, they are given a brief site safety training that includes the following:

- ▶ The signs and symptoms of COVID-19 and how the disease is potentially spread, including the fact that infected people can spread the virus even if they do not have symptoms.
- ▶ Information on appropriate social distancing and hygiene practices, including:
 - ▶ Avoiding physical contact with others and maintaining a distance of at least 3 feet whenever possible.
 - ▶ Appropriate cleaning practices (i.e., washing hands frequently with soap and water for at least 20 seconds, or, if soap and water are not immediately available, using alcohol-based hand sanitizer and rubbing hands until they are dry;
 - ▶ Alternatives to shaking hands upon entry, and the importance of workers not touching their own faces (mouth, nose, eyes).
 - ▶ Wearing masks over their noses and mouths to prevent them from spreading the virus
 - ▶ Removal and disposal of any PPE being used.
 - ▶ The importance of staying home if they are sick.
 - ▶ The importance of cleaning and sanitizing the frequently touched surfaces like tools, handles and machines.
 - ▶ The need to report any safety and health concerns.
- a) Worker screening is done (checking body temperature with infrared thermometer) to reduce sick workers entering the job site;

- b) A record is maintained of who is at the construction site and when. In the event of a worker contracting COVID-19, these records will be utilized to inform those who may have come into contact with that person;
 - c) While construction is ongoing supervisors keep a close watch and monitor adherence to social distancing by the workers. When required the workers are split into smaller groups to adhere to the 2m or 6ft social distancing rule;
 - d) To the extent possible, lunch break times are also staggered so that large group of workers does not sit at one place
369. Social distancing and physical distancing are explained to the persons working the field. However, they were advised not to leave the working vicinity as well as the labor shed. If anyone have to leave the site, they must maintain quarantine.

9.7.6.3 EMERGENCY RESPONSE

370. All employees must use site emergency contact number and any sign of Covid-19 cases must be report to concern departments including Contractor, Sub- Contractor and other stakeholder. In case of any suspected cases, Corona specific call center No-16263 (DGHS) or 333 must be contacted.

9.7.7 EARTHQUAKE

- ▶ During an Earthquake event
 - ▶ Stay calm and await instructions from the Emergency Coordinator or the designated official.
 - ▶ Keep away from overhead fixtures, windows, filing cabinets, and electrical power.
 - ▶ Assist people with disabilities in finding a safe place.
 - ▶ Protect your head.
 - ▶ Evacuate as instructed by the Emergency Coordinator and/or the designated official.
- ▶ After the Earthquake Event
 - ▶ Visually inspect the structures such as buildings, storage tanks for any visible cracks. Identify critical and weak areas of the building and organize to support them adequately to prevent collapse.
 - ▶ Isolate electrical supply if required.
 - ▶ Isolate all pipelines of steam, natural gas etc. in case of any leakage.
 - ▶ Empty such tanks, which are found in relatively unstable conditions.
 - ▶ Take a review of material storage and ensure that stored materials are kept in safe manner.
 - ▶ Ensure that LPG cylinders are removed from manufacturing areas and stored in the designated shed in safest manner. Also identify leaked cylinders if any
 - ▶ Immediate ready to use all Emergency equipment like stretchers, breathing equipment, PPEs, Dewatering, portable welding gas cutting equipment, Spill kits, emergency lights, Battery-operated public-address equipment, ropes, lifting tackles, trolleys, emergency medical equipment, etc.
 - ▶ Inspect hazardous chemicals storage area to comply with normal storage safety requirements. Also, inspect secondary containments and restore their integrity wherever necessary.
 - ▶ Inspect the firefighting equipment provided at site.
 - ▶ Inspect if the electrical panel and other sources of ignition for any fault and damage
 - ▶ Ensure that flammable liquids i.e., Petrol, Diesel and other petroleum products are stored under secondary containment with due precautions.

371. After such inspection notify the top management about the damage that has been identified.

9.7.8 FLOOD

372. In case of any flood, incident flood alert communication procedure will be initiated as discussed below:
- ▶ Red Alert: This will be triggered when floodwater level will raise within 1 feet of working site level. All preparations for temporary protection to be started at this state. This includes:
 - ▶ Giving sufficient notice to evacuate prior to flooding;

- ▶ Initiate protection of raw materials, finished good, critical equipment, records and electronic equipment as best as possible;
- ▶ Take normal actions for building evacuation and proceed to safe location;
- ▶ Orange Alert: This will be triggered when floodwater level will raise within 2 feet of working site level. During red alert:
 - ▶ Evacuate all affected spaces immediately;
 - ▶ Relocate to a safe place on the upper floors of the building;
 - ▶ Prevent personnel to wade through flood waters of any depth;
 - ▶ Do NOT try to leave the building in a car. In case anyone needs to evacuate, he/ she must wear life-jackets or similar flotation devices.

373. The general emergency instruction for flood emergency is furnished below:

- ▶ Evacuate the people from flooded area and send them to a safe Area.
- ▶ Switch of the power supply from effected area.
- ▶ Remove obstructions from the drain.
- ▶ Coordinate with the SERT and take action as per their guideline.

374. Based on the magnitude of the flood incident the IC and SEC will decide upon involving outside agencies during flood scenario based on the emergency classification as mentioned above.

9.7.9 WIND STORM

375. The nature of the wind storm provides for more warning than other natural and weather disasters. The following responses needs to be implemented:

- ▶ Once a storm alert has been issued
 - ▶ Stay calm and await instructions from the Emergency Controller or the designated official
 - ▶ Continue to monitor local weather station and radio stations for instructions.
 - ▶ Stay away from the river side.
 - ▶ Collect drinking water in appropriate containers.
- ▶ Once the storm has arrived
 - ▶ Remain indoors specifically in small interior rooms on the lowest floor and without windows,
 - ▶ Stay away from doors and windows, and potential falling objects such as electrical poll, scaffoldings, cable tray etc.
- ▶ After the cyclone
 - ▶ Inform to Emergency Management Team to investigate the property loss for further action;
 - ▶ Immediately notify the SERT for any missing personnel

376. Based on the magnitude of the wind storm incident the IC and SEC will decide upon the level of emergency and deployment of external emergency responders.

9.8 EMERGENCY RESPONSE EQUIPMENT

377. The Site uses following emergency response equipment namely:

- ▶ Firefighting Equipment: The firefighting equipment includes:
 - ▶ Fire extinguishers;
 - ▶ Hose reel and fire hydrant boxes;
 - ▶ Fire water tank;
 - ▶ Fire pumps;
 - ▶ Fire tenders;
- ▶ Personal Protective Equipment (PPE)
 - ▶ Fire retardant suits;
 - ▶ Self-Containing breathing apparatus;

- ▶ Safety helmet, safety goggles, safety vest.
- ▶ Medical Aids
 - ▶ Ambulance;
 - ▶ First aid boxes.
- ▶ Spill Control kit.

378. The detail list of the emergency equipment is furnished in the Annex 9-4 of this response plan. All the emergency response equipment specified in the Annex shall be inspected and maintained monthly and records maintained.

9.9 EMERGENCY RESPONSE TRAINING

379. The aim of emergency response training is to build the capacity of Project employees, to improve preparedness and response at all levels before during and after emergencies. The focus of emergency response training is generally on improving the technical skills of the participants, but also on personnel and team management. It also aims to improve coordination of emergency response and the quality and availability of emergency management tools/equipment.

380. In accordance to the relevant provision of the Bangladesh Labour Act, 2006 and Bangladesh Labour Rules, 2015 all workers or at least 18% of the workers employed in project shall be trained on the following emergency response aspects:

- ▶ Fire-fighting;
- ▶ Emergency rescue operation;
- ▶ First aid; and
- ▶ Portable fire-fighting equipment usage.

381. The trained workers shall be divided into fire-fighting team, rescue team and first aid team (6% members in each team) and records related herewith shall be preserved in accordance with Form 22 (Annex 9-5) of the previously mentioned Rules.

382. The members of firefighting team, rescue team and first aid team shall wear the prescribed uniform while conducting their respective operations and the dress code shall be as follows:

- ▶ Firefighting team: yellow coloured apron, in rear of which 'FIRE' shall be written in red colour.
- ▶ Rescue team: yellow coloured apron, in rear of which 'RESCUE' shall be written in red colour.
- ▶ First aid team: White coloured apron, in rear of which 'FIRST AID' shall be written in red colour.

9.10 EMERGENCY DRILLS/EXERCISES

383. Fire drills and emergency evacuation drills shall be arranged at least once in every six-month period and records of such drills shall be maintained in Form 22 in the Annex 9-5. In addition, the concerned Inspector and nearby Fire Service Station shall be informed minimum 15 days before such drills are held.

9.11 EMERGENCY COMMUNICATION

384. Clear communication is essential during an emergency. Multiple methods need to be use during an emergency as one single method of communication may not be able to communicate the emergency to the designated site personnel and off-site agencies in a timely manner. The Site has provided emergency and warning signage at conspicuous locations of Site to make Site personnel aware about the:

- ▶ Potential hazards and risks pertaining to their operation and activities;
- ▶ Pertinent risks present at a particular area;
- ▶ Emergency escape route.

19. The Site has displayed emergency related signage such as:

- ▶ Emergency exit signage;
- ▶ First Aid Box Signage;
- ▶ Floatation Device Signage;
- ▶ Fire Extinguisher & Hydrant Signage;
- ▶ Safe Mustering Point Signage

385. In case of an emergency, the emergency communication will be initiated. The emergency communication:

- ▶ Must be made in simple language;
- ▶ No code word should be used

386. The methods of communication at site to notify all personnel during an emergency include:

- ▶ Emergency siren;
- ▶ Manual Call Point
- ▶ Public address system;
- ▶ Mobile phone, land line and intercom;
- ▶ Two-way radio or wireless system;

387. The IC will evaluate the emergency and determine the best method to notify the site personnel of the emergency. The on-site and off-site emergency contact numbers are furnished in the Annex 9-1 and Annex 9-3 of the response plan.

9.12 AUDIT AND EMERGENCY RESPONSE PLAN REVIEW

388. IC and SEC will annually review this Plan along with the other members of the Emergency Response Team (SERT). In addition, IC will also be involved in monitoring the following performance indicators to assess the effective implementation of the procedure:

- ▶ Emergency drill records; and
- ▶ Training records.

389. **Audit:** A periodic audit dedicated to assessing the overall integrity of the emergency management system shall be conducted. Plant Managers shall be responsible for resolution of matters arising from such audits and for implementation of corrective action/s.

10 ENVIRONMENT AND SOCIAL MANAGEMENT PLAN

- 390.** The objective of the Environmental and Social Management Plan (ESMP) is the effective implementation of the mitigation measures. It is also a key to the project's sustainable development. The desired result for achieving sustainable development is difficult to achieve without a management plan.
- 391.** The proposed ESMP covers the potential impacts identified during the study, mitigation measures to reduce/mitigate the intensity of impacts, responsibility matrix for mitigations, and budgetary cost estimates for the project construction and operation phase. The different agencies identified are for the proper implementation of ESMP.
- 392.** The PIU of RHD will be the main coordination body for implementing the ESMP during the preconstruction, construction, and operation period (**Table 10-1**). The PIU will approach and coordinate the individual departments to carry out different tasks, such as tree cutting, tree planting, utility shifting, waste management, etc. The ESIA/ESMP will be the RHD.

Table 10-1: Different Agencies for Implementation of ESMP

Agencies Name	Responsibility	Period
Road and Highways Department	Overall Implementation of Project	Overall Pre-construction and Construction Phase
Forest Department	Permission for tree cutting and tree plantation under social forestry	Pre-construction and Construction Phase
Department of Environment (DoE)	For No Objection Certificate as per the requirement and renewal of ECC	Pre-construction and Construction Phase
Jhenaidah Palli Biddut Samity (JPBS), Jashore Palli Biddut Samity (JPBS), West Zone Power Distribution Company Limited, Bangladesh Telecommunications Company Limited (BTCL), Power Grid Company of Bangladesh (PGCB)	Electric Poles and Telephone Cables Shifting	Pre-construction
District Administration	For taking up joint verification	Pre-construction and construction phase
Zila Parishad	Tree cutting	Pre-construction stage
Municipalities	Solid Waste Management	Construction Phase
Union Parishad	Solid Waste Management	Construction Phase
Bangladesh Water Development Board (BWDB)	Permissions for sourcing of water for construction activities (Surface Water or groundwater), if required joint verification	Construction Phase
Inland Water Transport Authority, Bangladesh	No Objection for the construction of Bridges to maintain clearance	Pre-construction stage

10.1 ENVIRONMENT AND SOCIAL MANAGEMENT PLAN

- 393.** The environmental and social risk clauses emphasize the requirements for environmentally responsible construction and specify the need for the contractor to apply the mitigation and monitoring measures as defined in the ESMP. The proposed plan covers the following phase project:

- Design/pre-construction phase

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- ▶ Construction phase
- ▶ Operation phase

394. Design/Preconstruction Stage Activities: The design stage requires most surveys/field investigations/meetings, and desktop work for designing the project; there will not be any major impacts on the existing environment. Similarly, the pre-construction stage pertains to the mobilization of the contractor, Construction Supervision Consultant (CSC), and engagement of NGOs to support RHD in the implementation of Resettlement, Rehabilitation, and Land acquisition work. However, before mobilization of the contractor, RHD needs to undertake various activities to provide encumbrance-free alignment, which involves the demolition of structures, tree cutting, utility shifting, compensation to be paid to the project-affected persons (PAPs), etc. Some activities do not require any specific mitigation, but activities like tree cutting and utility shifting require mitigation measures, which have been discussed in the proposed ESMP.

395. Construction Phase: Construction stage activities require careful management to avoid environmental impacts. Activities that trigger the need for environmental measures to be followed include:

- ▶ Implementation of site-specific mitigation/management measures
- ▶ Monitoring the quality of the environment along the construction sites (e.g., air, noise, water, soil, and sediment).

396. Several other environmental issues have been addressed as part of good engineering practices, the costs of which have been accounted for in the engineering costs. They include improving major and minor junctions, roadside drainage, providing additional cross drainage structures or raising the road height in low-lying stretches, providing bus stops, providing soil erosion prevention measures, etc.

397. Therefore, these mitigation measures shall be included in the contract document of the contractor for implementation by the contractor and for the sustainable development of the project.

398. To implement it properly, it is suggested that non-compliance should be considered as a major lapse from the contractor for which they need to be penalized. All lapses on the clearances/NOCs obtained by the contractor shall be deemed as major non-compliance. They must ensure all these approval/NOCs are valid throughout the construction stage/liability/maintenance period. The contractor needs to follow the conditions stipulated in the environmental clearance (EC), consent to establish (CTE), and consent to operate (CTO), as well as other approvals given by the regulatory authorities.

399. Operation/ Post Construction Phase: It includes monitoring and evaluating the ESMP measures and maintenance of shrubs and trees. The ESMP for the pre-construction, construction, and operation/post-construction phases is provided as **Table 10-2**.

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
A	Design stage/ Pre-construction Stage					
A-1	Design Consideration	▶ Culverts of adequate spans have been provided to meet the requirement of animal crossing. ▶ Ensure road design, embankment height, and pavement design comply with the relevant international and national approved design manuals, such as the RHD Geometric Design Standards Manual (Revised 2005), AASHTO's "A policy on Geometric Design of Highway and Streets" (2001), etc. ▶ The Bangladesh National Building Code (BNBC) should be considered for designing road infrastructures, particularly all buildings and building	Design consultant/ E&S consultant	PIU	Design stage/Pre-construction Phase	Design Standards Manual (Revised 2005); Bangladesh National Building Code; Road Master Plan; National Road Design Standard and Manual
A-2	Land Acquisition and clearance of Private structure	▶ Approximately 29.76 acres of land are to be acquired for the proposed development of the Chachra intersection. ▶ The livelihood of affected persons will be affected due to LA. ▶ A livelihood restoration plan has been suggested to mitigate the impacts of the Resettlement Action Plan (RAP) along with its budget. ▶ Skill Development Plan has also been	INGO	PIU	Design stage/Pre-construction Phase	National Land Use Policy 2001; The Acquisition and Requisition of Immovable Property Act, 2017 (ARIPA); Khas Land Policy 1997; Vested Property (Repeal) Act 2013

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Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		included in LRP. ▶ Special support for the disadvantaged/ marginalized groups is kept in RAP. ▶ Provisions for compensation for squatters and encroachers have been made in RAP. ▶ Payment of Cash Compensation under Law (CCL) by DC to compensate the impacts due loss of land as per RAP				
A-3	Issues from stakeholder Consultations	▶ The participants agreed to the project, provided that they would receive proper compensation for their land, etc. ▶ Fair and hassle-free compensation shall be paid as per RAP. ▶ A non-governmental organization, namely “INGO,” has been engaged in facilitating the implementation of RAP and LAP. ▶ 3-4 months’ notice shall be given ▶ Participants agreed to the removal of the trees since they are very old and could pose a risk/injury/causality by falling off the tree branches during the cyclone. ▶ As per demand of Stakeholders, VOP, POPs, fly over, ROB, and service roads are provided in the design. ▶ Side drains shall be provided.	NGO/RHD	PIU		

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		▶ Bridges and culverts of adequate capacity has been provided in the design, ▶ Road safety measures along with necessary road furniture are provided in the design. ▶ Compensation shall be paid; livelihood restoration measures are suggested in RAP.				
A-4	Tree-cutting • Loss of mature tree species • Loss of common species such as Rain tree, Mahagoni, Babul, Neem, Mango, Jackfruit, Debdarr, Deoa, Dumur, Gamari, Ipilipil, Jalpai, Jam, Khejure, etc. • No endangered/ threatened species are to be affected. • Loss of nest/ resting/ feeding sites of birds	▶ Necessary permission from the concerned agency shall be obtained before cutting the trees. ▶ Identified/ marked trees shall be removed ▶ No trees will be cut beyond the toe lines ▶ Tree plantation will be undertaken during the construction phase in place of an avenue of tree removal. It will be carried out in 1:3 ratios, i.e., three saplings will be planted for one tree cut. ▶ For private trees, DC will compensate titleholders, and RHD will disburse to non-titleholders as per the RAP. ▶ Shrub Plantation and grass carpeting in embankment slopes, including maintenance of trees. ▶ Necessary tree guards shall be provided to protect saplings. ▶ The maintenance of trees will be carried	FD/Zila Parishad	PIU	Pre-Construction Phase	National Environmental Policy 1992; The Forest Act 2000; National Forest Policy 1994; The Private Forests Ordinance 1959; Bangladesh Wildlife (Conservation & Security) Act, 2012

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Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
	Decrease in carbon sequestration	out by the same contractor under the supervision of Khulna Zone. ▶ Watering of tree plantation will be ensured. ▶ Cluster plantations need to be considered on community lands, such as ponds or mosques, or at other locations desired by the community. ▶ All realignments shall be enhanced with the tree plantation, ▶ Trees will be planted as an enhancement measure around the ponds or LGED link roads and vegetative noise barriers along the sensitive receptors in consultation with the stakeholders as per the requirement by the contractor ▶ Fast-growing native trees will be planted to improve the carbon sequestration ▶ The contractor shall take reasonable precautions to prevent his workmen or any other persons from removing and damaging any flora and fauna. ▶ While clearing vegetation, it must be ensured that no faunal species, such as mongooses, foxes, squirrels, etc., are injured and/or die. ▶ While removing the tree, if any endangered or endemic species is found				

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Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		immediately, the work shall be stopped. The name of the species, etc., need to be reported to the nearest forest department through RHD. ▶ The responsible agency (Forest department, Zilla parishad, etc.) must prepare a tree-cutting plan showing the schedule of tree cutting, locations of dumping and transportation of logs within their jurisdiction, and trees to be numbered/ marked before cutting. ▶ • The contractors must ensure proper OHS measures during tree cutting by arranging appropriate PPE (Helmet, gloves, eye shield, boots, etc.) for the workers. In case of using any electrical or other types of saws, necessary safety measures must be taken to prevent accidents. ▶ The trees should be cut in such a way so that pavement, nearby structures, utility lines, road furniture etc. is not damaged by fallen branches/logs. If needed local electric lines may be disconnected for a short period with prior intimation to the local authority/people. ▶ Tree-cutting to be coordinated with the local authority and Police for traffic control and to ensure CHS. ▶ Pits/holes created due to the removal of trees must be filled up to avoid accidents.				

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		▶ Logs/chopped trees are to be kept away from the shoulder and roadside so that they don't hinder the smooth traffic flow. ▶ Adequate safety measures need to be ensured by the contractors once these logs are loaded onto vehicles and during transportation. ▶ First aid /medical facilities to be arranged by the contractors to deal with any accident/injury. ▶ RHD to regularly monitor the tree-cutting activities and submit monthly progress reports to WB				
A-5	• Utilities Shifting • About 260 electric poles are to be shifted • Increase in ambient air quality due to operation of heavy equipment • Increase in Ambient Noise Levels due to operation of excavator, concrete mix, traction of electric lines	▶ Well maintained and good working condition machines and equipment meeting the pollution board requirement shall be deployed at site during erection of electrical poles. ▶ Warning signboards shall be placed at visible locations. ▶ Proper safety measures should be adopted during implementation of utility shifting so that accidents of workers, technicians and local people are avoided. ▶ All workers and project personnel should use PPE at the site. ▶ Utility shifting plan will be prepared by the design team in consultation with the	Jashore Palli Biddut Samity (JPBS), West Zone Power Distribution Company Limited(WZPD CL), Bangladesh Telecommunications Company Limited (BTCL)	PIU	Design stage/Pre-construction Phase	

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
	- Short-term impacts are due to temporary power cuts during the shifting of utilities like electric poles. - For a few days, there may be problems of street lighting, residential, commercial, and Bazar areas - While shifting underground cables, damages may be anticipated - Generally, shifting of Optical Fiber Cables may create communication problems due to damage during relocation. - Shifting of utilities may block access to the house's business	responsible agencies like – WGPDC, Jashore Palli Bidyut Samity (JPBS), Jashore Palli Bidyut Samity (JPBS) and Bangladesh Telecommunication Company (BTCL) for relocation of the utilities ▶ Utility shifting shall be done as per the agreed Utility shifting plan ▶ The contractor in consultation with the responsible agencies and RHD will inform the local people about the schedule of the utility shifting prior to start of the work ▶ Any grievance / complain shall be recorded and resolved by the competent authority as soon as possible. ▶ To reduce the impacts, shifting shall be carried out in phases ▶ Excavation/concreting for erecting the electric poles shall be planned so that it shall not disturb the movement of the local people and traffic. ▶ Installation of the electric poles and cable holders shall be done in such a way that it shall not disturb or be a concern of safety for the children playing in the area or going to schools ▶ Shifting shall not disturb access to religious places, community halls, municipal				

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Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
	centers and health centers. - Erection of electric poles may cause inconvenience and block access to the Public/ Community. - Storage of construction material on the road may pose risks. - Safety issues of the workers, technicians, and residents	services, local water sources, etc. - No material shall be so placed/stored that it may pose a risk or cause inconvenience to any person or the public. - Safety to the community while working near the residential/commercial areas and proper access to the community/public shall be provided.				
A-6	Environmental Monitoring	The monitoring of air, noise, soil, and water has been carried out at different locations along the project corridor. This will serve as a benchmark for monitoring during construction and operational phases	E&S consultant	PIU	Design Stage	Environmental Conservation Act 1995; Environment Conservation Rules 1997; Environmental Courts Act 2000
A-7	Road safety issues. - Poor road geometry - Mixed Traffic (fast-moving and Slow-moving)	- The design engineer has incorporated geometric improvement. - Measures for moving vehicular traffic lanes, Bus bays, Vehicular Overpasses, etc., have been considered	Design Consultant	PIU	Design stage/Pre-construction Phase	National Land Transport Policy; RHD's Road Master Plan; National Road Design Standard

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Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		► Compliance with International highway for curvature and grading and safety curve at all at Grade, U-Turn, and bridge approaches have been considered ► Sidewalks/pedestrian zones along the road near habitat areas, schools, hospitals, and religious places need to be included in the design, which will be further reviewed by the EPC contractor;				
A-8	Permission and Clearances	► Contractor shall follow the Environmental Clearance Certification (ECC) requirement and mitigation measures suggested in ESMP while establishing the construction campsites, crusher units, hot mix plants, concrete batch mix plants, WMM plants, and workforce camps. ▪ Layout approval for construction camps/labor camps from the CSC ▪ Permissions for sourcing of water for construction activities (Surface Water), if required ▪ Extraction of Groundwater, if required ▪ Contractor shall follow standard procedures as per Bangladesh Labor Act 2006 for labor recruitment	Contractor	CSC/ PIU	Design stage/Pre-construction Phase	Environment Conservation Rules 1997; Environmental Courts Act 2000; Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015; and Occupational Health and Safety Policies 2013
A-9	Orientation to	► Orientation program for the contractor to	Contractor	PIU	Pre-	Bangladesh Labor Act

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Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
	contractors	meet WB's ESMP and ESS requirements. The salient features of the program are as follows: ▪ Obligations under contract to submit and prepare the Contractor's Environmental and Social Management Plan ▪ Regulatory compliance requirements, if there are any. ▪ A Grievance redress mechanism (GRM) for social and environmental issues shall be developed to address the problem at the site. ▪ Various plans are required under C-ESMP related to standalone Contractors' Occupation Health and Safety (C-OHS), standalone Contractors' Traffic Management Plan (C—Traffic Management Plan) V, community health and safety, hazardous and non-hazardous waste, campsite management, emergency response, blasting, borrow area, muck disposal, restoration, etc. ▪ These C-OHS and C-Traffic Management Plans will be approved before commencement and reviewed by WB. ▪ Labor management procedures to be adopted ▪ Community health & safety aspects at the workplace and Reporting requirements, etc.,			construction phase	2006; Bangladesh Labor Rules 2015; and Occupational Health and Safety Policies 2013

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Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		under the project. - Stakeholder Engagement Plan: The Contractor shall appoint one Environmental safety, Social-cum Community Liaison Officer, and one Health and Safety Officer, both of whom shall solely be responsible for implementing all ESMP provisions in close coordination/consultation with Environmental and Social Specialists in the RHD. Contractor policy on Gender-Based Violence (GBV) free environment at the construction site or contractor's facilities. - Company policy on labor employment.				
B	Construction Phase					
B-1	Hot mix plant/ WMM/ Batching Plant/crushers - Air pollution, - Fugitive Dust Emission - Noise Pollution - Water pollution/ water logging - Safety Hazards	- Hot mix plant shall be installed on downwind side and at distance of 500m away from the residential area. - Batching plants/WMM shall be installed 500m away from the residential area on the downwind side. - These plants shall be at least 500m away from the water bodies or river/canals. - No batching plant /labor camp/construction camps shall be allowed to establish on the banks of river/canal. - To prevent water logging in the batching	Contractor	CSC/ PIU	Construction Phase before installing the plants	ECR 1997; Environmental Courts Act 2000; Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015; and Occupational Health and Safety Policies 2013

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Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		plant, drainage and sump shall be provided which shall be cleaned regularly. ▶ Hot mix plant shall be fitted with pollution control devices Bag filters etc. ▶ The stack height shall be at least 10m above the ground. ▶ The premises shall be enclosed, and trespassing shall not be allowed. ▶ The contractor shall submit the detailed layout plan for approval to the Engineer before entering into a formal agreement with landowners to set up such a site. ▶ Actions by the Engineer and PIU against any noncompliance shall be borne by the Contractor at his own cost. ▶ These plants need to be operated by skilled and trained staff, which the CSC will ensure.				
B-2	Labor Camp/construction camps	▶ Labor camps shall be located at least 500m from residential areas and waterbodies like the Muktassary River, wetlands, Baors, and Beels. ▶ A detailed layout plan for all such sites shall be submitted and approved by the CSC. ▶ The contractor shall refer to the non-productive lands which have access to the	Contractor	CSC/RHD	Construction Phase while establishing the camps	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015; and Occupational Health and Safety Policies 2013

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		existing roads. ▶ The contractor must make an agreement with the land parcel owner along with the photographs of the original land. ▶ Rooms of the labor camps must be properly ventilated. ▶ Hygienic conditions must be ensured in the labor camps ▶ Construction/ labor camps shall not be established on the banks of rivers or waterbodies to prevent soil erosion. ▶ No timber or wood shall be used for cooking purposes ▶ No illegal tree-cutting shall be allowed. ▶ Mobile toilets or toilets with septic tanks shall be provided. ▶ Either a canteen facility or cooking gas shall be provided. ▶ Labor/construction camps shall be properly fenced, and an informatory board as well as project details shall be displayed at the entrance and exit of the camp. ▶ Water logging shall not be allowed at construction camps/batching plants/WMM plants, etc. ▶ Contractor shall display company policy				

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Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		to prevent Sexual Harassment and Exploitation at workplace or construction camp/site/labor camps. ► Gender Based Violence (GBV) free environment shall be maintained at site/ labor camps/construction camps. ► Code of conduct (COC), along with other terms and conditions of employment, shall be provided to the workers in clear and vernacular language.				
B-3	Potable water	► The contractor shall provide potable water meeting the World Health Standards (WHO) in the construction camps/labor camps/construction sites. ► Drinking water quality shall be tested to check its portability to meet the requirement of WHO standards.	Contractor	CSC/PIU	Construction phase (entire period)	National Water Policy 1999; Water Reservoir Conservation Act 2000; The Water Act 2013
B-4	Sanitation Facilities	► Drains shall be provided. ► Proper lavatory facilities for male and female workers shall be provided. ► Proper hygienic conditions must prevail in such facilities. ► The mobile toilet shall be provided at construction camps/labor camps of adequate capacity. ► If mobile toilets are provided, they shall	Contractor	CSC/PIU	Construction phase (entire period)	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015; and Occupational Health and Safety Policies 2013

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		be periodically replenished with fresh water for ablution purposes, and wastewater shall be emptied through suction tankers and carried to the nearest municipal sewage treatment facilities, or soak pits shall be provided. ► Untreated liquid waste shall not be allowed to be discharged into surface water bodies.				
B-5	Solid Waste Management	► Contractor shall segregate waste at source. ► Biological waste from labor camps, construction camps, or other contractor facilities shall be collected for composting and gardening purposes. ► Intermingling of waste shall not be allowed. ► Municipal waste shall be disposed of at the approved landfill sites only, or the contractor shall make necessary arrangements with the municipalities/Zila Parishad. ► Construction and demolition (C&D) waste shall be disposed to identified and approved locations. ► C&D waste shall not be dumped into the water bodies. ► It is envisaged that about 40% of the	Contractor	CSC/PIU	Construction phase (entire period)	Bangladesh Solid Waste Management Rules 2021

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		scarified material will be reused in the sub-base preparation. Rest of the material will be disposed to the approved landfill in consultation with the Zila Parishad, etc. Contractor shall store the usable material properly on impervious platform to preventing mixing with the earth. ▶ Contractor shall prepare a waste management plan ▶ Open burning of solid wastes, whether hazardous or nonhazardous, shall not be allowed. ▶ E-waste shall be collected properly and disposed of by approved vendors only.				
B-6	Hazardous Material Management	▶ Oil/fuel shall be stored as per approved design and safety protocols applicable in the country. ▶ Entry of unauthorized persons shall be prohibited in Hazardous Waste Management areas. ▶ If there is any spillage of hazardous waste, the contractor will remove it immediately. ▶ An area shall be assigned for storing the oil/oily waste or any flammable material. ▶ Smoking shall be prohibited in such areas. ▶ Drip trays shall be provided at DG sets/ below the nozzles to fuel the construction	Contractor	CSC/PIU	Construction phase (entire period)	Bangladesh Solid Waste Management Rules 2021; National 3R Strategy

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		vehicles and equipment. ▶ Used oil or hazardous material/flammable material shall be collected in the drums and stored on the impervious platform sloped to contain a minimum of 25 percent of the total storage volume. ▶ It shall be disposed of by the authorized/ approved vendors as per the DOE norms. ▶ Tires shall be stored properly under the shed and shall be disposed to approved vendors. ▶ Hazardous materials from vehicle tanks to storage shall be transferred in areas with surfaces sufficiently impervious to avoid loss to the environment and sloped to a collection or containment structure. This shall not be connected to the municipal wastewater/stormwater collection system. ▶ To the extent feasible, secondary containment for components (tanks, pipes) of the hazardous material storage system shall be provided. ▶ Periodic (e.g., daily or weekly) reconciliation of tank contents and inspection of visible portions of tanks and piping for leaks shall be undertaken. ▶ Inform the employees about the hazards				

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		▶ Warning signboards shall be displayed at such locations. ▶ Awareness training shall be given to workers by the contractor's environmental safety health officer. ▶ Material Safety Data Sheets (MSDS) shall be compiled. ▶ Standard operating procedures (SOPs) for fueling/storing or other operations involving hazardous material shall be prepared. ▶ Contractor shall prepare a hazardous waste management plan.				
B-7	Water Resources and Water Quality	▶ Water quality was monitored during the baseline survey. ▶ Contractor shall undertake the water quality monitoring as per environmental monitoring program. ▶ Contractors shall ensure that construction materials like earth, stone, and ash do not block the flow of water. ▶ If a water body is lost, DC/PIU will provide proper compensation with assistance from an NGO. ▶ Workers shall not be allowed to pollute the water body. ▶ No illegal excavation shall be allowed	Contractor	CSC/PIU	Construction Phase	National Water Policy 1999; Water Reservoir Conservation Act 2000; The Water Act, 2013; Environment Conservation Rules 1997

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		from the bunds of water bodies. ► The water flow will be restored soon after completion of the work. ► No waste will be dumped into water bodies. ► Oil and grease separators shall be provided near the vehicle washing area/maintenance workshop. ► Drains shall be provided in labor camps/ construction camps/workshops and other contractors facilities along with soak pits. ► Silt fencing at the mouth of water body shall be provided. ► Side drains shall be provided ► River protection works are provided in the design				
B-8	Clearing and grabbing	► Clearing and grabbing shall be restricted to the working area within the toe line. ► Further activities must be planned/ started immediately to prevent fugitive dust emission and soil erosion during monsoon. ► The top (15cm) soil shall be preserved to redevelop the areas as required. ► Revegetation/ turfing shall be started immediately after completion of the work	Contractor	CSC/PIU	Construction Phase during clearing and grabbing operation	The Forest Act 2000; and National Agriculture Policy 1999
B-9	Borrow areas	► Only identified and approved borrow	Contractor	CSC/PIU	Construction	National Land Use Policy,

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Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		areas shall be used by the contractor ▶ Borrowing of earth from the cultivable land shall not be preferred. ▶ When borrowing earth from cultivable lands, the depth of borrowed earth shall not be more than 45cm. ▶ The top 15cm of soil shall be removed and stored separately. Thereafter, excavation shall not exceed 30cm, and topsoil shall be spread over the land. ▶ Borrow areas shall be dug at least 800m from the habitation. If unavoidable, the depth should not be more than 30cm and should be properly drained. ▶ Borrow pits shall not be dug continuously. ▶ The borrowing of the earth shall be used only after having an agreement between the contractor and land parcel owner and must include photographs of the original land. ▶ The haulage of borrowed materials will be maintained dust-free by the sprinkling of water. ▶ The borrow areas shall be 500m away from the toe line of the road. ▶ To reduce the earth requirement, about			Phase	2001

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		40% of the sacrificed material will be reutilized in the subbase material. - Any existing trees should be preserved by creating slopes with a ratio of 1:2 around them when digging out the soil. - Side slopes of 1:4 shall be maintained in the borrow areas. - A redevelopment plan shall also be prepared and agreed upon by the land parcel owner, which needs to be approved by the CSC.				
B-10	Loss of topsoil	- Topsoil (15cm) shall be removed and preserved for reuse/redevelopment. - Topsoil shall be preserved outside drainage lines, and stockpiles will be protected from erosion by silt fencing and diversion channels. - Use stripped topsoil to cover all disturbed areas along proposed tree plantation sites. - Limit equipment and vehicular movements to within the approved construction zone. - Topsoil shall be distributed free to local people who need it for their purpose. - The residuals shall be reused to form the ground around the interchanges, the areas along	Contractor	CSC/PIU	Construction Phase	

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		the road within the acquired land, or recover the vegetation in some affected areas due to the road project. ▶ The material stockpile sites shall be 500m away from surface water bodies and areas prone to surface run-off. ▶ An open ditch shall be built around the stockpile sites to intercept wastewater. If necessary, retarding basins shall be constructed to remove sands and other solids in the stormwater before it reaches the downstream rivers. ▶ During rainstorms, open stockpiles of construction materials (e.g., aggregates, sand, and fill material) of more than 50 m³ shall be covered with tarpaulin or similar fabric. ▶ Measures shall be taken to prevent the washing away of construction materials, soil, silt, or debris into any drainage system. ▶ At the start of site establishment, perimeter cutoff drains to direct off-site water around the site shall be constructed, and internal temporary drainage works, as well as erosion and sediment control facilities shall be implemented.				
B-11	Soil Erosion	▶ The Contractor shall reuse the excavated	Contractor	CSC/PIU	Construction	

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		soil as much as possible unless the soil is considered unsuitable for filling. ▶ The Contractor shall plan his works to minimize surface excavation works during the rainy season where practicable ▶ Immediately after work on bridges or high embankments is completed, slope stabilization measures such as turfing, etc., shall be taken. ▶ Excavation or similar activities shall not be undertaken during the monsoon period. ▶ Construction and demolition waste shall not be stored near bridge construction sites; it shall be disposed of at approved landfill sites. ▶ Loose materials shall be bagged and covered. ▶ Ground clearance area shall be minimum ▶ Approach roads shall be provided in construction facilities to reduce soil erosion. ▶ All exposed earth areas shall be completed and revegetated as soon as possible after earthworks have been completed. ▶ If soil excavation is unavoidable during the rainy season or any time of year when rainstorms are likely, exposed slope surfaces shall be protected by temporary drainage			Phase	

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		measures. ▶ The working area shall only be marked to restrain the activity within the demarcation area.				
B-12	Soil Quality	▶ Fuel or other petroleum products shall be stored on the impervious platform. ▶ The movement of construction vehicles, machinery, and equipment shall be restricted to the corridor or identified route. ▶ To avoid soil contamination, bitumen, fuel and chemical storages shall be on impervious base ▶ Any spillage of hazardous material shall be removed and disposed of at identified and approved sites.	Contractor	CSC/PIU	Construction Phase	
B-13	Operation of Hot Mix Plans/Batching plants/ crushers (Air Pollution)	▶ The stack height of the Hot Mix Plant shall be at least 10m from the ground. ▶ Regular maintenance of construction vehicles and equipment/plants shall be undertaken. ▶ The construction vehicles/ machinery/ equipment shall use only designated routes. ▶ DG sets shall comply with the Department of Environment (DOE) requirements.	Contractor	CSC/PIU	Construction Phase while installing plants and their operation	ECR 1997; Environmental Courts Act 2000; Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015; and Occupational Health and Safety Policies 2013
B-14	Movement of	▶ Water sprinkling using sprays shall be	Contractor	CSC/PIU	Construction	Environmental

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	construction vehicles (Air Pollution)	done on the un-metallic haul roads. ▶ Water sprinkling shall also be carried out on construction sites where the earthwork is unattended for four (4) days, especially in the summer season. ▶ Construction vehicles/equipment shall comply with national standards. ▶ Routine maintenance of pollution to control the emission. ▶ Low-emission construction equipment, vehicles, and generator sets shall be used at the site. ▶ Only those construction vehicles shall be used shall be used. ▶ Vehicles transporting construction material shall be covered by a tarpaulin. ▶ Speed of construction vehicles will be identified in contractors ESMP which will be approved the CSC.			Phase	Conservation Act 1995; Environment Conservation Rules 1997; and Bangladesh National Ambient Air Quality Standards 2005
B-15	Noise Environment	▶ Contractor shall abide by provisions of the Specifications of Contract regarding environmental protection and DoE regulations (≤ 60 dB levels at mosques, schools, populated areas, and other sensitive sites). ▶ Noise-generating equipment/plants shall be provided with dampeners.	Contractor	CSC/PIU	Construction Phase	ECA 1995; ECR 1997; and Noise Pollution Control Rules 2006

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Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		▶ Diesel Generating must be enclosed with soundproof acoustic enclosures to meet the Noise standards. ▶ Construction vehicles/equipment must be fitted with silencers ▶ Routine maintenance of equipment and construction vehicles shall be carried out. ▶ Low noise-generating equipment/ construction vehicles shall be used. ▶ Noise monitoring shall be undertaken as per the Environmental Monitoring Program ▶ Workers working in noisy areas shall receive PPEs and wear earplugs. ▶ Contractors' facilities will be sited away from the residential areas/sensitive receptors as mentioned above. ▶ Near sensitive receptors such as schools/mosques/hospitals, noise generating activities shall be carried out after consultation with the management committee, or low noise-generating equipment shall be used only. ▶ In Residential areas, hospitals etc. noise generating activities shall be prohibited and work shall be scheduled in consultation with neighborhood champions. ▶ Reducing construction vehicles through				

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Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		the residential area in consultation with the local champions ► Vegetative noise barriers in the sensitive receptor ► Any issue shall be resolved through a grievance redressal mechanism (GRM) developed by the contractor.				
B-16	Terrestrial Ecology (Flora and Fauna)	► About 40% of the trees will be planted by the PIU through a contractor, and 60% will be by the forest department under social forestry immediately during the implementation phase. ► Trees shall be planted in the available space in between as per CSC directions. ► Limit the construction works within the designated sites allocated to the contractors. ► No illegal tree felling shall be allowed at construction sites/borrow areas/construction camps/ labor camps. (Refer B-8/B-9 above) ► The construction activity shall be restricted to only identified areas. ► Hot mix plant/construction camps/labor camp/stockyards shall be located at least ~500m away from water bodies ► No untreated waste shall be allowed to discharge into the water bodies. ► Construction camps/labor camps, etc.,	Contractor	CSC/PIU	Construction Phase	National Environmental Policy 1992; National Environmental Management Action Plan 1995; ECA 1995; ECR 1997; Bangladesh Wildlife (Conservation & Security) Act, 2012; National Fisheries Policy, 1998; Protection and Conservation of Fish Act 1950

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		shall have a proper drainage system				
B-17	Aquatic Ecology	▶ Passage to free water flow shall be provided. ▶ Contractor shall clear the site immediately after the construction activity is over. ▶ Water Quality and sediment quality testing shall be undertaken per the monitoring plan. ▶ Bentonite slurry, if proposed to be used, shall not be allowed to be disposed of/dumped into the waterbody or agricultural land. ▶ Bentonite slurry shall be stored in a container and disposed of at identified/ approved sites in consultation with the Zilla Parishad or Local Government office. ▶ Washing of construction vehicles/equipment shall not be allowed near the waterbodies.	Contractor	CSC/PIU	Construction Phase	ECR 1997; Bangladesh Wildlife (Conservation & Security) Act, 2012; National Fisheries Policy, 1998; Protection and Conservation of Fish Act 1950
Socioeconomic Environment						
B-18	Influx of Labor	▶ Trespassing to the contractors' facilities, such as construction camps/labor camps, shall be strictly prohibited. ▶ Contractor facilities shall be located 500m away from residential areas. ▶ Any issue shall be resolved through a	Contractor	CSC/PIU	Construction Phase	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015; and Occupational Health and Safety Policies 2013

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		labor grievance redressal mechanism (GRM) developed by the PIU and run with assistance from the contractor. ▶ Contractor shall be encouraged to recruit local skilled/unskilled workers. ▶ Minimum 10-15% of female workers shall be given preference in the employment. ▶ Separate lodging arrangement for female along with appropriate facilities as mentioned above in B1, B2, B3, B4, ▶ CoC will be strictly enforced by the contractor				
B-19	Child Labor	▶ Bangladesh Labor Act 2006 section 34 prohibits child labor engagement in any project activities. ▶ According to Section 44, anyone under 14 is considered a child, and anyone between 14 and 18 is considered an adolescent. ▶ It is recommended that persons under 16 years of age shall not be employed in any work and should be encouraged to attend school. ▶ Between 16 and 18 years of age persons can be employed for lighter works/office works for 6 hours only with prior approvals from the Engineer ▶ Company policy on the labor	Contractor	CSC/PIU	Construction Phase while recruiting the labor	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		engagement rules shall be displayed at prominent locations such as contractor camps/labor camps/contractor offices. ▶ Between 16 and 18 years of age persons shall not be deployed at any hazardous works such as painting/or other construction activity. ▶ To ensure the age, the contractor must refer to the Certification of laborers' age/National Identification Card/Birth Certificate, etc.				
B-20	Community Health and Safety	▶ The contractor shall plan activities in residential areas after having a discussion with the community. ▶ Locals shall be kept informed about the activities the contractor is taking up in the residential areas. ▶ Trained drivers having valid licenses shall be engaged at equipment/plants. ▶ Speed of the construction vehicles/ equipment shall be defined by the contractor in the contractors' ESMP. ▶ Excavated areas shall be properly barricaded. ▶ Trespassing on the construction site shall be prohibited. ▶ The traffic management plan shall be	Contractor	CSC/PIU	Construction Phase	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015; and Occupational Health and Safety Policies 2013

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		prepared according to the activity schedules, which will be approved by CSC/PIU. ▶ Regular Consultation with the Community to know the effectiveness of the implementation of mitigation measures at construction sites/ camps ▶ Ensure implementation of mitigation measures suggested in B4 through B6 and B13 through B15 at site to control the environmental pollution. ▶ Compensation for impacts on infrastructure shall be provided per the Resettlement Action Plan (RAP). ▶ Water logging shall not be allowed at the construction site. To prevent vector-borne diseases such as malaria, areas of standing water must be minimized by providing effective drainage in construction areas. ▶ Access to the public shall be provided as per measures suggested in B-21. ▶ Prevention and management of HIV/AIDS and other STIs as suggested below in B-22. ▶ Vehicles/construction equipment need to be maintained and inspected/tested regularly, ▶ Drivers must have appropriate				

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		government licensing or certification and be provided with proper training. ▶ During the operation of construction equipment, a minimum safety distance from this equipment must be ensured for the movement of the local community to avoid any accident. ▶ Contractor shall take all precautionary measures to prevent community exposure to water-borne, water-based, water-related, and vector-borne diseases and communicable and non-communicable diseases that could result from project activities.				
B-21	Access to the Public	▶ The contractor shall provide adequate warning signboards in the local and English languages with messages in pictures or drawings so that those who cannot read will be able to understand. ▶ Flagmen shall be deployed to control the traffic during tree felling or removal/ erection of electric poles. ▶ The contractor shall provide temporary access to local religious places, schools, and nursing homes in consultation with the local champions. ▶ A grievance redressal mechanism shall be adopted at the site, which needs to be	Contractor	CSC/PIU	Construction Phase	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		approved by the CSC, to address the issue at the site.				
B-22	HIV and STD ³³	▶ Awareness campaigns on HIV/AIDS/STD ▶ HIV/STD voluntary counselling, testing, and treatment. ▶ Ensuring that construction workers have access to condoms ▶ Provision of vending machines at identified location ▶ Monitoring of outcomes, in collaboration with National HIV/AIDS Authorities	Contractor	CSC/PIU	Construction Phase	Occupational Health and Safety Policies 2013
B-23	Labor Management	▶ Contractor shall follow national legislations. ▶ Condition stipulated labor management procedures shall be followed by the contractor on labor management, workplace safety and health, and protection. ▶ Pooled transportation facilities as may be required, shall be provided by contractor. ▶ Contractors' company policy on prohibition of Child Labor shall be displayed at	Contractor	CSC/PIU	Construction Phase	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015

³³ FIDIC | HIV-AIDS in the Construction Sector | International Federation of Consulting Engineers

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		the construction camps/labor camps/ contractors' office etc. ▶ All basic facilities, such as water supply, cooking gas, sanitation facilities, and a mobile toilet (of adequate capacity for men and women separately), shall be provided within the labor camp. ▶ Crech facilities for women workers to be made with separate toilets, washing, and cleaning (if possible) ▶ Women security guards at the labor shade shall be deployed. ▶ Feeding corner for lactating mothers, if required to be provided ▶ Separate labor shade for men and women shall be provided. ▶ Contractor shall prepare a Labor Management Plan as per requirement.				
B-24	Occupational Health and Safety Aspects • Personnel Safety • Measures for Labor, Material, handling, Painting etc.	▶ The contractor will prepare a standalone contractor's OHS plan, which needs to be approved by the CSC before the commencement of activities. ▶ Contractor shall update the OHS plan regularly as and when required or as directed by the CSC. ▶ Contractor shall plan the activities to	Contractor	CSC/PIU	Construction phase	Occupational Health and Safety Policies 2013

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		prevent any untoward accidents at the site. ▶ Induction training to the workers and subsequent training on safety aspects. ▶ Trained workers will be deployed at hot mix plants, batching plants, and wet Mix Macadam (WMM). ▶ Toolbox (including its maintenance) training for workers, such as job rotation, safe work procedures training, lock-out and tag-out, workplace monitoring, limiting exposure or work duration, etc., shall be adopted. ▶ The contractor shall follow safe work systems and administrative or institutional control measures. ▶ No employee shall be exposed to noise levels greater than 85 dB(A) for more than 8 hours/day without hearing protection. ▶ In addition, no unprotected ear shall be exposed to peak sound pressure level (instantaneous) of more than 140 dB(C). ▶ Exhaust ventilation, isolation rooms, machine guarding, acoustic insulating, etc., shall be provided per CSC's direction. ▶ The contractor shall always take all reasonable precautions to maintain the health and safety of the contractor's personnel.				

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		▶ The contractor shall ensure that medical staff, first aid facilities, and ambulance service are always available at the site in collaboration with local health authorities. ▶ Workers shall wear protective footwear such as safety boots/gumboots, helmets, and protective goggles. ▶ Welders shall use protective eye shields or safety goggles. ▶ All electric wire must have proper insulation ▶ Lifesaving jackets shall be used by the workers and flagmen. ▶ Workers working in noisy areas shall be provided earmuffs. ▶ Fall prevention and protection measures shall be implemented for the workers working at more than 2m height. ▶ Safety belts along with connectors and anchorage shall be provided and used by the workers working at heights (more than 2m). ▶ Ladder and scaffold shall be provided with guardrails system and safety net system shall be provided when activities are going on at height more than 2m ▶ Proper use of ladders and scaffolds by				

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		the trained workers. ▶ Necessary lighting, which has proper illumination, shall be provided if required at the work site during nighttime. ▶ Potable water supplies to the workers. ▶ Water supplied to areas of food preparation or for personal hygiene (washing or bathing) shall meet drinking water quality standards ▶ Workers working in the dusty area shall be provided with nose masks. ▶ Sufficient fresh air shall be supplied for construction camps/labor rooms and confined workspaces. ▶ Construction/labor camps must receive natural light and be supplemented with sufficient artificial illumination, if required. ▶ Emergency lightening arrangement of proper illumination shall be installed at identified locations. ▶ Sufficient lightening arrangement shall be provided in toilets having doors along with locks. ▶ Eating areas such as canteen must be cleaned, and kitchen, toilet/ human waste must be segregated at source and collected separately				

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		as per measure suggested above. ▶ Hand, knee, and foot railings shall be provided on stairs, fixed ladders, platforms, ramps or loading bays etc. ▶ Covers should, if feasible, be installed to protect against falling items. ▶ First aid box shall be provided at identified locations. ▶ First Aid training to at least 25% of workers both female and male. ▶ Tie-up with local hospitals shall be maintained and ambulance facility shall be reserved for emergency purpose only. ▶ OHS training to all new workers and refresher training to the old workers/drivers shall be arranged by the contractor. ▶ Regular health check-up shall be undertaken at construction camps/labor camps etc. ▶ Visitors such as CSC engineers or employer officials visiting the construction sites/camps shall wear helmets of approved color. ▶ Fire extinguishing devices shall be installed in the identified areas. ▶ Arrangements with the local firefighting				

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		department shall be made. ▶ Contractor shall prepare and get approved an emergency response plan, including an evacuation plan, in consultation with the Fire Service & Civil Defense Department (FSCD) and train workers accordingly.				
B-25	SEA-SH	▶ Implementation of a GBV-free work environment shall be maintained at the project assisted by PIU ▶ PIU will have a gender specialist to monitor the GBV-free environment. ▶ Gender-based discrimination shall be strictly prohibited and monitored. ▶ Any sexual harassment, including homophobic slurs or using social media against a colleague, shall be dealt strictly with as per local law of the country, and the employee shall be terminated immediately from his duties. ▶ All workers, including skilled and non-skilled workers, shall be trained in the code of conduct and company policy in a SEA-SH-free work environment. ▶ It shall be ensured that everyone, including managers/engineers and other workers, has attended the training mentioned above. ▶ The contractor shall frame the Code of	PIU/ Contractor/ CSC	PIU	Construction Phase	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015, SEA-SH

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		Conduct (COC) with minimum standards of behavior with which project actors agree to comply individually. ▶ The COC Preventing SEA-SH and Violence against Children/Female Workers shall be rolled out among individuals and signed by each worker/manager/other staff member. ▶ Each worker needs to sign the COC every six months. ▶ A signed copy of the COC shall be documented physically, and a scanned version will be stored digitally. ▶ The company policy on a GBV-free work environment and COC shall be displayed at labor camps/canteens and other contractor facilities. ▶ Staff shall be encouraged to report suspected or actual GBV. ▶ A grievance redressal mechanism (GRM) shall be established at the site to address the issues immediately. ▶ Provision of separate, safe, and easily accessible facilities (e.g., toilets, sleeping areas)				

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		for male and female users, which can be locked from the inside³⁴ ; ► Provision of Safe, accessible, well-lit waiting areas and other public spaces (such as parking lots and construction sites); ► Visibly displaying signs around the project site that signal to workers and the community that the site is an area where SEA/SH is prohibited or a safe, SEA/SH-free zone. ► A Gender Specialist has been hired by the PIU to monitor indicators: (a) the number of training courses related to SEA/SH delivered; (b) the percentage of staff who have agreed to a CoC; (c) the percentage of project actors who have attended CoC or SEA/SH training; or (d) percentage of SEA/SH cases handled in line with quality requirements/established protocols.				
B-26	COVID-19	► Contractors must apply or comply with government guidelines in line with WHO guidelines to prevent the outbreak of infection at sites. ► Installation of dispensers for hand	Contractor/ CSC	PIU	Construction Phase	

³⁴ Good Practices Note on addressing Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH) in Investment Project Financing involving Major Civil Works Second Edition, the World Bank

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		sanitizers in labor camps/construction and other prominent locations. ► Distribution of N95 mask etc. to labor. ► Awareness campaigns through posters shall be periodically conducted in labor camps/ construction camps/other contractor facilities. ► Provision of isolation rooms in labor camps ► Contractor shall prepare a COVID-19 preventive action plan as per WHO norms for implementation ► Regular health check-ups PIU will employ a consultant to prepare a COVID-19 prevention plan at the construction site.				
B-27	Traffic Diversion and Detouring Plan	► Detailed “Traffic and Road Safety Management Plans” shall be prepared by the Contractor and submitted to CSC for approval. The traffic diversion plan shall contain but not limited to the following: ▪ Traffic safety arrangements for carrying out construction activities in congested urban areas. ▪ Arrangement of Signaling system and warning Signs system ▪ Traffic routes for construction vehicles/equipment	Contractor	CSC/ PIU	Construction Phase	Bangladesh Road Sign Manual, Bangladesh Road Transport Authority Ministry of Communication, March 2000

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		- Construction vehicles/equipment speed - Traffic control Arrangements at the site - Parking of construction vehicles/equipment/trucks - Temporary Traffic diversion and detouring arrangement - Traffic arrangement after cessation of work each day, - Safety measures for night-time traffic - Precaution for transportation of hazardous materials - Arrangement of flagmen/walkie-talkie/mobile phones etc. ▶ The Contactor must prepare a C-Traffic Management Plan, which is to be approved by CSC.				
B-28	Archaeology and cultural heritage management	▶ Contractors shall ensure that all archaeological and cultural heritage sites are protected from construction activities. ▶ The contractor shall devise mitigation and chance-find measures in consultation with the local champions. ▶ If an important site/potentially significant asset is uncovered during the contractor, the contractor shall immediately stop the work temporarily and report the finding to	Contractor	CSC	Construction Phase	The Antiques Law of 1968; Environment Conservation Rules 1997

Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		the project authorities. ▶ Contractor shall take necessary steps to protect chance finds from the impacts of any further project activities. ▶ Where necessary, signage and fencing shall be installed to protect known heritage sites close to construction areas. ▶ Contractors' code of conduct with rules and guidance on addressing chance finds and training of contracted workers shall be included in the CESMP.				
C	Operational Phase					
C-1	Environmental Monitoring	▶ Environmental monitoring of the air, noise, water, etc., shall be undertaken as per the Guidelines	Monitoring agency	Khulna Zone	Operational Phase	ECA 1995; ECR 1997
C-2	Monitoring and Evaluation of ESMP/RAP	▶ Client will undertake monitoring and evaluation of the effectiveness of the ESMP/RAP through the Environmental and Social division of PIU.	Monitoring agency	Khulna Zone	Operational Phase	
C-3	Terrestrial Ecology	▶ Shrubs and trees planted in the project are to be maintained. ▶ Trimming of the shrubs shall be undertaken regularly as per the Guidelines	Monitoring agency	Khulna Zone	Operational Phase	NEP 1992; ECA 1995; ECR 1997; Bangladesh Wildlife (Conservation & Security) Act 2012
C-4	Water Resources and Water Quality	▶ Side drains will be regularly cleaned before the onset of monsoon ▶ Water quality monitoring shall be	Monitoring agency	Khulna Zone	Operational Phase	National Water Policy 1999; Water Reservoir Conservation Act 2000;

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Table 10-2: Environmental and Social Management Plan

Sl. No.	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		undertaken.				The Water Act 2013
C-5	Air Quality	- Air Monitoring as suggested in the Environmental Monitoring Plan shall be undertaken. - PIU shall advise DOE to implement Schedule 4: Standards for Emission from Motor Vehicles of Environmental Conservation Rules 2017 (Draft).	Monitoring agency	Khulna Zone	Operational Phase	ECA 1995; ECR 1997; and Bangladesh National Ambient Air Quality Standards 2005
C-6	Noise and Vibration	Noise and Vibration Monitoring shall be undertaken as suggested in the Environmental Monitoring Plan.	Monitoring agency	Khulna Zone	Operational Phase	ECA 1995; ECR 1997; and Noise Pollution Control Rules 2006
C-7	Soil and Sediments	Any spillages or accidental vehicles shall be removed immediately.	Monitoring agency	Khulna Zone	Operational Phase	
C-8	Road Safety	- Road furniture, as provided in the operation phase, needs to be maintained properly. - Potholes or any other damages shall be rectified immediately after post-monsoon. - Road safety audits shall be undertaken regularly. - Public awareness campaign shall be regularly conducted using various Information, Education, and Communication (IEC) techniques such as Media (Television, newspaper) Display boards safety weeks and event organization etc.	Monitoring agency	Khulna Zone	Operational Phase	National Land Transport Policy; RHD's Road Master Plan; National Road Design Standard

10.2 ENVIRONMENTAL MONITORING PROGRAM

400. Monitoring and implementation following the requirements are critical components to prevent issues from becoming problems in the first place and to ensure that action plans are implemented, and procedures are being followed. The monitoring program related to the LMP is presented in **Table 10-3**. Any major non-compliance (e.g., issues that could lead to a significant failure of structures, fatal accident, major injuries, authorities' notice/prosecution, or delay in project schedule) shall be corrected within one working day. Minor non-compliance issues (e.g., issues that do not lead to a breach of statutory requirements, bodily injuries/damage to properties, the environment, and surrounding communities) shall be corrected within one week.

Table 10-3: Internal Monitoring Program

Action	Performance Indicators	Monitoring Protocol	Responsibilities	Monitoring Records
Internal Monitoring	The number of child labor, Number of forced labors; Number of Trade Union/Workers' Organization members and activities, Number of Trade Union/ Workers' Organization dialogues and no. of issues raised, Number of employees who sign the labor contract, Number of employees paid under regional minimum wage; Number of employees registered with social, health, and unemployment insurance; Type, number, and compensation of occupational accidents and diseases. Type and number of grievances; and Type and number of instances of disciplinary actions.	Quarterly	Contractor Personnel; and HR Specialist.	Employees' information; Internal Labor Regulation; CBA and other Trade Union/Workers' Organization's documents (minutes of Labor Conference, Social Dialogues, Trade Union/ Workers' Organization's Fund, records of Trade Union/ Workers' Organization's activities); Labor Contracts; Wage scale and pay slip; Documents on social, health, and unemployment insurance payments; Documents on occupational accidents and diseases; Grievance documents; and Discipline documents.
	Number of local people (separated by gender) working at the Projects	Quarterly	Contractor's Personnel; and HR Specialist.	List of local people (separated by gender)
External monitoring	Performance indicators are listed above, and the Labor Audit Report contains other indicators upon request by the lender.	Quarterly	HR Specialist	Upon request by the Lender

10.2.1 INTERNAL AUDIT

401. Apart from daily inspection, internal audits at planned intervals will be scheduled to ensure appropriate preventive actions are being taken as planned and corrective actions are being carried out on a timely basis. The internal auditing program is shown in **Table 10-4**.

402. The contractor's personnel shall conduct internal labor and working condition management audits quarterly during the construction phase and semi-annually during the operation phase to ensure the

project's performance complies with the applicable standard. The template of the audit checklist is presented in **Table 10-4**.

Table 10-4: Internal Auditing Program

Sl. No.	Audit/ Inspection	Responsibilities	
		The Project Owner/ Lender	The Contractor / Subcontractor/ Primary Supplier
1.	Monthly inspection		×
2.	Quarterly self-audit		×
3.	Quarterly audit of Subcontractor/Supplier Management (during the construction phase)	×	
4.	Semi-annual Labor Compliance Self-Assessment (during construction and operation phases)	×	

10.2.2 INTERNAL REPORTING

403. Internal reporting is communication between the project owner, the contractors, subcontractors, and primary suppliers. The internal reporting during construction shall include, but is not limited to:

- ▶ Quarterly self-audit report of contractor and primary supplier performance, including subcontractors' performance.
- ▶ Annual report of contractor/primary supplier management and
- ▶ Annual report of the project's labor and working conditions management.

404. HR specialists/contractors and primary suppliers shall be responsible for implementing corrective actions for issues identified during audits and assessments. A report on the status of corrective actions implementation shall be prepared and submitted to the contractor's personnel/HR specialist in the next audit.

10.3 GRIEVANCE REDRESS MECHANISM (GRM)

405. The contractor will assist and take necessary steps for collecting written complaints on behalf of the PIU and coordinate responses to all complaints. Both verbal and written complaints are to be entered into a Grievance Complaint Log as addressed when receiving a complaint. All employees shall refer the complainant to the PIU or the resident engineer. The process of GRM is sorted out below:

- ▶ The person receiving a complaint shall ensure that the Grievance Complaint Log is completed.
- ▶ The form shall then be forwarded to the PIU expert, who will assign it a number.
- ▶ The PIU expert shall ensure all actions are taken to close the complaint.
- ▶ Information on proposed corrective action sent to the complainant (if appropriate); the date the complaint was closed out; and the Date response sent to the complainant.
- ▶ All complaints shall be responded to in writing, though a verbal response will also be provided if this is more appropriate in the circumstances (e.g., where the complainant cannot read).
- ▶ All complaints must be responded to within two weeks of being received, even if the response is just a summary of what is planned and when it is likely to be implemented.
- ▶ Further correspondence should be given once the complaint is closed out.
- ▶ The PIU expert, through the contractor, will be responsible for providing a monthly report detailing the

level of complaints and any outstanding issues to be addressed.

- ▶ Monthly reports will include an analysis of the type of complaints, levels of complaints, and action taken to reduce complaints.
- ▶ The PIU expert shall file all documentation related to complaints in a file in his office.

10.3.1 CLOSURE OF THE CONSTRUCTION SITE AND CONSTRUCTION LABOR CAMPS

406. The contractor will hand over the borrowed land to the individuals or government after completing all project activities while complying with national or international standards. The construction site and construction labor camp will be closed considering the following aspects.

- ▶ The temporary infrastructure should be demolished, considering the baseline environmental aspects after the project has completed its duration.
- ▶ Materials, scarps, debris, etc., should be relocated or vacuumed as per the standard procedure.
- ▶ All of the machinery, vehicles, and equipment should be relocated without hampering the existing environmental features;
- ▶ The land should be handed over by making its natural state like before borrowed;
- ▶ Labor camps should be ensured empty before demolition and safe exit of workers will also be ensured;
- ▶ Environmental and social assessment should be conducted after or during the closure of the construction site and construction labor camps to avoid any environmental and social hazards;
- ▶ Construction dervish from the construction camps should be properly dumped into a designated dumping yard during the closure of the labor camps.

10.4 ENVIRONMENTAL MONITORING PLAN

407. To evaluate the effectiveness of the mitigation measures to reduce the environmental impacts, it is necessary to monitor the environmental parameters during the project construction and operation phase. The proposed monitoring plan provides information to ensure that the development initiative of this national highway is complying with the regulatory standards and helps define the thresholds that would signal the need for immediate corrective actions.

408. From the environmental monitoring point of view, it is proposed to monitor ambient air quality, ambient air for noise, water quality, and soil and sediment quality during the construction and operation of the project. The contractor can collect the meteorology data from the nearest meteorology station located in Jashore, or it can be monitored at the site by installing the equipment.

409. The following subsections present an environmental monitoring plan covering the parameters to be monitored, sampling locations, and frequency.

10.4.1 AMBIENT AIR QUALITY

410. The ambient air quality is proposed to be carried out at Four (04) locations in addition to villages in the vicinity of the construction camps/Hot mix plants/stockyards, and borrow areas and near sensitive receptors, such as schools/hospitals/mosques, during the construction phase. In total, the contractor must carry out ambient air quality at four (04) locations. However, during the operation phase, the ambient air quality monitoring will be carried out at four (04) locations in consultation with the Department of Environment (DOE). The ambient air quality monitoring details are given in **Table 10-5**.

Table 10-5: Ambient Air Quality Details

Sl. No.	Items	Description of Items
1.	Monitoring Parameters	Particulate Matter (PM10 and PM2.5), Sulphur Dioxide, Nitrogen Oxide, Carbon Monoxide (CO)
2.	Monitoring Locations	One in each contract (Chachra Circle, Escon Mondir, and Chachra Checkpost most.) Three (03) locations as per the suggestion of the Environmental Engineer of CSC/RHD
3.	Monitoring Frequency	Continuous 24-hourly monitoring twice a week for summer, winter, and post-monsoon season
4.	Total number of samples	3-locations x 1-days x 3-season x 2 years Total number of samples 6 during the construction phase Total number of samples during operation phase 6.

10.4.2 NOISE AND VIBRATION MONITORING

411. Similarly, the ambient air for noise shall be monitored at four (04) locations in addition to villages near construction camps/Hot mix plants/stockyards and borrow areas and near sensitive receptors such as schools/hospitals/mosques during the construction phase. In a total of nine locations, the contractor will monitor noise during the construction phase. In contrast, the noise monitoring will be carried out at four (4) locations near sensitive receptors in consultation with DOE officials during the operation phase of the project. The noise quality monitoring details are presented in **Table 10-6**.

Table 10-6: Ambient Air Quality for Noise Monitoring

Sl. No.	Items	Description of Items
1.	Monitoring Parameters	Noise and Vibration quality monitoring (L_{eqday} and $L_{eqnight}$, L_{10} , L_{98} , L_{max} and L_{min})
2.	Monitoring Locations	Chachra Circle, Escon Mondir, and Chachra check post mosque. Three (03) locations, such as construction camps/maintenance workshops/labor camps, and one (1) location in sensitive receptors/residential areas near the construction site, as per the suggestion of the Environmental Engineer of CSC/RHD. During the operation phase, in consultation with the DOE officials, near the three (03) sensitive receptors.
3.	Monitoring Frequency	Continuous 24-hour monitoring using an Integrated Sound level meter with a data logger.
4.	Total number of samples	Throughout the construction period Total number of samples = 3-locations x 12-month x 2-years Total number of samples during the operation phase is 6

10.4.3 SURFACE WATER QUALITY

412. As presented in the Table 10-7 Surface water samples will be collected from the two (02) surface water bodies during the project's construction and operation phase. The sampling will be done once a season except during the monsoon season.

Table 10-7: Surface Water Quality Monitoring Details

Sl. No.	Items	Description of Items
1.	Monitoring Parameters	pH, DO, BOD ₅ , Temperature TSS, Oil and grease, free ammonia, etc. Total Coliforms, and E-coli form per 100ml
2.	Monitoring Locations	2 surface water bodies (river/canal)
3.	Monitoring Frequency	Once in a season except monsoon season
4.	Total number of samples	Throughout the construction period

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Table 10-7: Surface Water Quality Monitoring Details

Sl. No.	Items	Description of Items
		Total number of samples = 2-locations x 1-sample per season x3-season x 2-years=12 samples Total number of samples during operation phase is 6.

10.4.4 GROUNDWATER QUALITY

413. The groundwater samples will be collected from the two (2) locations during the project's construction phase. The samples will be collected and analyzed every season except monsoon season, as presented in **Table 10-8.**

Table 10-8: Groundwater Monitoring Details

Sl. No.	Items	Description of Items
1.	Monitoring Parameters	pH, EC, TDS, Temperature, Taste, TSS, Oil and grease, Heavy metals
2.	Monitoring Locations	2 Groundwater samples Construction Camps Labor camps
3.	Monitoring Frequency	Every season one sample from each location except monsoon season
4.	Total number of samples	Total number of samples = 2-locations x 1-sample per season x3-season x 2-years=12 samples per contract The total number of samples during the operation phase is 12 in consultation with DOE officials.

10.4.5 SOIL AND SEDIMENT QUALITY

414. The soil samples will be collected from the three (3) locations during the project's construction phase. The samples will be collected and analyzed every season except monsoon season, as presented in **Table 10-9.**

Table 10-9: Soil Monitoring Details

Sl. No.	Items	Description of Items
1.	Monitoring Parameters	pH, electrical conductivity, organic matter (%), nitrogen (mg/1000g), potassium (mg/1000g), phosphorous (mg/1000g), sulfates and sodium sulfates, and oil & grease
2.	Monitoring Locations	<u>3 Soil samples</u> Construction Camps Labor camps Maintenance workshop
3.	Monitoring Frequency	Every season, one sample from each location except for the monsoon season
4.	Total number of samples	Total number of samples = 3-locations x 1-sample per season x3-season x 2-years=12 samples

415. The sediment samples will be collected and analyzed every season except monsoon season from the two (02) sediment samples near the bridges of river/canal, as presented in **Table 10-10.**

Table 10-10: Sediment Monitoring Details

Sl. No.	Items	Description of Items
1.	Monitoring Parameters	pH, electrical conductivity, organic matter (%), oil & grease, Heavy metals
2.	Monitoring Locations	2 Sediment samples from river

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Table 10-10: Sediment Monitoring Details		
Sl. No.	Items	Description of Items
3.	Monitoring Frequency	Every season one sample from each location except monsoon season
4.	Total number of samples	Total number of samples = 2-locations x 1-sample per season x3-season x 2-years=12 samples per contract

10.5 INSTITUTIONAL ARRANGEMENT FOR ESMP IMPLEMENTATION

416. The RHD will establish a PIU to oversee the implementation and management of project-related activities. An organogram for the implementation of environmental and social management is presented in **Figure 10-1**.

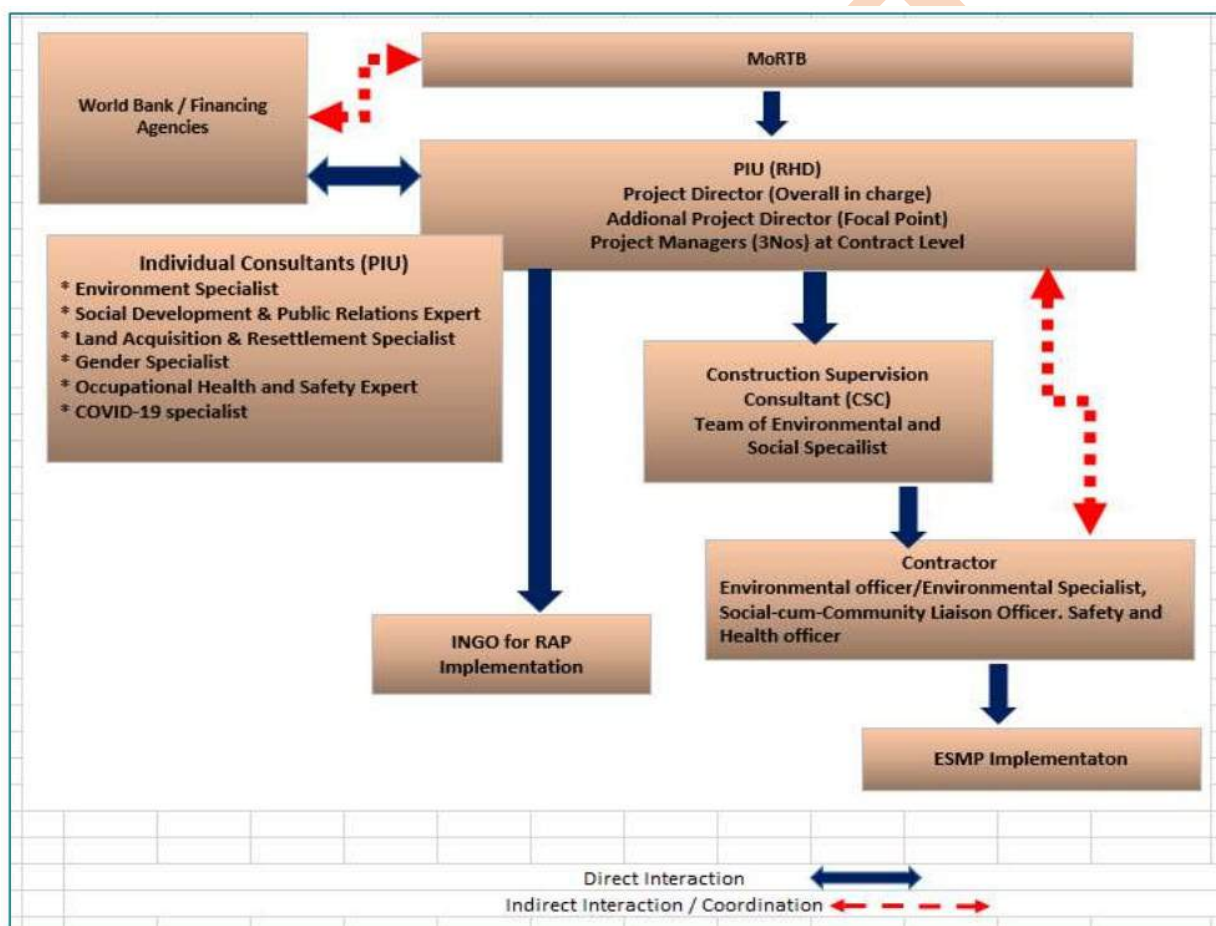


Figure 10-1: Organogram for the Implementation of ESMP

417. The institutional setup is as follows:

418. The environmental officer/Environmental Specialist, Social-cum-Community Liaison Officer, and safety and Health officer of the Contractors will be responsible for implementing the ESMP at the site.

419. CSC will be the project engineer and report to the PIU. He will be responsible for contract administration and day-to-day project supervision, including implementing environmental and social management plans. The CSC will consist of an environmental and social expert. It is suggested that a team of environmental and social experts at the national level for each contract will be comprised of a senior environmental

specialist, a Public Health Specialist, a Gender specialist, a senior Resettlement, and a rehabilitation specialist/ senior social development specialist, the CSC team.

420. The Project Implementation Unit (PIU) of RHD will be the responsible agency for the overall implementation of project activities. Since the project road has been divided into three contracts, the project manager at the contract level will be assigned to implement the project activities, including ESMP. PIU will hire Subject Matter Experts, namely, Environment Specialist, Social Development and Public Relations Expert, Land Acquisition/Resettlement & Rehabilitation Specialist, Gender Specialist, Occupation Health and Safety, and COVID -19 specialist, to assist the PIU in the implementation of ESMP and RAP. In PIU, an Additional Project Director (APD) will be deployed, who will be a focal point for the implementation of ESMP and the supervisor of the Project Managers. The head of PIU will be the Project Director.
421. MoRTB is an umbrella agency with the overall responsibility of ensuring that the project is developed sustainably and meets the World Bank's environmental and social safeguards.
422. The roles and responsibilities of different designated staff at the project are given in **Table 10-11**.

Table 10-11: Roles and Responsibilities of Different Designated Staff

Institution	Designation	Role and Responsibility
MoRTB	-	▶ Ensure that the project, regardless of financing source, complies with the provisions of the ESMP, World Bank ESS and GoB laws and policies ▶ Ensure that project implementation complies with government environmental policies and regulations. ▶ Ensure that project environmental and social management is implemented and reported to the Steering Committee and the financing agency as required.
PIU	Project Director, PIU of RHD	▶ Overall implementation of the project ▶ Coordination among the high-level committees to obtain regulatory clearance/permissions. ▶ Participate in high-level meetings. ▶ Review of progress of the project and ESMP ▶ Approved to release the funds
	APD, PIU of RHD	▶ Updating the PD on various aspects of the project ▶ Coordination with the World Bank and regulatory authorities on EMP implementation with assistance from PIU ▶ Recommendation to PD for release of funds ▶ Responsible for regulatory obligations for the project. ▶ Review the monthly progress of the contractor ▶ Grievance redressal at the project level
	Project Manager (PM) - PIU	▶ Overall implementation of the project at site ▶ Check and verify Interim Payment Certificates (IPCs) for contractors' payment ▶ Coordinate the different district level committees to obtain regulatory clearance/permissions. ▶ Participate in district-level meetings. ▶ Monthly review of progress ▶ Grievance Redressal at field level
	Environment Specialist (PIU)	▶ Planning and implementation of ESMP ▶ Review the monthly progress of the contractor on ESMP implementation ▶ Reviewing the periodic progress reports on ESMP ▶ Assisting PIU on Environmental Safeguards issues and ESMP implementation ▶ Conducting field visit, as and when, required

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Table 10-11: Roles and Responsibilities of Different Designated Staff

Institution	Designation	Role and Responsibility
		▶ Assisting PIU in coordinating with the regulatory authorities. ▶ Supervision and monitoring of progress of activities of the consultants and contractors for the implementation of different components of ESMP ▶ Provide guidance to PIU, CSC, and contractors in conducting subsequent monitoring and reporting and in undertaking corrective options ▶ Imparting training to the field staff and contractor on ESMP. ▶ Ensuring that the CSC commits and retains dedicated staff as social and environmental managers to oversee CESMP implementation ▶ Ensuring that submission of periodical environmental and social management and monitoring reports to the steering committee and co-financers through RHD; ▶ Preparation and submission of semi-annual monitoring reports on ESMP implementation for the WB review through RHD ▶ Implementation of environmental monitoring measures (such as environmental quality monitoring, tree plantation, landscaping, and wildlife monitoring) during the O/M stage of the Project. ▶ Grievance Redress
	Social Development and Public Relations Expert	▶ Liaison with district administration (DC) to support land acquisition and RAP implementation activities; ▶ Assist the PMU on RAP implementing iNGO and setting up a baseline and monitoring system.
	Land Acquisition/Resettlement & Rehabilitation Specialist (PIU)	▶ Review and finalize RAP additions when necessary and Monitor activities of the NGO (iNGO); ▶ Conduct internal monitoring of the resettlement process to ensure smooth implementation. ▶ Ensure timely compensation payments and other entitlements as per the RAP are made before physical relocation or civil work commences. ▶ Participate, record, and address grievances at the project level ▶ Coordinate with the project cell to ensure the availability of funds for all R&R activities. ▶ Promote improved social and environmental performance through the effective use of management systems; ▶ Ensure that proper implementation of the Livelihood restoration plan and gender action plan including ▶ Grievance Redressal ▶ Liaison with relevant government authorities for protecting archeological and cultural heritage sites.

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Table 10-11: Roles and Responsibilities of Different Designated Staff

Institution	Designation	Role and Responsibility
	Gender Specialist (PIU)	▶ Review and prepare the project Gender Action Plan (GAP) & support PIU for its implementation. ▶ Coordination with the WB task team and PIU ▶ Organize/facilitate initial training of PIU staff on GBV & support the PIU with the development of GBV action plan ▶ Develop or adapt standard operating procedures for GRM ▶ Assess the need for and support the implementation of community consultations and stakeholders' engagement during upcoming implementation support missions. ▶ Support the adaptation of a code of conduct (CoC) for workers. ▶ Carrying out advocacy for promoting equal rights for women as skill and unskilled labor force, day-care centers at worksite etc.
	Occupation health and Safety (OHS) expert (PIU)	▶ Review and prepare the project OHS plans ▶ Review the progress of OHS implementation at site and safety arrangements made by the contractor to prevent untoward incident. ▶ To interact with regulatory agency on the environmental social, occupational and safety issues including safety aspects ▶ Review the Contractor's OHS plan and its updates
	COVID – 19 Specialist (PIU)	▶ Undertake necessary tasks to develop Emergency Response and Action Plans (ERAP) for COVID-19 ▶ Support PIU implementation of COVID-19 prevention measures, ERAP ▶ Support PIU to monitor COVID-19 situation in country and project locations ▶ Training project personnel on infection prevention and response
Construction Supervision Consultant	Environmental Engineer/ Specialist	▶ Responsible for ensuring that effective measures of implementation of ESMP are being taken at the construction site. ▶ Before construction, review and approve CESMPs/method statements prepared by the contractors ▶ Inspection and reporting of Contractor activities to ensure effective implementation of the ESMP. ▶ Suggesting mitigation measures or action, followed by inspections and evaluation. ▶ Ensuring that the social and environmental mitigation measures are incorporated in the Contractors Environmental and Social Management Plan (CESMP), etc. ▶ Monitor the implementation of the CESMP and review the environmental management and monitoring reports prepared by the contractor

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Table 10-11: Roles and Responsibilities of Different Designated Staff

Institution	Designation	Role and Responsibility
		▶ Review of progress reports and periodic reporting to PIU ▶ Interaction with Environment and R&R Specialist (PIU) ▶ Overall, CSC is responsible for ensuring the proper and timely implementation of all their tasks specified in the ESMP
	Social Team (Social Development Specialist/ Resettlement and Rehabilitation (R&R) Expert/Gender Specialist, Public Health Expert)	▶ Inspection and reporting of Contractor activities to ensure effective implementation of the ESMP (social aspects) ▶ Implementation of RAP, Interaction with INGO and reporting of progress of LAP/RAP ▶ Audits of Construction camps/labor camps and other facilities to monitor health/hygiene issues including HIV/AIDs ▶ Monitoring report
Contractor	1. Environmental officer/ Environmental Specialist 2. Social-cum-Community Liaison Officer 3. Safety and Health officer	▶ Responsible for preparing the Contractor's site-specific Construction Environmental and Social Management Plan (CESMP) based on the ESMP of the Project. The CESMP will have but not limited to the following: • Labor Management Plan, • Waste Management Plan • GBV Action Plan, • COVID 19 Prevention Measures • Construction and Demolition waste, and Liquid Waste Management Plan Hazardous Waste Management Plan, • Workers' Camp Management Plan, • Construction Materials Sourcing Plan • Community Health and Safety Plan • Chance finds procedures • Training schedule of staff ▶ The CESMP needs to be approved by the CSC before the commencement of work. ▶ Prepared a standalone C-Traffic Management Plan that met the Bangladesh Traffic Rules Manual's 2000 requirement. ▶ Direct Reporting to the Project Manager of the contractor ▶ Assisting in ensuring that environmentally sound practices are adopted at the construction site.

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Table 10-11: Roles and Responsibilities of Different Designated Staff

Institution	Designation	Role and Responsibility
		▶ To prepare a redevelopment plan in consultation with CSC and land parcel owner for all the sites of identified project-related ancillary facilities like (i) construction camp, (ii) labor camp, (iii) stone crusher unit, (iv) borrow area and (v) waste including debris disposal site. ▶ Ensure that all valid permits and approvals are in place ▶ To have regular interaction with CSC and provide data on the implantation of ESMP. ▶ To ensure that all the waste is managed per the DOE rules and regulations. ▶ To ensure that Hazardous waste or chemicals are managed at construction site/construction camps as per the DOEs rules and regulations. ▶ To ensure that traffic management plans and road safety issues are attended to at the site. ▶ To interact with regulatory agencies on environmental, social, occupational, and safety issues, including safety aspects. ▶ Imparting training to the staff on environmental safety and health issues and ESMP measures. ▶ Implementation of Environmental Monitoring Plan being done at site. ▶ Taking corrective action measures at the site. ▶ Ensuring that all the permits/approvals are valid. ▶ Prepare and submit monthly ESMP implementation progress reports per the format in annexes. ▶ Contractor will report to CSC within 24 hours any incident fatalities, injuries, gender-based violence, etc., including measures taken at the site. ▶ Prepare a monthly progress report on ESMP, OHS, etc., and submit it in the first week of every month.

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10.6 REPORTING

- ▶ The Contractor will submit the monthly progress report on ESMP implementation to CSC
- ▶ The CSC will valid the report based on observation/audit carried out by the Environmental Engineer/Specialist on implementation of ESMP. The CSC will submit monthly progress report and quarterly progress to PIU. The PIU will transmit the monthly progress report regularly to the World Bank as stipulated in Environmental and Social Commitment Plan (ESCP). Besides, quarterly report on monitoring the ESHS performance of the PIU will submit regularly to WB by the PIU as per the requirement of ESCP.

10.7 CAPACITY BUILDING

423. To strengthen the capacity of Staff, the following training of target groups such PIU staff, stakeholder, community, project workers, consultants, contractors, subcontractors is suggested as per Environmental and Social Commitment Plan (ESCP). The proposed capacity building training of different target groups will be carried out by Individual Consultant of PIU. Total training budgetary cost for capacity building has been worked out to be BDT 2, 50,000 in **Table 10-12**.

Target Group	Subject(s)	Method	Time Frame	Cost (BDT)
All concerned PIU /project staff (6 Numbers) in Dhaka	▶ Environmental and Social Standards Overview ▶ Environmental regulations, and national standards, ▶ Process of impact assessment and identification of mitigation measures, ▶ Importance of ESMP & its monitoring, ▶ Occupation Health and Safety (OHS) ▶ Community Health and safety (CHS) ▶ Road Safety and Traffic Management at construction site ▶ ERAP on COVID-19 including prevention, mitigation, and response	Lectures	Before beginning of the implementation of the project	50,000
Project Workers, Environmental Engineers, field officers, contractors, Sub-contractors' stakeholders, community, supervision consultants (50 Number at Jashore)	▶ Basic features of an ESMP, planning, ▶ Implementation of ESMPs: ▶ Occupation Health and Safety (OHS) ▶ Community Health and safety (CHS) ▶ Designing and execution of social and environmental mitigation (SEA/SH, GBV, COC) ▶ Road Safety and Traffic Management at construction site	Workshops and Seminars	Before the construction	1,25,000

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Table 10-12: Training Schedule and Training Cost for 2 days

Target Group	Subject(s)	Method	Time Frame	Cost (BDT)
	- Enhancement measures, - monitoring and evaluation of environmental conditions – during construction and operation - ERAP on COVID-19 including prevention, mitigation, and response			
Project staff field officers, contractors, Subcontractors stakeholders, community, dealing in social/land matters.	Social awareness: Monitoring consultants/organizations, Land acquisition and compensation-related Grievance Redressal Mechanism (GRM) and SEA/SH-related GRM, Redressal Mechanism	Lectures, Workshops, and Seminars	Before the implementation of R&R and LA	75,000
Total training budgetary cost for capacity building for each contract				2,50,000

10.8 CHECKLIST FOR MONITORING ESMP

424. To effectively implement ESMP provisions, checklists for different parameter monitoring and reporting formats for various activities (EC-1 to EC-13) are presented in **Annex 10-1**.

10.9 ENVIRONMENTAL MONITORING COST

425. The environmental monitoring cost was worked on to assess the environmental parameters during the construction and operation phases of the project. It is presented in Table 10-13.

Table 10-13: Summary cost of the Environmental Monitoring and Training

S. No	Component	Cost
A	Training on Safeguards	52,000
B	Construction Camp Management	11,92,000
C	Environmental Monitoring	27,80,000
D	Pollution Control Measures at Work Zones	28,40,000
E	Safety Measures for Workers	13,60,000
F	Operation Phase Safeguards	12,65,000
	Total	94,89,000
	Contingency (10%)	9,48,900
	Grand Total	1,04,37,900
In words: One Crore Four Lacs Thirty-Seven Thousand Nine Hundred Taka only		

10.10 ENVIRONMENTAL MANAGEMENT COST

426. The budgetary cost estimates for the implementation of construction and operation phase EMP for the Intersection of Chachra More, Jashore are presented in **Table 10-14**.

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Table 10-14: Budgetary Cost Estimates for ESMP Provisions

Sl. No.	Description	Unit Type	Unit	Quantity	Unit Cost (BDT)	Amount (BDT)
A	Construction Phase ESMP Cost					
A.1	Two days Training on Environment, Health & Safety		No.	2	26,000	52,000
	Sub Total					52,000
B.	Construction Camp					
B.1	Establishment of Construction Camp		Sft.	2,000	400	8,00,000
B.2	Provision of potable water supply in the construction camps		Month	48	2,000	96,000
B.3	LPG Cylinder at construction camp for cooking	(5 cylinders/ month for 48)	No.	4	2,000	8,000
B.4	Provision of Wastewater Treatment facility at Construction Camp		Month	48	5,000	2,40,000
B.5	Providing solid waste management facility in construction camp		Month	48	1,000	48,00
	Sub Total					11,92,000
C.	Environmental Monitoring					
C.1	Air Quality Monitoring	(1 locations x 1 day week for 4 weeks in a season x 3 seasons x 4 years)	Samples	48	20,000	9,60,000
C.2	Noise Level Monitoring	(1 locations x once in a month x 48 months)	Samples	48	10,000	4,80,000
C.3	Surface Water Sampling & Analysis	(1 locations x once in a season x 4 seasons x 4 years)	Samples	16	25,000	4,00,000
C.4	Ground Water Sampling & Analysis	(1 locations x once in a season x 4 seasons x 4 years)	Samples	16	25,000	4,00,000
C.5	Soil Sampling & Analysis	(1 locations x once in a season x 3 seasons x 4 years)	Samples	12	20,000	2,40,000
C.6	Sediment Sampling & Analysis	(1 locations x once in a season x 3 seasons x 4 years)	Samples	12	25,000	3,00,000
	Sub Total					27,80,000
D.	Mitigation Measures					
D.1	Dust Suppression at construction sites /stockyard / construction camps / haul roads	(1 trips/day x 60 days in a year for 4 years)	Trips	240	6,000	14,40,000
D.2	Plantation of trees & its maintenance for 6 years		No.	1,500	500	7,50,000
D.3	Shrubs Plantation on median, including maintenance for 6 years		No.	500	400	2,00,000
D.4	Oil Interceptors	Lump sum	No.	1	25,000	25,000
D.5	Noise Mitigation Cost		Sft.	150	1500	2,25,000
D.6	Silt Traps for road side water bodies	Lump sum	No.	5	40,000	2,00,000

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Table 10-14: Budgetary Cost Estimates for ESMP Provisions

Sl. No.	Description	Unit Type	Unit	Quantity	Unit Cost (BDT)	Amount (BDT)
	Sub Total					28,40,000
E.	Safety Measures					
E.1	Demarcation of borrow area using fencing if needed.	Lump sum				1,50,000
E.2	Traffic Management during Construction Phase		Month	48	10,000	4,80,000
E.3	Provision for bi-annual health check-up for construction workers at construction sites		No.	50	1,000	50,000
E.4	Provision for PPEs, such as helmet, gumboots, jackets, goggles for labors		No.	100	2000	2,00,000
E.5	Disposal of construction debris and other waste materials & Transportation		Month	48	10,000	4,80,000
	Sub Total					13,60,000
F.	EMP Cost during Operation Phase					
F.1	Air Quality Monitoring	(1 location x 1 day per season x 3 seasons)	No.	3	20,000	60,000
F.2	Noise Level Monitoring	(1 location x 1 day per season x 3 seasons)	No.	3	10,000	30,000
F.3	Surface Water Sampling & Analysis	(2 locations x once in a season)	No.	2	25,000	50,000
F.4	Ground Water Sampling & Analysis	(1 location x once in a season)	No.	1	25,000	25,000
F.5	Shrubs maintenance				LS	5,00,000
F.6	Sanitation and sanitary facilities including waste (liquid and solid) as per DOE requirement				LS	6,00,000
	Sub Total					12,65,000

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