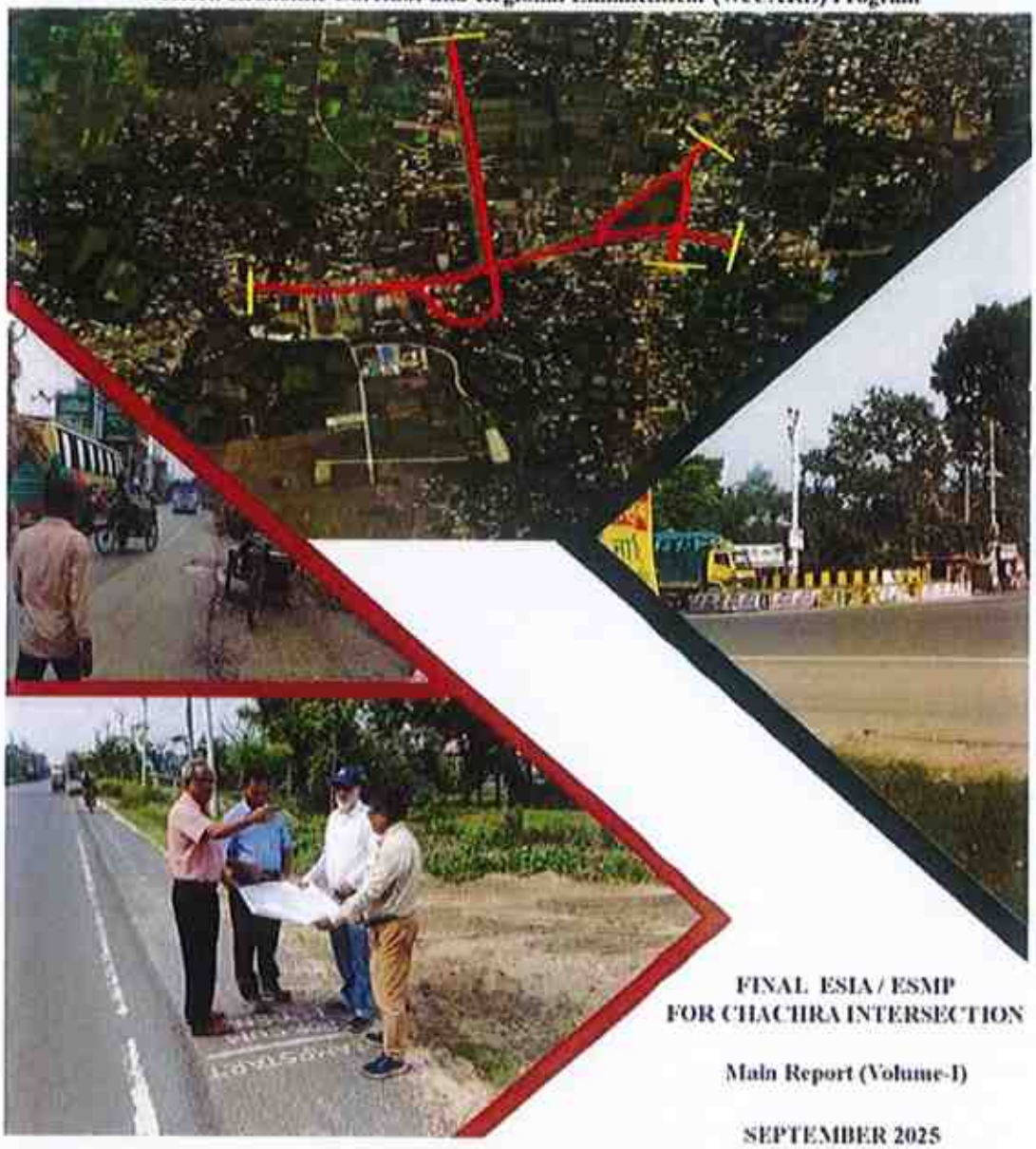
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH
MINISTRY OF ROAD TRANSPORT AND BRIDGES

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



FINAL ESIA / ESMP FOR CHACHRA INTERSECTION

Main Report (Volume-I)

SEPTEMBER 2025

JOINT VENTURE OF

STUP CONSULTANTS PVT. LIMITED (STUP), INDIA

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ACRONYMS		
	Unit	
AASHTO		American Association of State Highway and Transportation Officials
ADB		Asian Development Bank
APHA		American Public Health Association
ARIPA		Acquisition and Requisition of Immoveable Property Act
As	Mg/l	Arsenic
BD		Bangladesh
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 Environmental and Social Management Plan
CCL		Cash Compensation under Law
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
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
IUCN		International Union for Conservation and Nature
JPBS		Jashore Palli Biddut Samity
LGED		Local Government Engineering Department
km		Kilometer
km/h		kilometer 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
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
SOx	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
VOP		Vehicle Overpass
WHO		World Health Organization
WMM Plant		Wet Mix Macadam Plant

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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 county and strengthen road sector management. 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-2: The current project is upgrading the Chachra Intersection. It is 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 Department of Environment (DoE), and the ECC was obtained for the entire highway covering this intersection. During the study, the Chachra intersection was detached from the J-J Highway and was supposed to be developed along with the Line of Crrdit (LoC) project. Since the LoC project was getting late, this intersection was included again in Phase 1 as a variation. The client advised the consultant to prepare a separate ESMP and RAP for this intersection, meeting the Bank's requirement.

POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

ES-3: Relevant environmental and social policies, laws, regulations, and rules of the country, international treaties, and the WB's Environmental and Social Standards (ESS) have been reviewed, along with their applicability and gaps.

DESCRIPTION OF PROJECT

ES-5: Phase 1 (Jhenaidah-Jashore Road Section) is an essential 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 Intersection Study has been commissioned, and this study therefore constitutes the Chachra Intersection Improvement Study as a variation to Phase 1. Chachra Junction is in Jashore City, Bangladesh. The salient features of the proposed Chachra Intersection Improvement are as follows:

- The current project will involve the upgradation 3.5 km of Chachra More Intersection,
- The trumpet arrangement between roads N7 and N706 at Chachra Intersection is placed towards the Benapole side.
- At Jhenaidah—Jashore Road, a Flyover (Level-1) for the Bhanga—Benapole road stretch. This will be an access-controlled.
- 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.
- Pedestrian crossing Facilities: Facilities such as Foot-over bridges (FOBs) and Pedestrian subways are provided.
- Chachra is extended up to the gate of Medical College on the Benapole side, including the Roundabout at Chachra Bazar/ Raja Bordakanta (RBK) road on the Bhanga/Khulna side, and the Flyover on Jhenaidah—Jashore starts after the Pier of the Railway overpass.
- Road Widening: Extra widening is provided on the main loop of the Trumpet and Ramps 1 and 2. The carriageway on the service road is proposed to be widened.
- Improvement of a total existing nine (09) culverts.

ES-5: The new structures on the project corridor comprise an Elevated Flyover of the Chachra intersection along with Ramps, POP, Subway, FOBs, and Culverts. The consultants have made efforts to design the highway structures, offering detailed designs that are representative of the most economical and sustainable

improvements for the Chachra intersection.

DESCRIPTION OF THE ENVIRONMENTAL AND SOCIAL BASELINE

ES-6: The Chachra intersection is in Jashore Sadar Upazila, Jashore district, in the country's southwestern region.

- **The topography of the project area:** The project area is 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 zone 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 or clay in most of the horizons.
- **Land Use**: 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%).
- **Climate:** Jessore district has a humid subtropical climate with significant 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, the average annual 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.
- **Ambient Air and Noise qualities:** Primary field investigation covering ambient air quality at three (03) locations, noise and vibration level at three (03), Surface water body (Upstream and downstream of Bridge and one Canal) 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., $PM_{2.5}$, PM_{10}, SPM, and gaseous pollutants such as NO_2, SO_2, CO, CO_2, O_3, etc. have been monitored. Air quality results are within the national standard for $PM_{2.5}$, NO_2, CO, and O_3, but higher for SO_2 and at one location for PM_{10}. Noise levels are within standards in one location and exceed standards in the other. The average vibration level is 0.58 to 1.06 mm/s on the existing highway.
- **Surface water and Groundwater qualities:** The results from surface water analysis of the three (03) samples show that all the measured parameters are well within the National Standards. Except that coliforms and Arsenic were observed in the groundwater samples. However, groundwater is safer and less susceptible to bacterial pollution than surface water because the soil and rocks through which groundwater flows screen out most of the bacteria. While the tested results of groundwater two (02) samples showed bacteriological contamination, it may be due to one or more reasons, such as, contamination during sample collection, holding time/temperature, leakage from extraction pipes, breakage of tubewell platforms, unclean well casings, and/or the samples not being tested within the appropriate holding time in the laboratory, which is the allowed time from sample collection until analysis.
- **Trees and Vegetation:** A total of 952 species, including herbs, shrubs, trees, and climbers, have been recorded from the study area's private lands, of which 198 are large, 345 are medium, 316 are small, and 93 are saplings. Most of these are fruit trees. Whereas, 255 trees are to be removed within the RoW of RHD due to the widening of the existing road. About 106 are timber and 95 fruit trees are likely to be affected by the improvement of the Chachra intersection; Most of them are small trees located at Chachra towards Benapole Road. Only 54 trees in Mondolgati Mauza would be affected; most of them are timber. These 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.
- **Settlement within proposed RoW:** According to the Inventory of Loss (IOL) survey under RAP, 274 households will likely be affected in Chachra and Mondolgati mouza due to land acquisition

for proposed project. Out of 274 households, 239 (87.23%) are male-headed HHs, while 35 (12.77%) are female-headed HHs. There is a total affected population of 1,205, comprised of male and female populations are 636 (52.78%) and 569 (47.22%), respectively. The average household size of the affected population in the project area is 4.4, while the sex ratio is 111.78. There are no indigenous people/ethnic groups in the project-affected area.

ANALYSIS OF ALTERNATIVE ALIGNMENTS

ES-7: 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. The alternative alignment options are;

A. Option 1: with Grade Separation Between Benapole and Khulna and Roundabout N7 to Jhenaidah
B. Option 2 with Grade Separation between Benapole, Khulna, and Jhenaidah
C. Option 3: Grade Separation and Elevated Ramp
D. Option 4: Grade-separated movement between Benapole, Khulna, and Jhenaidah
E. Option 5: Grade Separation and Flyover at Junction at Level 1 and Level 2

After thorough analysis, option 3 was revised and considered as the most feasible alignment option. The "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-8: 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. 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-9: The participants in all consultation's session appreciated to the RHD for the improvement of the Chachra Intersection. 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-10: The anticipated environmental impacts are determined at their significance level without mitigation during the project Design / pre-construction (D), construction (C), and operation phases (O) are shown in **Error! Reference source not found.**. The significance/magnitude of impacts was evaluated based on the rating criteria identified by the significance of impacts (indicated by the color of the cells in the last column of the table, where yellow, orange, and red colors indicate minor, moderate, and major respectively for negative impacts that need to be mitigated during different implementation phases of the project. The Green color with different shade indicated the posive impacts of the ptoject activities as minor, moderate, and major.

In the design phase, major risks include land acquisition and removal of private/public structures, while positive effects such as stakeholder disclosure and improved road safety features are rated minor to moderate. The construction phase shows the most significant negative impacts, including dust, emissions, water and soil pollution, tree loss, noise, vibration, and health and safety risks, many of which are moderate to major. During operation, risks continue with emissions and public safety concerns, though benefits like higher land value, better accessibility, and compensatory plantations appear as positive impacts. Cultural

heritage and indigenous peoples are not expected to face adverse impacts. In recapitulation, the construction stage carries the heaviest load of major risks, while design and operation phases show a mix of both challenges and benefits. The color-coding highlights priority areas for mitigation, especially around public health, safety, and environmental quality. Major and moderate impacts have been given priority for the identification of adequate mitigation measures to ensure that they are minimized or taken up with no residual impacts. The major impacts and their mitigation measure during design/ pre-construction, construction and operational phases are briefly highlighted below;

ES-11: Preconstruction Phase Impact and Measures

- **Design consideration**: 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 geometrical improvement, pavement designs with concern to pavement damage, such as rutting, embrittling, softening, road migration of liquid asphalt, thermal expansion in bridge joints, realignment locations, siting of construction/labour camps, and other associated infrastructures can have significant impacts on the biophysical, economic, and socio-cultural environments of the project area. In this respect, the embankment height and pavement design complied 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) is also considered in the design of road infrastructures, particularly all building structures. In addition, the adverse impact from the Bridge/ culverts construction will be due to the improper design of the Bridge's location and inadequate opening and land acquisition. Improper design also causes navigation problems at the Bridge and also leading to construction period impacts affecting river hydrology and water quality. To mitigate these impacts, the area's hydrology and adequate cross-drainage structures are considered. Improperly situated labor camps and construction yards, as well as the batch plant(s) will have adverse impacts on the environment and local communities, thus, before commencement of the construction works, proper planning is essential during the preconstruction phase. Pedestrian safety and road safety measures have been addressed by providing vehicular underpasses, pedestrian passes (POP), Flyovers, etc
- **Land acquisition and resettlement:** Implementation of the proposed road improvement will cause a significant adverse impact on the social environment. The total amount of land required is 33.3152 acres. Out of this, the proposed private land is 12.9448 acres, and the government land is 20.3704 acres, including 16.0103 acres of RHD land, and 4.360 acres of other governmental land.
- The total affected persons are 1205, of whom 636 are males. The affected households are 274 including 239 (87.23%) are male-headed HHs, while 35 (12.77%) are female-headed HHs. The affected residential HHs are 50, including 46 titled and 4 non-titled HHs. The affected HHs losing Commercial Premises and/or Business are 172, including 62 titled HHs, 108 non-titled HHs, and two (02) encroachers' HHs. Whereas, the affected HHs losing Residential-cum-Commercial premises and/or business are 53, including 49 titled HHs, 1 non-titled HH, and 3 encroachers' HHs. Twenty vulnerable HHs 20 are located at Chachra Mouza. A total of CPRs are five (05)), including four (04) CPRs in the Chachra mouza and one (01) CPR in Mondolgati mouza, and six Government and other entities located within the proposed Right of Way (RoW).
- To reduce these impacts, the mitigation measures include implementing the Land Acquisition Plan (LAP) and approved Resettlement Action Plan (RAP) of the Project following ARIPA, 2017, and the World Bank's ESS5. The Deputy Commissioner (DC) will pay Cash Compensation under Law (CCL) to the PAPs to compensate for the impact due to the loss of lands, structures, ponds, trees, standing crops, etc. The payment of compensation to titled and non-titled households should be carried out according to the entitlement matrix defined in the RAP. Implementing a Non-Government Organization (INGO) will execute the RAP on behalf of RHD.
- **Utilities shifting, Drainage problem, Road safety, and Community health and safety:** The risks and adverse impacts on the utilities shifting and community's health and safety are expected during construction activities like excavation, earth working, dismantling the existing structures and road pavement, shifting of 261 electric poles, setting of construction camps/labour camps, etc.

Before starting the civil works, utilities shifting, drainage problems, road safety, and community health and safety issues need to be planned.

ES-12: Construction Phase Impacts and Mitigation Measures

- **Dust emission/ air pollutant:** The dust emission/ air pollutant emissions due to the movement of construction vehicles/plants during construction and the gaseous air pollutant emissions from vehicular exhaust during the operation phase will have an 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 a hot mix plant. A safe distance of 500m away, downwind of 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.
- **Operation of equipment/machinery:** Operation of the machinery or other activities such as piling, excavation, etc., at the construction site/camp will be the 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.
- **Soil of the haulage roads and construction camp: The** 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.
- **Tree Removal:** According to IoL, a total of 1207 trees will be removed. Of them 952 trees are likely to be removed from private land, comprising 195 large, 346 medium, 308 small, and 93 are saplings. The Deputy Commissioner (DC) of Jessore District will pay compensation to titleholders, and RHD will disburse it to non-titleholders in accordance with the RAP. In addition to the compensation for the affected private trees, an extra 10-12 saplings would be given to each affected titled and non-titled households at free cost as the resettlement benefits. To compensate for affected avenue trees, a replantation plan has been proposed in the ESMP. A total of 900 trees will be replanted, about 1:3.5 of the 255 roadside trees that would be cut. A typical road re-plantation scheme is presented in Annex 11, Volume 2. Of the total tree plantation, 40% will be undertaken by RHD through a contractor, and the remaining 60% will be planted by the Forest Department under the social forestry program and the RHD Arboriculture Department.
- **Habitat and Biodiversity:** Loss of vegetation and disturbance to terrestrial and aquatic ecosystems are expected. Mitigation includes tree plantation, controlled clearing, and biodiversity conservation measures
- **Occupational health and safety**: without occupational health and safety (OHS) procedures, workers are at risk of temporary and sometimes permanent physical injury, such as hearing and sight loss, damage to limbs, etc. They could even face a fatal outcome. These risks could create long-term impacts for the health and safety of the construction workforce. To mitigate these adverse impacts and risks, the safe work systems and administrative or institutional control measures shall be followed by the contractor. All worker should be provided with Personal Protective Equipment (PPE), daily toolbox training, and workplace safety awareness training.
- **Community Health and Safety (CHS):** The risks and adverse impacts on the community's health and safety (CHS) are identified, which will be due to various construction phase activities including the establishment of construction camps/labor camps, water logging, accidents, the

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influx of labor, child labor, gender based violenece (GBV), human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS), etc. Mitigation measures are suggested to ensure control of CHS risks and impacts, barricading excavated areas and to prevent trespassing from construction sites/construction camps/labor camps, proper public access to the community to visit to religious place or bazars or houses, 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.

- **Grievance Redress Mechanism (GRM):** The GRM of the project will provide a platform for affected stakeholders, communities, and project participants to submit and resolve complaints, concerns, and feedback about a project's activities. The PIU, RHD will establish two separate Grievance Redress Committees (GRC) to resolve the raised complaints, such as related to (i) compensation payment to the project affected persons, ii) Sexual Exploitation and Abuse/Sexual Harassment (SH) and (iii) Labor Health Safety, etc.
- 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 of Law (CCL), Payment of Top-up, compensation for the loss of private lands, ponds and private trees Etc, and the social and economic development support to restore the livelihoods of women and vulnerable groups. The GRM will ensure that issues are addressed fairly and efficiently, often through receiving complaints investigating them, implementing resolutions, and providing ongoing feedback to maintain project transparency, accountability, and stakeholder belief.
- **SEA/SH:** Measures to prevent impacts on gender, The Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH) at the project site, 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 toensure 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 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.

ES-13: Operation Phase Impacts and Mitigation Measures

- **Land Use Pattern:** Implementation of the project will cause a permanent impact on the existing land use pattern by changing it from agricultural or rural residential/commercial to paved roads due to additional widening of the existing road. Mostly Road projects often lead to increased urbanization around the project area. This can result in converting agricultural or undeveloped land into residential, commercial, or industrial areas. Due to increased accessibility, land prices along the road will also soar in nearby places. The mitigation measure to prevent ribbon development is to restrict land by placing concrete pillars by RHD, and master planning /zoning must be taken by the concerned authority. Integrated planning is crucial to address these impacts. Coordinating land use and transportation planning is must to ensure that new developments are sustainable and beneficial to the community.
- **Soil and Sediments, and Water Resources:** The activity of the proposed development will be only vehicular movements on the newly developed roads and flyover infrastructure. The increased movement of vehicles will be impacts on soil and sediment due to accidents and spillage of oils and lubricants from vehicle engine. The heavy metals and other pollutants from traffic accidents and oil heavy metals and lubricants contaminate roadside soils, potentially entering the food chain, and soil compaction from traffic, changes in soil physical and chemical properties, and the risk of leaching into groundwater also occur.
- Erosion from surfaces, runoff from the road surface, and drainage ditches continue to carry sediment and silt into nearby water bodies, leading to water quality degradation during the operation phase. Usually, the sediment entering streams carries pollutants and can also smother aquatic habitats, negatively impacting fish and other wildlife. To mitigate planting and maintaining vegetation on slopes and in ditches helps stabilize soil and reduce sediment yield. Runoff controls

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are crucial to intercept and treat pollutants before they reach water resources. Proper maintenance of drainage systems and vegetated areas helps reduce ongoing sediment and pollutant transport. Any spills or accidental vehicles shall be removed immediately.

- **Air and Noise:** Vehicular emissions will be the principal source of pollution during the operation stage. This development will provide a mode to decongest traffic in the project area. As such, the proposed development is not envisaged to impact air quality during the operation. During the operation stage, increased traffic will likely raise the noise level. However, this development will provide a mode to decongest traffic and thereby help reduce impacts due to increased noise levels.

LABOR MANAGEMENT PROCEDURE

ES-14: 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 conductedconsidering the standard procedure of relevant rules and regulations (national and international) as well as rolling out of code of conduct for workers. 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 offuel/cooking gas, firefighting, medical services, etc.

EMERGENCY RESPONSE AND DISASTER MANAGEMENT PLAN

ES-15: To prevent untoward incidents/accidents due to construction activities, an Emergency Response and Disaster Management Plan is presented to manage emergencies and crises arising from construction activities. The specification will be included in the contractor bidding document to implement the mitigation measures as a mandatory requirement for the contractor to comply with. 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. 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-16: An 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. 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-17: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-18: The Project Implementation Unit oversees project activities. The PIU has employed specialists, including an Environment Specialist, a Social Development and Public Relations Expert, a Land Acquisition/Resettlement & Rehabilitation Specialist, a Gender Specialist, and an Occupational Health and Safety Specialist, to support the implementation of ESMP and RAP. An Additional Project Director (APD) has been added as a focal point for ESMP implementation and will supervise the Project Managers. The head of the PIU is the Project Director. Construction and Supervision Consultancy (CSC) will be engaged to serve as the project engineer, reporting to the PIU. They will manage contract administration and daily project supervision, ensuring the implementation of the environmental and social plan.

ES-19: The budgetary cost estimates for implementation of the construction and operation phase ESMP for the Intersection of Chachra More, Jashore is 6,742,780 (Six million, seven hundred forty-two thousand, seven hundred eighty) Taka only.

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ES 20: Therefore, it can be concluded that the proposed Project is environmentally sound and sustainable. The following recommendations are made based on the findings of the ESIA,:

- The provisions of ESMP needs to be included in the Bidding Documents as environmental and social (ES) specifications and BoQ items in the Tender Document.
- The Contractor must comply with applicable national rules and legislation and World Bank' ESF through implementation of their Construction Environmental and Social Management Plan (C-ESMP) for the compliance of the Project's Safeguard requirement following the ESMP of the Project.

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1 INTRODUCTION

1.1 PROJECT BACKGROUND

1. Bangladesh is one of the most populous and densely populated countries[1] in the world, with an estimated population of 167 million in 2019 and a geographical area of about 144,415 km^2. 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.

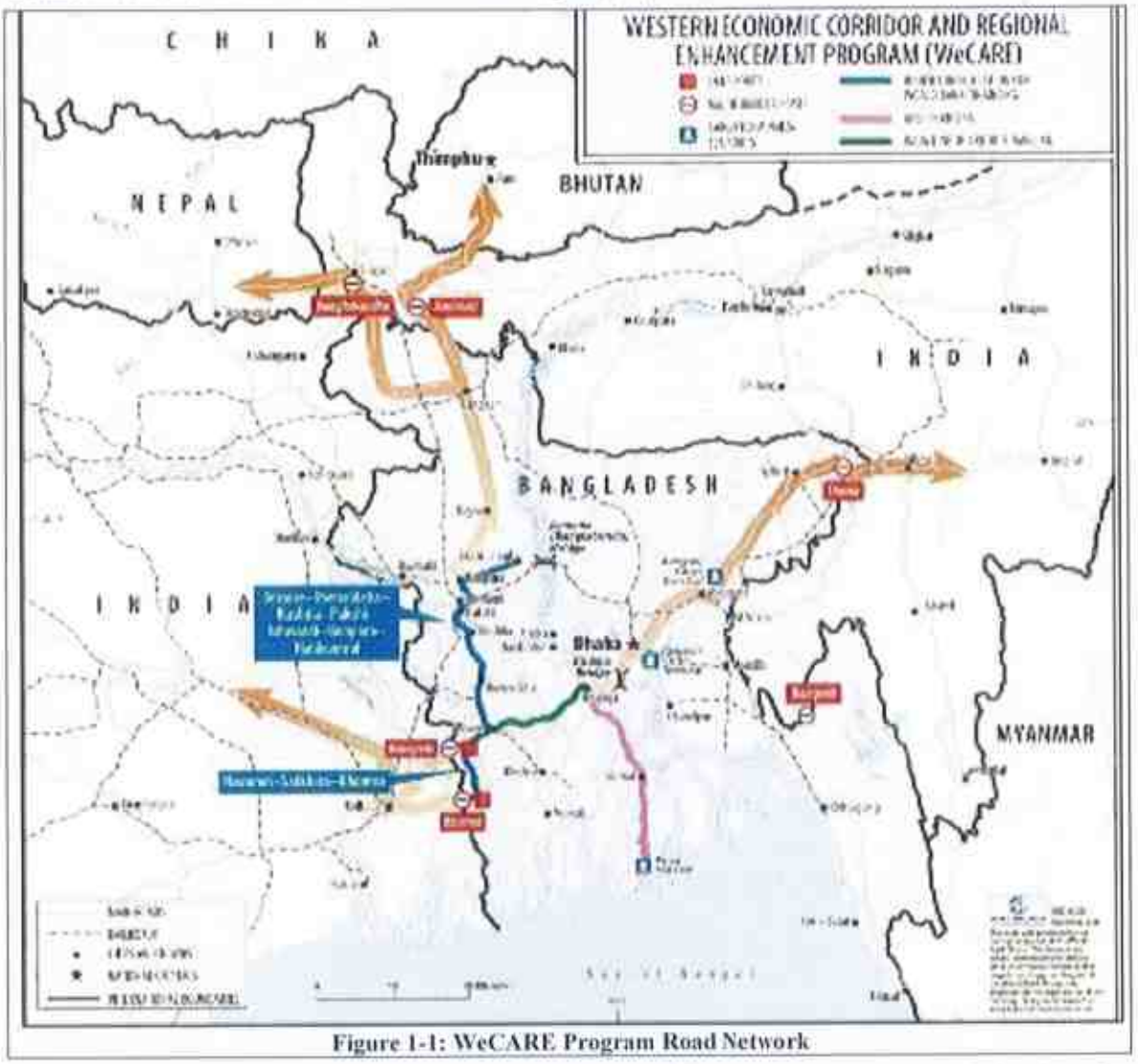

Figure 1-1: WeCARE Program Road Network

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 km^2). The primary road network[2] 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 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.

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

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 I) and Navaron-Satkhira-Bhomra Road Section (Phase III) (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 1-2[3]. This busiest intersection carries major traffic movements from the following road section.[3]

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

[3] Final Design Report of Roads & Bridges, RHD

Figure 1-2: Chachra Intersection, Jashore

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 study 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 follows.[4]:

- 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

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

1.4 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.

1.5 APPROACHES AND METHODOLOGY

13. To conduct this ESIA study, the methodology includes screening, scoping, baseline data collection, and identification and evaluation of impacts with the formulation of mitigation measures. Environmental and Social Impact Assessment (ESIA) baseline data were collected by primary baseline surveys and filled out with available secondary data. The primary data on air, noise, and vibration levels, surface and groundwater quality, and soil quality were collected and analysed in the renowned laboratories.

14. The social data are extracted from the draft RAP report of the project. The social team collected data through Census Surveys, Inventory of Loss (IOL) surveys, socioeconomic surveys (SES), stakeholder consultations meeting (SCM), focus group discussions (FGD), and key informant interviews (KII)as per ESS10.

1.6 STRUCTURE OF THE REPORT

15. The ESIA includes:

- Section 1: Introduction
- Section 2: Regulatory Framework, Standards, and Guidelines
- Section 3: Project Description
- Section 4: Environmental and Social Baseline
- Section 5: Analysis of Alternatives
- 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

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2 REGULATORY FRAMEWORK, STANDARDS AND GUIDELINES

2.1 INTRODUCTION

16. 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.

17. 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.

18. 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

19. 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.

20. 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	Sets overarching environmental protection goals. The project must integrate environmental considerations at all stages to ensure alignment with national goals for sustainable development.
2.	National Environnemental 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.	Provides a long-term strategic framework for integrating environmental considerations into development planning, including infrastructure like roads. Encourages public participation, pollution control, and ecosystem protection, which should guide ESIA and project planning.
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.	Establishes the legal framework for environmental protection in Bangladesh. The project must obtain environmental clearance and implement pollution control measures during construction and operation.
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.	As there are waterbodies in the project area, care is taken to follow the guidelines.
5.	Environment Conservation Rules, 2023	ECR 2023 is promulgated under the ECA 1995, superseding the 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 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.	As the project involves major infrastructure, it falls under the Red Category, requiring an ESIA and Environmental Management Plan for Environmental Clearance Certificate (ECC) from DoE. This document will provide much assistance, requirements and standards for environmental clearance.

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Table 2-1: Existing Policy/Acts/Rules

Sl. No.	Policy/Acts/Rules	Key Provisions and Purpose	Applicability to Project Road
		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. Thus, appropriate measures must be taken so as to avoid this.
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.	Requires that new and upgraded roads undergo ESIA. The project must follow sustainable road development practices and integrate social and environmental considerations.
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.	Emphasizes protecting physical and social environments. The project must align with strategic connectivity, safety, and environmental sustainability goals.
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.	Mandates preservation of urban water bodies. The project must conserve any such water bodies within the road corridor during construction and operation.
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 needed for a public purpose.

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Table 2-1: Existing Policy/Acts/Rules

Sl. No.	Policy/Acts/Rules	Key Provisions and Purpose	Applicability to Project Road
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 mandate 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.

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Table 2-1: Existing Policy/Acts/Rules

Sl. No.	Policy/Acts/Rules	Key Provisions and Purpose	Applicability to Project Road
21.	Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009	This is a comprehensive strategy to address climate change challenges in Bangladesh. Bangladesh Climate Change Strategy and Action Plan built on and expanded the NAPA.	Addresses climate vulnerability. The project must consider climate risks like flooding and incorporate adaptive infrastructure measures.
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 project must follow fair acquisition processes and provide adequate compensation to all affected persons.
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	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	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

Table 2-1: Existing Policy/Acts/Rules

Sl. No.	Policy/Acts/Rules	Key Provisions and Purpose	Applicability to Project Road
	Health and Safety Policies 2013)	regulations on working terms, worker 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. Thus, applicable laws are to be followed.
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 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 project must conduct meaningful consultations and disclose environmental and social findings.
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	This Act applies to the sub-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.bilshd.org/wp-content/uploads/2016/03/BILS-ILO-Study_OSH-Profile_Final-Report_29-June-2015.pdf
[15] https://occup-med.biomedcentral.com/articles/10.1186/s12995-022-00366-y

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Table 2-1: Existing Policy/Acts/Rules

Sl. No.	Policy/Acts/Rules	Key Provisions and Purpose	Applicability to Project Road
		inconvenience as may be and will make full compensation for any damage, detriment, or inconvenience caused by the 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 is applicable if there is need for 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 for the sub-project as 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. The project must manage all generated solid waste responsibly in accordance with 3R principles.
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

21. 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.

22. 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**.

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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
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.	Applicable. The ESIA/ESMP process for the Chachra Intersection aims to identify, assess, and manage site-specific environmental and social risks, such as impacts on nearby communities, sensitive receptors (e.g. schools, markets), and temporary disruptions due to construction. The intersection is a critical urban node, necessitating stakeholder engagement and alternative analysis.
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 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.	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, 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.	Applicable. The project will involve direct and contracted workers, especially during construction and traffic rerouting. Occupational Health and Safety (OHS) measures, fair treatment, and a GRM for workers are critical, especially given the urban setting and potential use of subcontracted labor.

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
		• The Labor Act does not require development projects to prepare labor management plans/procedures or OHS Plans.	
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 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' EHSGs. **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 efficiency measures in their ES risk management plans	Applicable. Construction at the intersection will generate dust, noise, emissions, and waste. Measures for efficient use of materials, dust suppression, noise barriers, and waste handling will be included in the ESMP. There may be minor water and energy demands to manage.
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.	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. **Relevant GoB Laws and Regulation** ▶ National Road Transport Act	Applicable. 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.

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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
	Effective measures should be put in place to address emergency events.	► ECR 2023 ► BLA 2006 ► Public Procurement Rule,2008 ► Water Act 2013 **Gaps:** • While other acts cover all ESS-4 requirements, gaps exist for Community exposure to health issues. • Covered under ESIA, the systems do not provide clear requirements for the development project and implementation.	The gaps between GoB regulations and ESS-4 will be addressed through suitable provisions in the ESMP and 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	Applies to permanent or temporary displacement due to land acquisition or access restrictions, excluding voluntary market transactions unless third parties are affected. Sets criteria for voluntary land donations, community land sales, and illegal rental income. Prohibits forced eviction without due legal process and safeguards. Requires compensation and resettlement before land acquisition, along with community consultation, information disclosure, and a grievance mechanism. **Relevant GoB Laws and regulation** Acquisition and Requisition of Immovable Property Act, 2017 **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.	Applicable. 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.

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
	development programs.	• 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. ▶ 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 Plan. • differentiated measures on types of habitats. • conduct of due diligence on primary suppliers.	Not directly applicable. The project is in a built-up urban area with limited biodiversity value (mostly Trees). Minor vegetation and tree clearance, will be documented and mitigated through the ESMP.
ESS-7: Indigenous-Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	▶ 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	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: • coverage of IP impacts in the ESIA;	Not Applicable. No indigenous or tribal communities are known to reside or depend on the area around the Chachra Intersection.

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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
	Informed Consent	special treatment or differentiated approach to IPs and vulnerable groups. conduct of FPIC. development of IP Plan.	
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 meaningful consultation with stakeholders regarding cultural heritage. ▶ Promote the equitable sharing of benefits from the use of cultural heritage.	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 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: • the application of hierarchy of measures. the development of Cultural Heritage Management Plan; the development and adoption of project-specific Change Find Procedures; and the engagement of cultural heritage experts.	Not Applicable. Although no known heritage sites are in the immediate area, chance find procedures must be included in the ESMP to address accidental discovery of artifacts or culturally significant structures during excavation.
ESS-9: Financial-Intermediaries	▶ 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-	▶ To identify stakeholders and maintain a constructive relationship with them. ▶ Assess stakeholder interest and support for the project and enable	It requires identifying the stakeholders, both project-affected and other interested parties and clarifying how effective engagement occurs. It requires stakeholder engagement	Applicable. The intersection affects a wide range of stakeholders including commuters, businesses, residents, and informal

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
Information-Disclosure	stakeholders' views to be considered in project design. ► Promote and 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.	throughout the project life cycle and the preparation and implementation of a Stakeholder Engagement Plan (SEP). **Relevant GoB Laws/Regulation** No Specific Policy or Legislation identified **Gaps:** • 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. • There is also no provision for stakeholder engagements during project implementation.	workers and so RHD has prepared a stakeholder engagement plan. The project will ensure: • Stakeholders have been/are to be consulted on the Stakeholder's engagement plan. The updated SEP will be followed during the project implementation. 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. 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

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2.4 CLEARANCES/PERMISSIONS REQUIRED FOR THE PROJECT ROAD

23. 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 the end point of the Jhenaidah-Jashore Road (Phase-1), for which the RHD obtained EC in 2021. Further, the ESIA report has been prepared according to the requirements as a variation to phase 1 of the World Bank (ESS-1). This ESIA/ESMP is not ECC from DOE.
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

24. The ambient air quality standards relevant to the project are outlined in the Environmental Conservation Rules (ECR), 2023, Schedule-1. This document aims to ensure proper air quality monitoring for various projects like construction. These regulations prescribe permissible concentrations of key air pollutants, including carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), ozone (O_3), and particulate matter (PM10 and PM2.5). For instance, the allowable annual average for PM2.5 is 35 µg/m³, while the 24-hour maximum is 65 µg/m³. These limits are set to protect human health and environmental integrity, particularly in areas near traffic-intensive intersections like Chachra. The air quality standards are presented in the Annex 1.1, Volume 2.

2.5.2 GROUNDWATER QUALITY

25. For groundwater quality, standards are defined under ECR 2023, Schedule-3 (B). This regulation aims to control groundwater contamination and maintain drinkable quality sustainably. These set permissible limits for drinking water quality parameters, ensuring water is safe for human consumption. Notably, fecal and total coliforms must be absent, arsenic must not exceed 0.05 mg/l, and pH should remain between 6.5 and 8.5. Other critical parameters include heavy metals such as lead (Pb) at a maximum of 0.01 mg/l and cadmium (Cd) at 0.003 mg/l. These criteria guide both baseline assessments and long-term monitoring of groundwater sources impacted by road infrastructure development. The standards for drinking water have been presented in the Annex 1.2. Volume 2.

2.5.3 SURFACE WATER QUALITY

26. Regarding surface water quality, ECR 1997, Schedule-3 (A), and draft updates in ECR 2023 categorize water uses based on intended application—such as drinking (with or without treatment), recreation, fisheries, and irrigation. This is done so that water resources are used effectively in a sustainable manner without major contamination or pollution. Each category is assigned specific thresholds for parameters like pH (typically 6.5–8.5), biochemical oxygen demand (BOD), dissolved oxygen (DO), and total coliform. For example, water intended for drinking after conventional treatment must have BOD ≤5 mg/l and DO ≥3 mg/l. These classifications inform impact predictions and mitigation strategies where the project may interact with surface water bodies. The standards for surface water and inland surface water quality have been depicted in the Annex 1.3 to 1.4. [16] Volume 2.

27. **Sewage discharge standards** under ECR 2023 regulate effluent discharged into surface waters. These regulations aim to control the water pollution and contamination. Treated effluent must have a pH between 6 and 9, BOD ≤30 mg/l, and COD ≤125 mg/l. Furthermore, total coliform content must not exceed 1000 CFU/100 ml, and disinfection through chlorination is required prior to discharge, with residual chlorine levels not exceeding 0.2 mg/l. These provisions are essential for minimizing public health risks and ecological impacts. The national standards for sewage discharge are presented in the Annex 1.5. Volume 2.

There are some conditions regarding this standard:

- ► 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.

28. The **effluent quality guidelines** provided by the **International Finance Corporation (IFC, 2008)** apply to industrial discharges, setting additional benchmarks for pollutants such as total suspended solids (**TSS** ≤50 mg/l), **oil and grease** (≤10 mg/l), and heavy metals including **chromium, lead, and mercury**. These international benchmarks are often used in conjunction with national standards, particularly for donor-financed projects or where higher standards of environmental management are applied. Effluent guidelines of IFC are presented in the Annex 1.6, Volume 2.

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

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29. For **treated sanitary sewage, IFC (2008)** guidelines recommend specific limits to safeguard environmental and public health. These include **pH** between 6 and 9, **BOD** ≤30 mg/l, **COD** ≤125 mg/l, total nitrogen ≤10 mg/l, and total phosphorus ≤2 mg/l. **Total coliform** bacteria should not exceed 400 N/100ml, except for centralized systems governed by separate sanitation guidelines. These standards ensure that wastewater from construction camps or facilities associated with the project does not adversely affect the surrounding environment. The Standard for Treated Sanitary Sewage Discharge is given in the Annex 1.7, Volume 2.

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

2.5.4 AMBIENT NOISE LEVEL

30. The ambient noise level standards are prescribed under ECR 2006 (amended) and the IFC General Environmental, Health, and Safety (EHS) Guidelines (2008). Nationally, noise limits vary by land-use zone, with residential areas capped at 55 dB(A) during the day and 45 dB(A) at night, while industrial areas allow up to 75 dB(A) during the day and 70 dB(A) at night. The IFC standards echo these values, particularly for sensitive receptors like residential or educational facilities, ensuring noise impacts from road works and traffic are properly mitigated. The level of noise from multiple sources will be limited to following these two standard sets. The noise level standards based on ECR 2006 and IFC 2008 are given in Annex1.8 and Annex 1.9, respectively, Volume 2.

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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 Benepole (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–Khulna 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 CATERGORY

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). Since the Chachra intersection was initially the endpoint of the Jhenaidah—Jashore highway, the ECC was obtained for the entire highway covering this intersection. During the study, the Chachra intersection was detached from the J-J Highway and was supposed to be developed along with the LOC project. Since the LOC project was getting late, this intersection was included again in phase 1 as a variation. The client advised the consultant to prepare a separate ESMP and RAP for this intersection, meeting the Bank's requirement.

3.3 EXISTING ROAD PROFILE

37. 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. The alignment does not intersect with any major water bodies. There are nine existing box culverts falling in the proposed alignment (**Table 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 Road	46+616	Box	1x1.9x1.95	The existing culvert is in good condition but hydrologically not adequate, requires replacement by new culvert.
2	Jhenaidah-Jashore Road	47+470	Box	1x3.00x3.30	
3	Jhenaidah-Jashore Road	47+500	Pipe	NA	
4	Banga- Benapole Road	98+100	Box	1x1.00x1.00	
5	Banga- Benapole Road	98+200	Box	1x3.00x3.00	
6	Local Link Road from Banga-Benapole Road near Main	0+400	Box	1x3.00x1.50	
7	Local Link Road from Banga-Benapole Road near Main	0+550	Box	1x3.00x2.50	
8	Jashore City Bypass Road from Banga- Benapole Road	0+215 (RA-L)	Box	1x3.00x2.00	

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
9	Jashore City Bypass Road from Banga- Veniole Road	0+035 (RA-R)	Box	1x1.50x1.00	The existing culvert is to be replaced by new culvert.

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

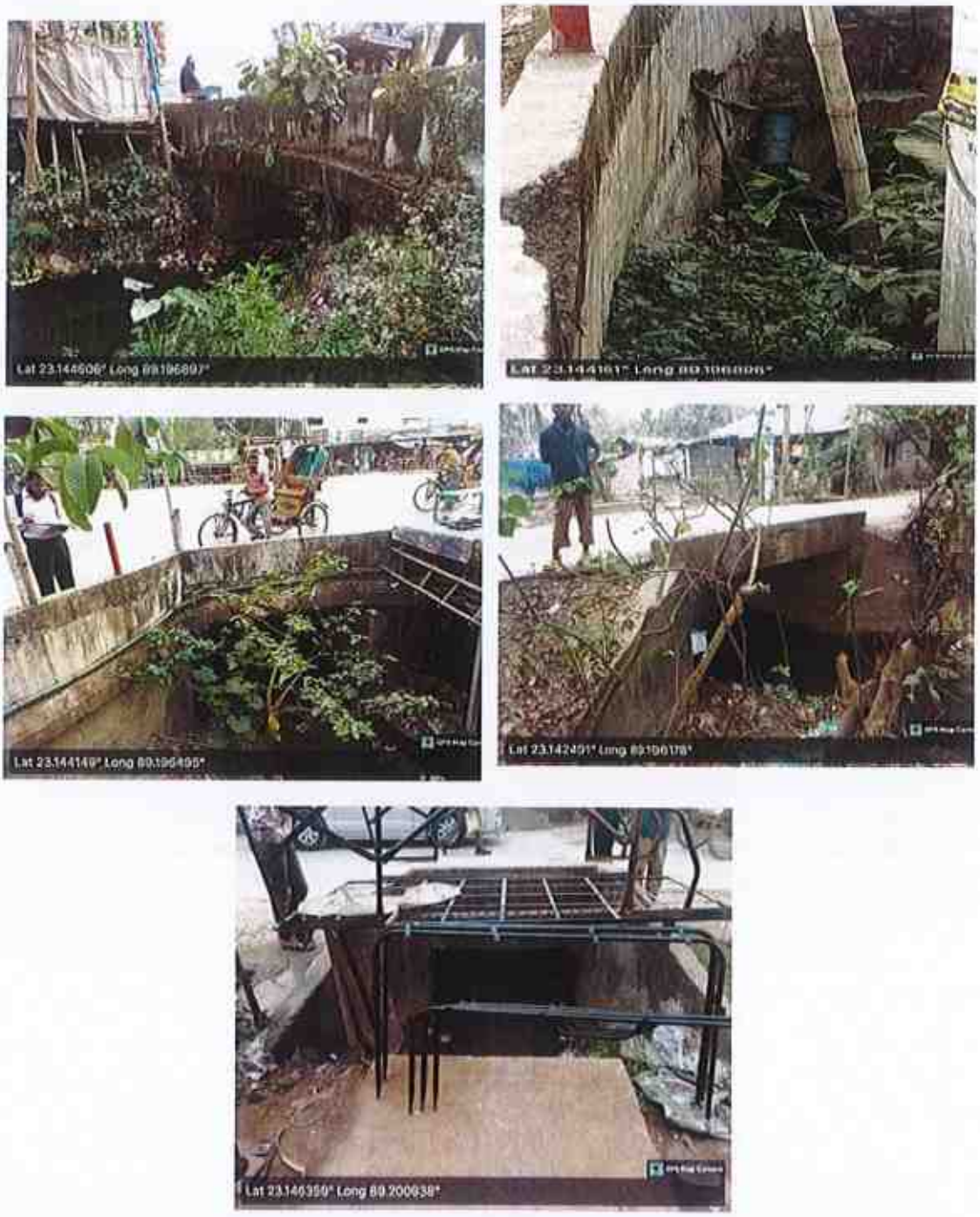

Exhibit 3-1: Existing Culverts along the Project Corridor

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40. 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

41. The Chachra More Intersection is the Junction of N7 and N706. It is the endpoint of the Phase-1 Jhenaidah–Jashore road section. This existing road section is a 2-lane asphalt road. The Alignment 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.

- Buildings are on both sides of Road N7 and N706 near the Chachra More Intersection. These include hospitals, religious buildings, government offices, major factories, and private residential buildings.
- The Bangladesh Design Manual specifies the criteria and interventions necessary for junctions. The analysis was conducted using the IRC Manual, as Bangladesh experiences heterogeneous traffic conditions and issues comparable to those in India. Based on traffic flow assessments, it is recommended to implement a grade-separated structure rather than an at-grade junction to accommodate future traffic demands and ensure smooth traffic flow.

42. Considering all the above points, Chachra Intersection Improvement has been proposed with the following key features

- The design speed for the loop and ramps is 40 km/h, reducing the requirement for land acquisition. However, 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 at the interchange 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 the Bhanga-Benapole Road section is an access-controlled at-grade road.
- Railway over Pass (ROP) cum Flyover of Jhenaidah-Jashore road of Phase 1 has been continued up to this Junction.
- pedestrian crossing facilities such as POP, FOB, and Pedestrian subways.
- A flyover with two spans, including a Chachra Bazaar/RBK road roundabout.
- The RE wall approach.
- A slip road is provided for the future VOP/Flyover at the Chachra Bazar location/RBK road junction. This will help local traffic use the trumpet's main loop to go to Jhenaidah or Benapole.

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Figure 3-2: Schematic Diagram of Proposed Chachra Intersection Improvement

3.4.1 ROAD DESIGN

43. 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, bazaars, 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

Sl. 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 meters	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	Carriageway width for dual carriageway (m)	7.3
		Traffic lane width (m)	3.65

Table 3-3: Proposed Road Engineering Design			
Sl. No.	Description		Value
	Elements for Highway	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)

44. **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 **Annex 2.1, Volume 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
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

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45. **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

46. **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

47. 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

48. **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

49. 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.**

50. 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.

51. The hydrological recommendation of the side Drain proposed in the Chachra Intersection alignment is shown in Table 3-9.

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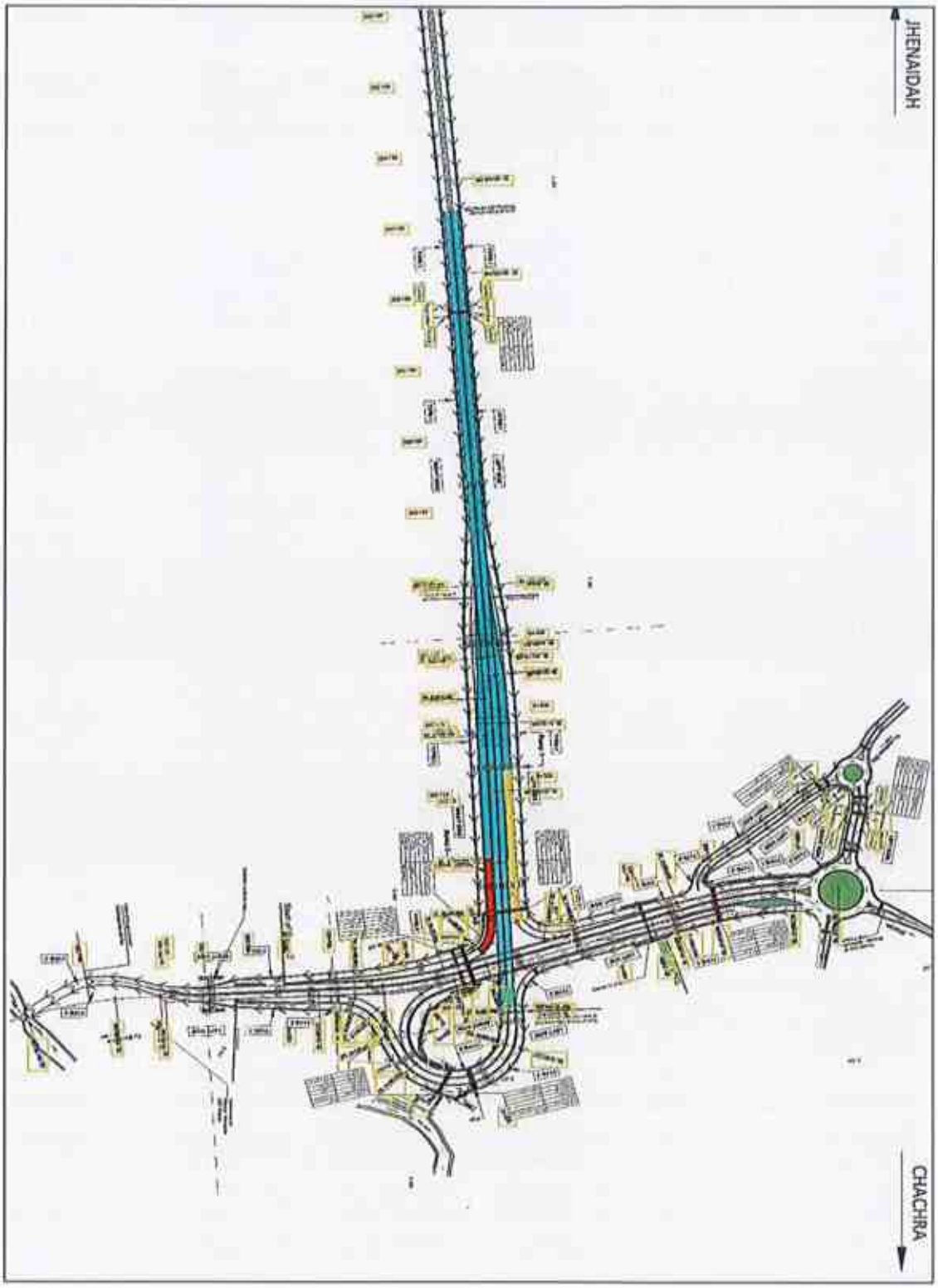

Figure 3-3: Drainage system of the proposed project area

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

Table 3-9: Proposed Roadside Drains in Chachra More Intersection			
Sl. No.	Chainage		Length (m)
	U/S (m)	D/S (m)	
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

52. 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.

53. 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.

54. 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.

55. Comparing the practices of different countries, the design period for the road project is 20 and 30 years for flexible and rigid pavement, respectively.

56. 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

57. 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.

58. 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.

3.4.5 ROAD SIGNS, PAVEMENT MARKING AND ROAD STUDY

59. 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.

60. 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, SOURCEING AND UTILITIES REQUIREMENT

61. The construction materials, such as earth/sand, cement, steel, aggregate, bitumen, and water, are the main requirements for the road's construction. The contractors of his arrangement will procure/purchase the construction materials from the approved suppliers, subject to compliance with the statutory/legal requirements of the Bid Documents and approval of the Construction Supervision Consultant (CSC) or Engineer and RHD-PIU.

62. **Borrow Materials, Sand, and 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

Table 3-10: Sources of Construction materials

Sl. No.	Construction Material	Source/ Location	Distance (Km)
		BP 14*	17
		BP 15*	17
2	Sand	Sylhet Sand	440
		Subarnakhali Sand (Navaron)	43
		Debhata Sand (Debhata Bazar)	82
		Kaliganj Sand (Kaliganj Bazar)	95
3	Aggregate	Meghalaya Stone	445
		Bhomra Land Port (Nalhati Stone)	95

**Borrow pits identified*

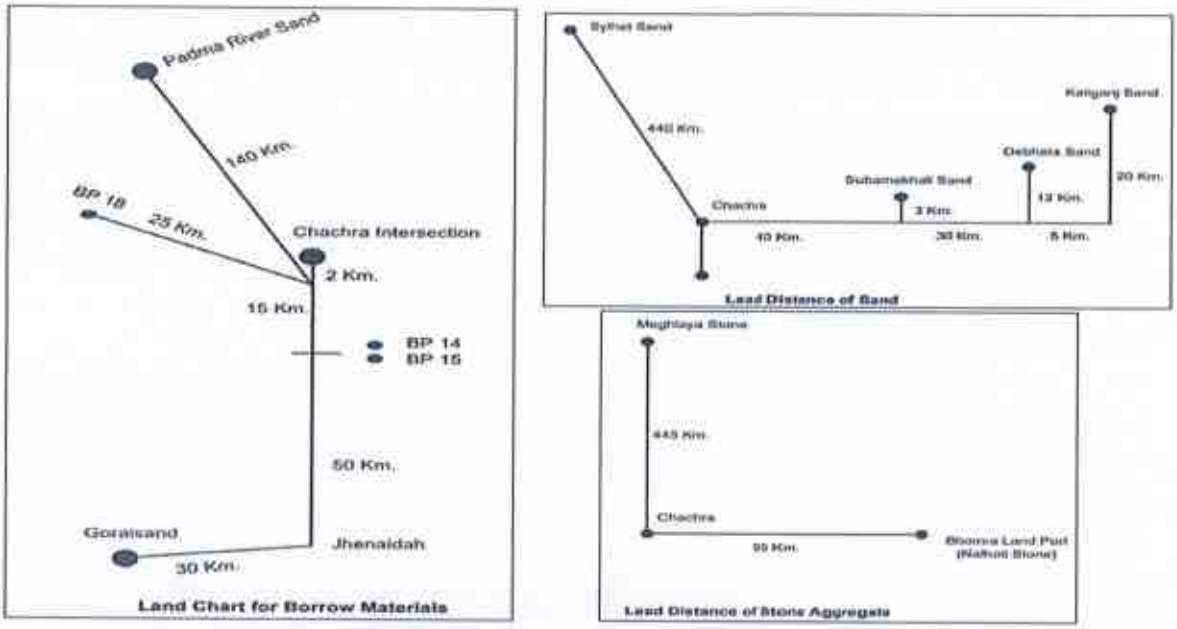

Figure 3-4: Locations of Suitable sources of Construction materials for the Project

63. **Cement and Steel Reinforcement:** Admixture, Cement, and steel are available from the local market.

64. **Bitumen**: Bitumen can be obtained from Eastern Refinery and abroad.

65. **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.

66. 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.

67. **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.

68. **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

69. The total amount of land required is 33.3152 acres. Out of this land, the private land is 12.9448 acres. Government land is 20.3704 acres. Of the total government land, RHD land is 16.0103 acres of land and 4.3601acres of affected land owned by other government agencies, namely the Custom Office (2.4118) , BADC (irrigation) (1.0366), and the Fish Research Institution (0.972), and the affected land of Puler Hat High School (0.1561 acres).

70. Due to Land Acquisition, a total of 274 affected HHs in the Chachra Intersection Area will be affected. The affected male-headed HHs are 239 (87.23%), while 35 (12.77%) are female-headed HHs. There is a total affected population of 1,205, out of which the affected male 636 (52.78%) and the female population 569 (47.22%),

71. 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.

72. The total estimated land acquisition and RAP implementation budget is **BDT 5,200,254,549** (BDT **Five billion two hundred million two hundred fifty-four thousand five hundred forty-nine).** Estimated land acquisition is **BDT 5,004,225,037 (Five billion, four million, two hundred twenty-five thousand, thirty-seven.),** and RAP implementation budget is **BDT 193,121,912 (One hundred ninety-three million, one hundred twenty-one thousand, nine hundred twelve**). A standalone Resettlement Action Plan (RAP) has been prepared and may be referred to for further information.

3.7 IMPLEMENTATION SCHEDULE

73. 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.**

Table 3-11: Tentative Project Implementation Schedule

Sl. No.	Major Work Components	Actual/ Schedule Date of Completion
1	Call of tender	January 2026
2	Award of contract	March 2026
3	Start of construction	April 2026
4	Construction period	30 Months
5	End of construction	September 2028
6	Opening of road to traffic	September 2028

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4 DESCRIPTION OF THE ENVIRONMENTAL AND SOCIAL BASELINE

4.1 INTRODUCTION

74. 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

75. 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

4.2.1.1 Physiographic Features

76. The Chachra 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 Chachra 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..[17]

4.2.1.2 Topography

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

[17] https://en.wikipedia.org/wiki/Jessore_District

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

4.2.2 GEOLOGY AND SOIL

4.2.2.1 Geological Characteristics Of The Project Area

78. 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.

79. 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. A heterogeneous mixture of sand, silt, and clay characterizes the subsurface lithology. 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. The Geological Map of Bangladesh. is given **Annex 3.1**[18] **, Volume 2.**

80. 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.

4.2.2.2 Seismology

81. 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 zone coefficient of 0.05. So, considering Bangladesh's seismic zoning, the

[18] Volume I - Draft Design Report of Roads & Bridges Chachra Intersection. March 2024

project area is less vulnerable to earthquakes. Characteristic features of the 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	Lalmai, Barind, Madhupur Tracts, Dhaka, Comilla, Noakhali and western part of Chittagong Folded belt.	VIII
III	Khulna division S-E Bangladesh (Seismically relatively quiet)	VII

4.2.3 SOILS

82. The alignment of the Chachra 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 clayor 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.
- 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

83. 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.

4.2.4.1 Study Area

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

4.2.4.2 Methodology

85. 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.

4.2.4.3 Land Use Classification

86. 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.

4.2.4.4 Existing Land Use Pattern Along The Project Road Alignment

87. 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. The predominant land use pattern within the 1.5 km buffer is vegetation, followed by built-up areas, Agriculture, and others.

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

88. The land use pattern within 1.5km is shown in **Figure 4-2.**

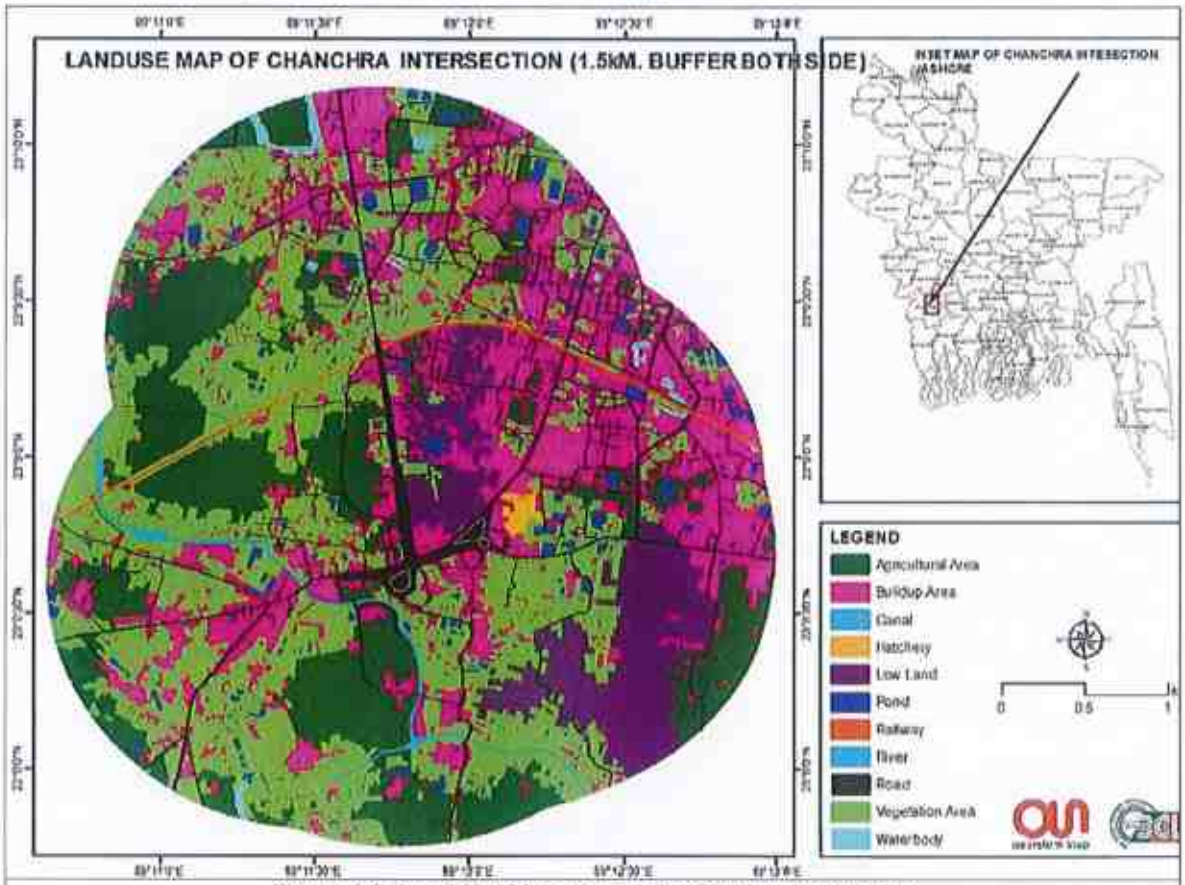

Figure 4-2: Land Use Map around the Chachra Intersection

4.2.5 METROLOGICAL STUDY

4.2.5.1 Climate

89. Bangladesh is in the central part of the Asian 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 the moisture-laden monsoon winds flow predominantly from the southwest during summer and the comparatively dry and colder northwestern winds during winter.

90. 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

91. 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.

92. 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.

93. 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. The climate sub-region is shown in Annex 4.2..[19]

94. Different meteorological data like rainfall, temperature, relative humidity, and wind speeds monitored at the meteorological station in Jashore is summarized in .[20]

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
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	82.9	81.9	78.5	80.3
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

4.2.5.2 Temperature

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

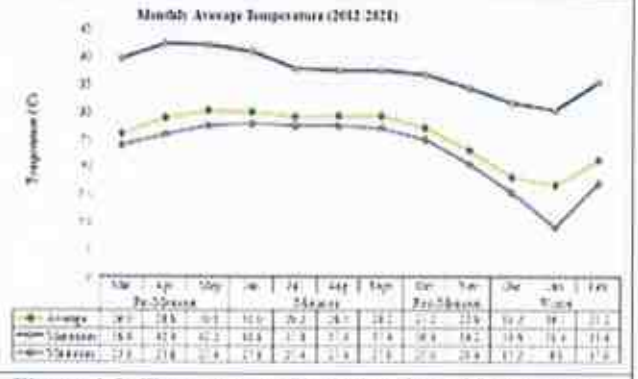

Figure 4-3: Temperature Variation from 2012 to 2021, Jashore

96. 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 4-620.

[19] Sources: Climate Cell, Department of Environment, MoEF, 2020
[20] Source: Jashore Meteorological Station, Bangladesh Meteorological Department (BMD), 2021

4.2.5.3 Rainfall

97. From 2012 to 2021, the project area got about 2.99 mm of rain on average. Most of it is 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 4-7**[20].

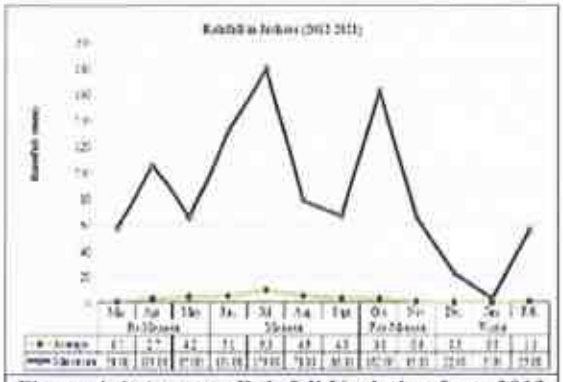

Figure 4-4: Average Rainfall Variation from 2012 to 2021, Jashore

4.2.5.4 Humidity

98. 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.

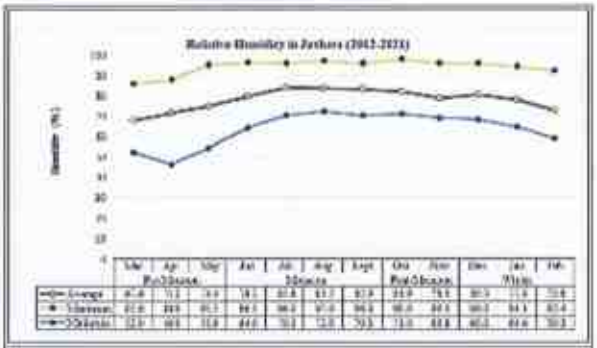

Figure 4-5: Relative Humidity , Jashore

4.2.5.5 Wind Speed And Direction

99. 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.

100. 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 4-9[19]Error! Reference source not found. shows the seasonal monthly maximum wind speed direction rose plot from 2012 to 2021.

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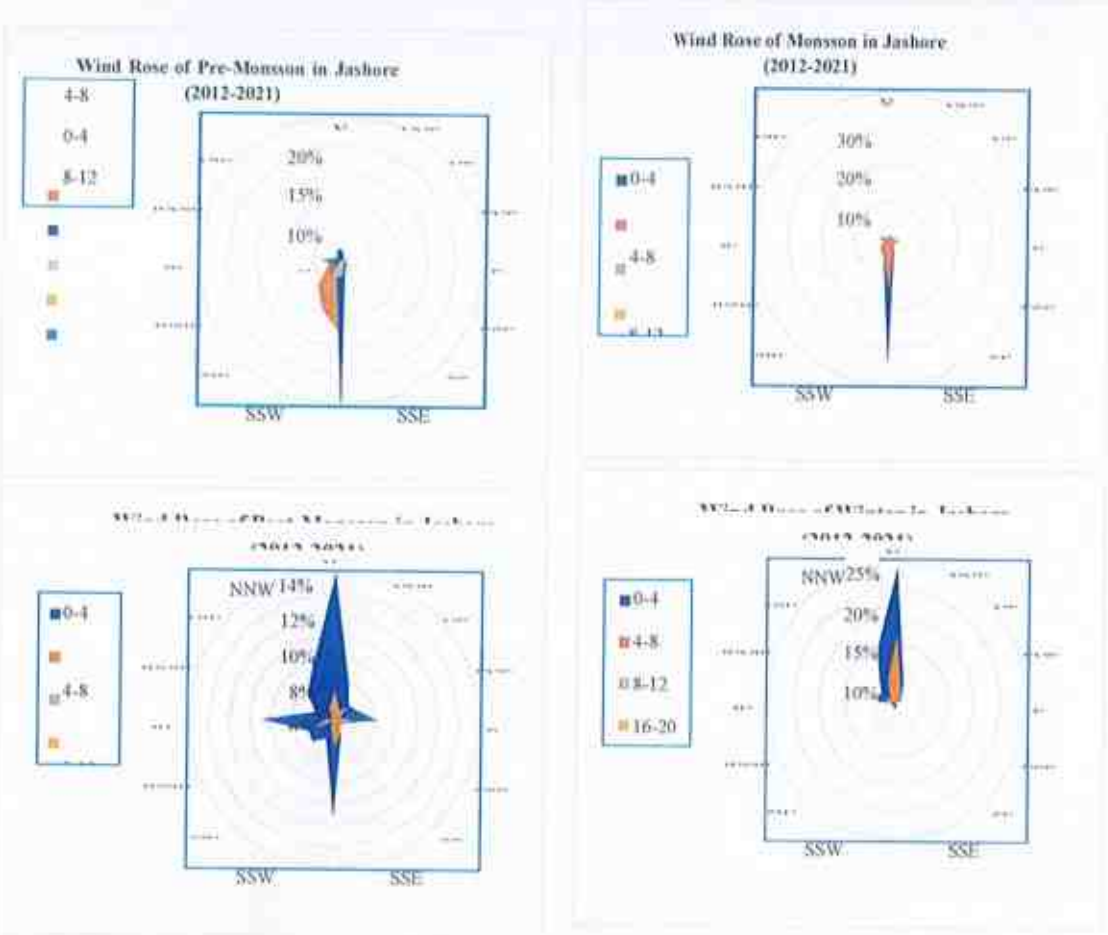

Figure 4-6: Seasonal Variation of Wind Rose in Jashore during the Years of 2012-2021

4.2.6 AMBIENT AIR QUALITY

101. Measurements of ambient air quality were taken at three (Refer to the **Table 4-4)** sampling locations were selected along the Chachra 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, Chachra Bazar, Chachra, Jashore	Commercial	23°08'45.6"N 89°12'02.4"E	21.05.2024 10:10 AM
2.	AAQ2	In front of Chachra Check post Jame Mosque, Chachra, 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, Chachra, 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

102. Annex 3.3, Volume 2 shows the photographs of the ambient air quality measurement locations. Among all the parameters CO, CO_2, and O3 had been converted for 8 hours, and the rest were transformed on a 24-hour hours. Both particulate and gaseous samples were analyzed using the proper procedure.

[6]. The ambient air quality test sheets have been attached in **Annex 3-4, Volume 2.**

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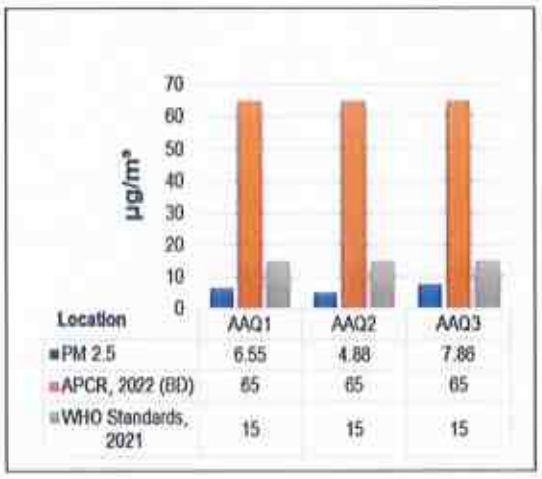
Table 4-5: Results of the Ambient Air Quality Monitoring

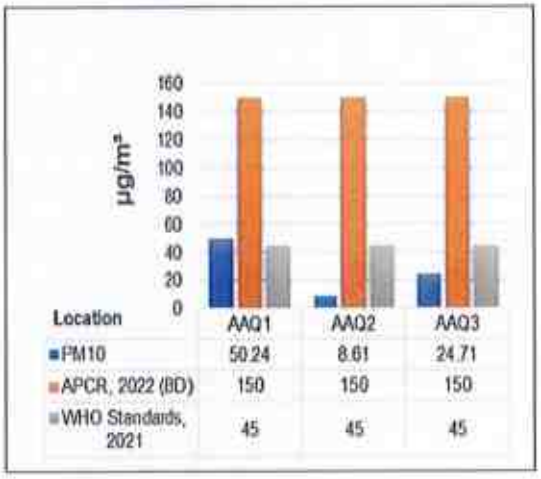
Sl. No.	Code	Concentrations (µg/m3)					CO (ppm)	CO2 (ppm)
		PM2.5	PM10	NO2	SO2	O3		
1.	AAQ1	6.55	50.24	10.43	70.51	8.67	0.75	185.11
2.	AAQ2	4.88	8.61	0.76	59.28	10.96	0.47	184.16
3.	AAQ3	7.86	24.71	14.23	42.96	24.40	0.56	175.45
National Standard[21]		65	150	80	80	100	05	-

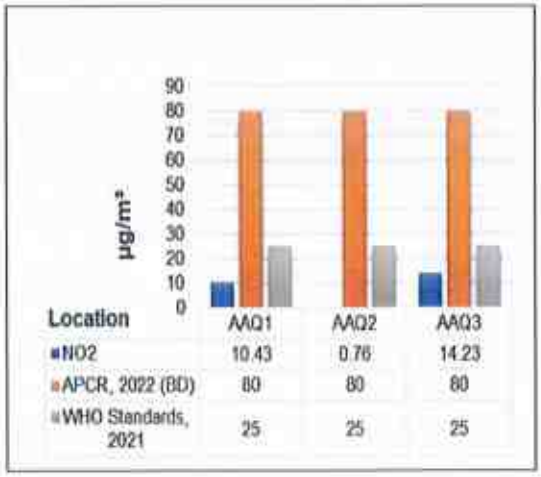
Source: Primary Data Collection by the Environment Team of BCL JV May 2024

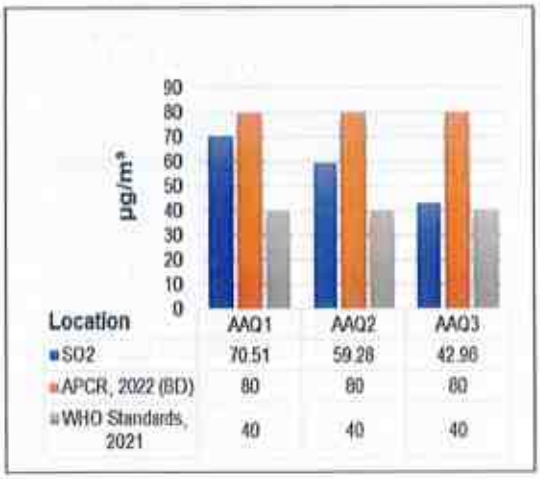
103. **Result and Discussion**: Ambient air quality results are compared with the national ambient air quality standards[21] (NAAQS). The monitoring results show that particulate matter, i.e., $PM_{2.5}$ and PM_{10}, have been observed below the national standards. AAQ1 and AAQ3 are comparatively high concentrations of particulate matter ($PM_{2.5}$ and PM_{10}) among all the sampling locations. Chachra Intersection is urban. Several major highways cross the intersection. Heavy traffic movement is the primary source of air and dust pollution. Besides this, domestic cooking using firewood is a potential source of Sulphur dioxide in the ambient air.

104. High volume SO_2 found in AAQ1 due to the bazar area has more vehicular movement. It may also high due to cooking actives of various restaurants using fuel wood. However, SO_2 values are below standard level. showed the graphical presentation of air quality with national and International standard.[22].









[21] *Air Pollution (Control) Rules, 2022*
22 WHO Ambient Air Quality Guidelines Values (2021), which are also being referred in the World Bank and IFC's general EHS Guideline.

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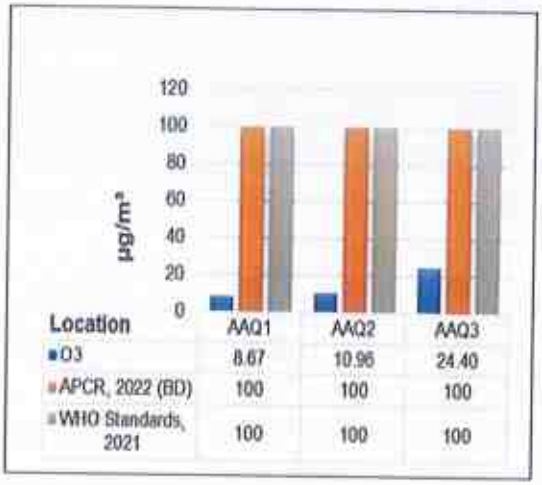

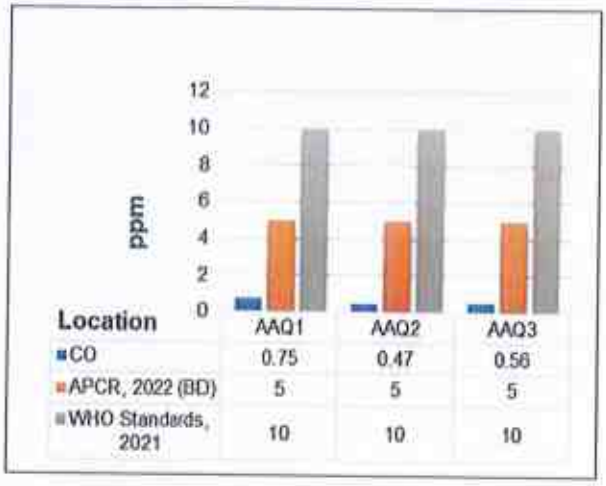

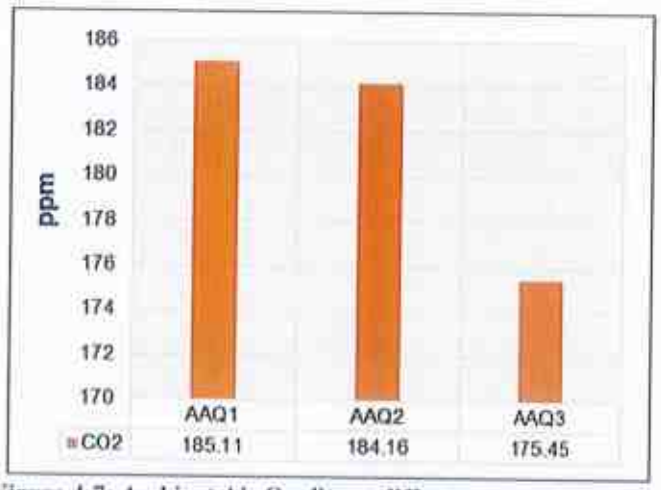

Figure 4-7: Ambient Air Quality at different sampling locations with standard

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

4.2.7 AMBEINT NOISE LEVEL

105. 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

- impact of the project,

106. ***Household survey:*** conducted a survey with 274 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 roadwaytransports many both motorized and non-motorized vehicles, resulting in noise pollution alongthe road corridors.
- **Industries**: There are few industries and factories in the project area. Noise is generated in the project areaby 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 peoplealways congregate and create constant turmoil and source of noise pollution.

107. 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 **Annex 4.5**. 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, Chachra Bazar, Chachra, Jashore	Commercial	23°08'45.6"N 89°12'02.4"E	21.05.2024
2.	ANL 2	In front of Chachra Check post Jame Mosque, Chachra, Jashore	Silent	23°08'31.4"N 89°11'47.9"E	22.05.2024
3.	ANL 3	In front of Pulerhat Secondary school, Chachra, 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

108. A data logger noise meter has been used to conduct the study. The recorded noise levels measurment results are shown in Table 4-7. Photographs of noise measument and test result sheets are given in **Annex 3.5, Volume** 2.

Table 4-7: Ambient Noise Level Monitoring Results

Sl. No.	Code	Noise Level (dBA)				*Standard (dBA)	
		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

109. **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 standards and details.

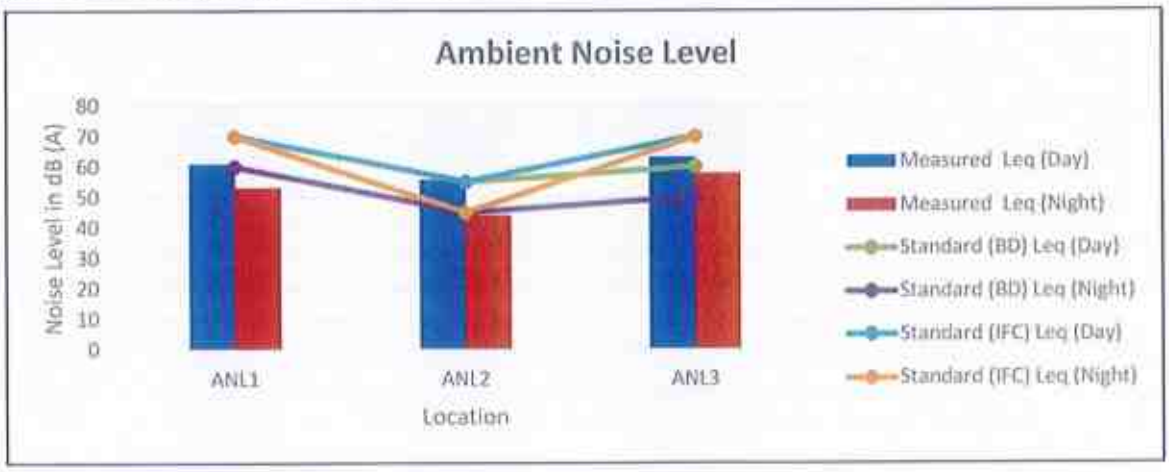

Figure 4-8: Ambient Noise Level and Standard

4.2.8 AMBEINT VIBRATION LEVEL

110. The project area's vibration intensity is negligible. The vibration from traffic on a neighboring road, on the other The project area's vibration intensity is negligible. The vibration from traffic on a neighboring road, onthe other hand, is insignificant. On focusing on the heavy vehicle movement, vibration levels were measured atclose 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

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locations. The ambient vibration measurement result sheets and sampling phots are shown in **Annex 3.6 and Annex 3.7, Volume 2.**

Table 4-8: Vibration Level Monitoring Details

Sl. No.	Code	Locations	Area Settings	GPS Coordinate	Date
1.	VL1	In front of Kamal Super Market, Chachra Bazar, Chachra, Jashore	Commercial	23°08'45.6"N 89°12'02.4"E	21.05.2024
2.	VL2	In front of Chachra Check post Jame Mosque, Chachra, Jashore	Silent	23°08'31.4"N 89°11'47.9"E	22.05.2024
3.	VL3	In front of Pulerhat Secondary school, Chachra, 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

110. 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 for the vibration level have been attached in **Annex 4-8.** The photographs showing vibration monitoring are given in **Annex 4.9.**

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	

111. 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.

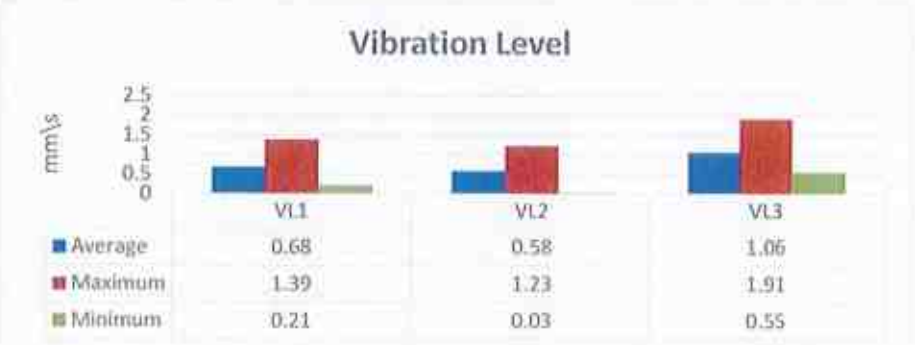

Figure 4-9:: Vibration level in Different Sampling Locations

4.2.9 HYDROLOGY AND WATER RESOURCE

4.2.10 GENERAL HYDROLOGY AND RIVER NETWORK

112. Muktessary River: A branch of the Padma River that flows through southwestern Bangladesh is the Muktassary 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 Muktassary 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 Muktassary 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 Muktassary and Atai rivers, which then flows into the Pasur River.

4.2.11 SURFACE WATER QUALITY

113. 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.

114. 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 Chahcra check post which also considered for sampling. Sampling location details given in **Table 4-10**. Photos of the water sampling and testing laboratory reports are given in **Annex 3.8,** and **Annex 3.9** respectively**.** Results of the surface water sample are given in **Table 4-11.** Lab results are given in Annex **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)	Chachra, Jashore	23° 8'33.33"N 89°11'29.72"E
Surface Water	SW-2	Mukteswari River (Upstream)	Chachra, Jashore	23° 8'36.36"N 89°11'27.04"E
Surface Water	SW-3	Unknown Canal	Adjascent to the Chachra Circle, Chachra, Jashore	23° 8'56.85"N 89°11'46.26"E

Table 4-11: Surface water Analysis Results

Sl. No.	Parameters	Unit	SW1	SW2	SW3	Bangladesh Standard25F25 [23]	Test Method (APHA)
1.	TDS	mg/L	327	258	314	1000,	APHA 23rd EDN. 2017 (2540 C)
2.	Turbidity	NTU	4.03	4.11	4.07	NYS	APHA 23rd EDN. 2017 (2130 B)
3.	pH	--	6.71	6.47	7.03	6-9	APHA 23rd EDN. 2017 (4500 O)
4.	DO	mg/L	6.81	6.51	6.19	≥5	APHA 23rd EDN. 2017 (4500 0)
5.	BOD	mg/L	18.2	21.7	24.1	30	APHA 23rd EDN. 2017 (5210 B)
6.	Phosphate (PO_4^{3-})	mg/L	1.03	1.07	1.01	NYS	APHA 23rd EDN. 2017 (4500 P)
7.	Nitrate	mg/L	3.02	4.01	4.12	10	APHA 23rd EDN. 2017 (4500 NO_3-)
8.	Oil and Grease	mg/L	3.02	4.01	4.12	10	APHA 23rd EDN. 2017 (5520 B)
9.	TSS	mg/L	20.1	21.6	20.3	100	APHA 23rd EDN. 2017 (2540 D)
10.	TC	CFU/1000 ml	128	113	131	≤5000	APHA 23rd EDN. 2017 (9222 B)
11.	FC	CFU/1000 ml	47	44	38	NYS	APHA 23rd EDN. 2017 (9222 D)
12.	Temperature	°C	24	24	25	--	APHA 23rd EDN. 2017 (2550 B)

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

115. 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 4-11.**

[23] Environmental Conservation Rules, 2023, Schedule-2(A)

Air Quality Specialist, STUP-BCL
E&S Consultant, WeCARE

Deputy Team Leader, STUP-BCL
E&S Consultant, WeCARE

4.2.12 GROUNDWATER QUALITY

116. 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 (**Map in Annex 4.10).**

117. Two ground water samples have been collected form the project affected area. One sample collected from the Chachra 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 are given in Annex 4.11 and results Lab sheets in Annex1. Summary 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, Chachra, Jashore	23° 8'35.06"N 89°11'33.36"E
Ground Water	GW-2	Tube well	Chachra Circle, Chachra, 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 [24]	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

118. 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. Groundwater is safer and less susceptible to bacterial pollution than surface water because the soil and rocks through which groundwater flows screen out most of the bacteria. However, the tested results of groundwater samples showed bacteriological contamination due to one or more reasons, such as samples being contaminated during sample collection times, leakage of the extraction pipe, breaking of the tubewell platforms, well casing being unclean, and /or in the laboratory, the sample not being tested within the appropriate holding time, that is, the allowed time from sample collection until analysis[25]. The Groundwater result sheets are in Annex 3-13.

[24] Bangladesh Environment Conservation Rules, 2023, Schedule-2(B)
[25] According to the EPA, holding times are generally very short—6 hours for source water compliance samples and **30 hours for drinking water samples**

4.2.13 NATURAL HAZARD

119. Bangladesh is almost 10% prone to seasonal floods, with up to 24% of the country vulnerable to flooding during wet years. Due to its unusual location, deadly tropical cyclones regularly hit it. 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.

120. **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.

121. Flood occurs moderately in Bangladesh (**Annex 4.3**) 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.

122. **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

123. 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

124. The area is semi-urban, with local giant companies conducting commercial fishing along the eastern road from Palbari to Chachra Point. The rest of the area contains offices, homesteads, and small cultivated land. Natural wetlands are absent, though there are fisheries ponds, a canal, and a small river. The Mukteshari River is located on the way to Benapole Road before Pulerhat. A man-made canal runs from Palbari towards Chachra Point and connects with the Mukteshari River. The study area has recorded 195 species, including herbs, shrubs, trees, and climbers, across various 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. On the roadside, homestead, agricultural, and aquatic flora are discussed in subsections. Approximately 100 roadside avenue trees may be affected by improvements at the Chachra Intersection, located on the route from Chachra to Benapole Road. These trees belong to the Road and Highway Department (RHD)/Zila Parishad. The Forest Department notes that social forestry was not practiced in this area.

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

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

4.3.2 ROADSIDE PLORA

125. 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 sophera, 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. According to the IOL survey, about 255 RHD road side tree would be affected due to widening existing road. Details in **Annex-3.15, Volume** 2. Out of 255 trees, 211 trees in Chachra mouza, and 54 trees in Mondolgati mouza.

4.3.3 HOMESTEAD FLORA

126. 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 plumbaginifolia (Bon Tamak), Acalypha indica (Muktajhuri), Croton bonplandianum (Pani Morich) and Heliotropium indicum (Hatishur). About 952 privated trees would be affected due to land acquisition. Details in **Annex 3.14, Volume 2**.

4.3.4 AGRCULTURAL LAND FLORA

127. 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 Chachra 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), Amarnathus spinsosus (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.

4.3.5 TERRESTRIAL FAUNA

128. 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. 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 versicolar* (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* (Binocellata 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 tigerimus, Naja Naja,* and *Felis Chaus* are under CITIES Appendix II. Finally, all these species are protected by the Wildlife Protection and Security Act, 2012.

4.3.6 AQUATIC ECOLOGY

129. Aquatic ecology presents the details of aquatic flora and fauna, which are presented in the following subsections.

4.3.6.1 Aquatic Flora

130. The project area contains many commercial ponds, which local companies cultivate. The natural wetland is absent; however, a canal and a small river named Mukteshwari were found crossing the roads. The canal flows from Palbari towards ChachraPoint, and after crossing it, it finally meets the Mukteshwari River. The river crosses the road from Chachrato 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 many algal flora, although those were not counted and assessed during the study. Of

these, the most common aquatic species are Enhydra fluctuance (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.

4.3.6.2 Aquatic Fauna Including Fish

131. In total, 29 fish species were identified through interviews and discussions with local fishermen. Thesefish 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 *Notopterusnotopterus* (Poli), *Anguilla bengalensis*(Bain), *Oxyurichthyspetersii* (Baila), *Mystus bleekeri* (Tengra), *Amblypharyngodon* (Mola), *Putinus* (Puti), *Channa punctatus* (Taki), *Channa striata* (Shoal), *Heteropneustes* (Shing), *Clariasbatrachus* (Magur), *Macrobrachiumrosenbergii* (Chingri), *Anabustestudineus* (Koi), *Channa marulius* (Gojar) and so on. From theassessment 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 InternationalTrade in Endangered Species of Wild Fauna and Flora), and species protected by Wildlife Protection & Security Act, 2012 were not recorded.

132. 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

133. The social-economic condition assessment was carried out by conducting a primary survey in February-July 2024. Based on primary data collected from the field, the following subsections discuss the existing socioeconomic conditions in and around the Chachra Intersection.

4.4.1 CENSUS AND INVENTORY OF LOSS OF SURVEY

134. A census and inventory of loss survey were conducted by BCL Associates Limited in the Chachra Intersection Improvement Project from February 2024 to July 2024. The main reason behind using these crucial steps is to assess the social impacts and risks of the Chachra 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 (AHs) 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 Chachra Intersection Improvement project area,
- To identify all potential individuals and households affected by the project,
- To provide a baseline for monitoring and evaluating the 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 LOCAL ADMINISTARATITIVE PROFILE FOR SOCIAL IMPACT ASSESSMENT

135. The RHD, through the World Bank Assistance, is the implementing agency of the Chachra Intersection improvement under the WeCARE program in Phase 1. The Chachra Intersection, the Jhenaidah–Jashore road's endpoint is 2.507 km long and falls in Jashore Sadar Upazila. This intersection passes through two mouzas, Chachra 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
Chachra Intersection Improvement	47+130Km at Jhenaidah to Jashore road	Jashore	Jashore Sadar	Jashore Sadar	Chachra Mondolgati

4.4.3 DEMOGRAPHIC PROFILE OF AFFECTED POPULATION

136. This subsection presents the socioeconomic profile of the AHs in the project area. No project-affected ethnic minority or Indigenous peoples exist in the project areas. The socioeconomic profiles include the demographic characteristics, income and expenditure status, and poverty situation of the project-affected households.

4.4.4 HOUSEHOLD CHARACTERISTICS IN THE PROJECT AFFECTED AREA

137. Key demographic characteristics include mouza-wise diverse and heterogeneous dimensions (e.g., household heads by sex, population by sex, religion, age composition, marital status, etc.). Key characteristics are presented in the tables below.

4.4.4.1 Distribution of Population, Household Heads by Sex

138. A total of 1205 population will be affected by the project. Of them 274 surveyed households. There are 263 (96.00%) and 11 (4.00%) households in Chachra and Mondolgati mouzas, respectively, under the Chachra Intersection project area, which are likely to be affected due to land acquisition for the proposed project. Out of 274 affected households, 239 (87.23%) are male-headed, while 35 (12.77%) are female-headed in the Chachra Intersection Project area. Mouza-wise distribution of the affected male and female-headed households is presented in Table 4-16. The highest affected male-headed HHs found in Chachra mouza. All 35 female-headed HHs are affected in Chachra mouza.

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

Category of Vulnerable Households	Chachra		Mondolgati		Total	
	No.	%	No.	%	No.	%
Male Headed HHs	229	86.74	11	100	240	87.27

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

Category of Vulnerable Households	Chachra		Mondolgati		Total	
	No.	%	No.	%	No.	%
Female Headed HHs	35	13.26	0	0	35	12.73
Total	*263*	*100.00*	*11*	*100*	*274*	*100*

Source: Census, IOL, and SES Conducted by BCL and STUP, February – July 2024

4.4.4.2 Distribution of Population by Sex

139. Findings of the census and IOL survey are presented in Table 4-17. This table shows that the total affected population is 1,205, including 636 (52.78%) males and 569 (47.22%) females. The average sex ratio is 111.78, i.e., 111 males per 100 females. This sex ratio is higher than the national sex ratio (1.03)[26]. The average household size is 4.38 in the project area (including 4.33 and 5.73 in Chachra and Mondolgati mouzas, respectively).

Table 4-17: Mouza Wise Affected Population, HH Size and Sex Ratio in the Chachra Intersection

Sl. No.	Particular	Chachra		Mondolgati		Total	
		No.	%	No.	%	No.	%
1.	Male Population	601	52.63	35	55.56	636	52.78
2.	Female Population	541	47.37	28	44.45	569	47.21
3.	Total Population					1205	0
4.	Number of Household	263	95.93	11	4.07	274	100.00
6.	*Household Size*						***4.4***
7.	*Sex Ratio (Sl. No. 1/2*100)*						*111.78*

Source: Census, IOL, and SES Conducted by BCL and STUP, February – July 2024

140. About 168 (61.09%) AHs belong to 4–6-member households with a moderate average HH size of 4.77, followed by 85 (30.91%) affected households that belong to 1–3-member households with a low average HH size of 2.57. The lowest 22 (8.00%) affected households belong to >6-member households with the highest average HH size of 8.36. Mouza-wise distribution of AHs and population is presented in.Table 4-18.

Table 4-18: Mouza Wise Affected HHs and Population by HH Size in Chachra Intersection

HH Size Range	No. of Affected Population by Household Size							Average HH Size
	Chachra		Mondolgati		Entire Chachra Intersection			
	No. HHs	Population	No. HHs	Population	No. HHs	% of HHs	Popn.	
1 to 3	84	216	1	3	85	30.91	219	2.57
4 to 6	160	760	8	42	168	61.09	802	4.77
> 6	19	166	2	18	22	8.00	184	8.36
Total	*263*	*1142*	*11*	*63*	*274*	*100.00*	*1205*	*4.4*

Source: Census, IOL, and SES Conducted by BCL and STUP, February – July 2024

141. In Chachra Mouza 144 Titled HHs, of them 46 residential, 57 commercial and 41 residential cum commercial. Non titled HHs were a toal 113, out of these four (04) were residential, 108 commercial and one (01) was residential cum commercial and six (06) were encrocher HHs, whereas in Mondolgati, only 11 titled HHs, of them eight (08) were residential cum commercial as shown in **Table 4-19.**

Table 4-19: Mouza Wise Total HHs Losing Primary and Secondary Structures by Utilization Type in The Chachra Intersection

Structure Utilization Type	Chachra				Mondolgati				Entire Chachra Intersection Area				
	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	46	4	0	50	0	0	0	0	46	4	0	50	18.24
Commercial	57	108	3	168	3		0	3	60	108	3	171	62.40

[26] (Household Housing and Population Census by BBS, 2011)

Table 4-19: Mouza Wise Total HHs Losing Primary and Secondary Structures by Utilization Type in The Chachra Intersection

Structure Utilization Type	Chachra				Mondolgati				Entire Chachra Intersection Area				
	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-cum-Commercial	41	1	3	45	8	0	0	8	49	1	3	53	19.34
Total	*144*	*113*	*6*	*263*	*11*	*0*	*0*	*11*	*155*	*113*	*6*	*274*	*100*

Source: Census, IOL, and SES Conducted by BCL and STUP, February – July 2024

4.5 RELIGION

142. Mouza-wise affected population by religion is presented in Table 4-20., Islam (97.76% followers) is the main religion in the project area, followed by Hinduism (2.24% followers).

Table 4-20: Mouza Wise Affected Population by Religion in the Chachra Intersection

Religion	Distribution of affected Population by Religion			
	Chachra	Mondolgati	Entire Chachra Intersection	%
Islam	1115	63	1178	97.76
Hinduism	27	0	27	2.24
Total	*1142*	*63*	*1205*	*100.00*

Source: Census, IOL, and SES Conducted by BCL and STUP, February – July 2024

4.6 AGE COMPOSITION OF THE AFFECTED POPULATION

143. The population pattern of the affected households in Chachra and Mondolgati mouzas in the Project area is presented in **Table 4-21**. There is a total affected population (AP) of 1205. Out of the total AP, the highest affected population is the 606 (50.29%) in the 15–45-year age range. The female population is 310 (54.48%), compared to the 296 male population (46.54%), followed by the 139 male population (21.86%) and the 108 female population (18.98%), who belong to the age range of 46 to 64 years. The affected male and female populations are 107 (16.82%) and 91 (15.99%), respectively, in the 5–14-year age range.

Table 4-21: Mouza Wise Age Composition of the Affected Population in the Chachra Intersection

Age Range (Years)	Affected Population				Total Affected Male and Female Population in the Chachra Intersection				Grand Total 41.26612	
	Chachra		Mondolgati		Male		Female			
	Male	Female	Male	Female	Population	%	Population	%	Population	%
0-4	42	31	1	3	43	6.76	34	5.98	77	6.39
5-14	103	88	4	3	107	16.82	91	15.99	198	16.43
15 to 45	277	293	19	17	296	46.54	310	54.48	606	50.29
46 to 64	131	105	8	3	139	21.86	108	18.98	247	20.50
65 and above	48	24	3	2	51	8.02	26	4.57	77	6.39
Total	601	541	35	28	**636**	100	569	100	1205	100.00

Source: Census, IOL, and SES Conducted by BCL and STUP, February – July 2024

144. The dependent population is 352, including three age ranges: (a) 0-4 years, (b) 5-14 years, and (c) 65 years and above (including 77, 198, and 77, respectively. On the other hand, people of working (economically productive) ages include two age ranges- (i) 606 persons belong to the 15 to 45 years age range, and (ii) 247 persons belong to the 46 to 64 years age range. The working age population among the AP is given in Table 4-21. The dependency ratio among the APs is 41.27% (352* 100/853).[27]

145. The legal ages for marriage in Bangladesh are 21 for males and 18 for females, though the Child Marriage Act 2017 permits girls under 18 to marry with parental consent. Among the surveyed population, most marriages occur within the legal age. Findings reveal that 81.86% of men and 77.88% of women are

[27] Total dependency ratio refers to ratio of dependent population and the active working age population in the area

married, while 15.12% of men and 5.29% of women are unmarried. There are 198 men and 162 women below the legal marriage age. Detailed marital status information is presented in a standalone Resettlement Action Plan (RAP) prepared for this project.

4.7 EDUCATION

146. The literacy rate in Bangladesh was 74.66% in 2022. The literacy rates in Jhasore Sadar Upazila of Jashore District are 76.96%. According to the census, IOL, and socioeconomic survey findings, the literacy rate is 96.28%, and the illiterate population is 3.72% among the APs. The literacy rate is higher among the female population than the male population, with education levels from class nine to HSC being passed in the project area. Mouza-wise information on the education levels of the APs aged 7 years and above is presented in **Table 4-22**.

Table 4-22: Distribution of Affected Population (7 Years and Above) by Education Level

SL#	Education Level	Mouza Wise Education Details				Grand Total	
		Chachra		Mondolgati			
		Male	Female	Male	Female		
i.	Up to IV	84	75	2	4	165	14.96
i.	Primary/ Ebteday.	53	45	1	0	99	8.98
i.	Class VI-VII	30	45	3	0	78	7.07
v.	JSC Exam	41	37	2	2	82	7.43
v.	Class IX-X	47	49	4	2	102	9.25
i.	SSC Exam or equivalent/Dakhil	68	69	4	6	147	13.33
i.	HSC Exam or Equivalent/ Alim	70	78	6	7	161	14.60
i.	B.A. or Equivalent/ Fazil	4	2	1	0	7	0.63
x.	M.A. or Equivalent/Kamil Pass/ Higher education	4	2	1	0	7	0.63
x.	Others (Hafiz)	3	1	0	1	5	0.45
Literate		528	475	34	25	1062	96.28
Illiterate		19	22	0	0	41	3.72
Total Population (below 7 years)		54	44	1	3	102	-
(A+B Grand Total Population		601	541	35	28	1205	-

Source: Census, IOL, and SES Conducted by BCL and STUP, February – July 2024

4.8 OCCUPATION

147. According to the census and IOL survey, HH heads are engaged in diverse occupations as their primary occupations among the APs. The primary occupation of 60% of AHs is businesses, followed by teaching (8.73%), service or employment (10.18%). Information about the primary occupations of AH heads is presented in **Table 4-23**.

Table 4-23: Mouza Wise Affected HHs Heads by Primary Occupation in the Chachra Intersection

Primary Occupations	Primary Occupation of Household Heads		Total	
	Chanchra	Mondolgati	No.	%
	1	2	3	4
Business (Male)	160	5	165	60.00
Business (Female)	6	0	6	2.18
Teacher (Male)	24	0	24	8.73
Teacher (Female)	1	0	1	0.36
Employment or Service (Male)	28	1	29	10.55
Employment or Service (Female)	6	0	6	2.18
Employed Abroad/Overseas	2	1	3	1.09
Housewife	18	0	18	6.55
Doctor (Male)	2	1	3	1.09
Doctor (Female)	1	0	1	0.36
Old Man	1	0	1	0.36
Farmer	3	0	3	1.09
Driver	3	0	3	1.09
Male	2	1	1.09	1.00

Table 4-23: Mouza Wise Affected HHs Heads by Primary Occupation in the Chachra Intersection

Primary Occupations		Primary Occupation of Household Heads		Total	
		Chanchra	Mondolgati	No.	%
		1	*2*	*3*	*4*
Managing rental income from renting out house to maintain household	Female	2	0	0.73	0.66
Hafez		1	0	1	0.36
Daily Labor		1	0	1	0.36
Rickshaw/Van Puller		1	0	1	0.36
Retired (Male)		1	2	3	1.09
Student (Female)		1	0	1	0.36
Total		*264*	*11*	*275*	100.00
Source: Census, IOL, and SES Conducted by BCL and STUP, February – July 2024					

**Note: Skilled laborers include (i) carpenter, (ii) mason, (iii) barber, (iv) blacksmith, (v) driver, (vi) mechanic, (vii) rickshaw driver, (viii) tailor, (ix) imam, (x) cobbler, (xi) kabraj, etc.*

4.8.1 INCOME STATUS

148. About 61% of the AHs' primary occupations are businesses, followed by service/employment. Details about income level and expenditure may be referred to the RAP for the project.

4.9 ACCESS TO ELECTRICITY, WATER SUPPLY, AND SANITARY FACILITES

149. According to socioeconomic survey findings, the sources of electricity/energy include (i) Bangladesh Rural Electrification Board (BREB)/Polli Biddut Samity, (ii) solar energy, and (iii) other sources of energy.

4.10 WATER SUPPLY

150. According to the census and IOL survey findings, 248 affected households, 6 affected CPRs, and 1 other entity use water from own and private sources, while 4 government agencies and 5 others use water from government sources for various purposes, including drinking, domestic and bathing, handwashing, ablution, washing, and cleaning after defecation.

4.11 LATRINE USES BY AFFECTED HOUSEHOLDS

151. According to the census and IOL survey, of 276 affected households, 267 (96.74%) reported latrine utilization. Among these, 229 (85.77%) use sanitary latrines, 36 (13.48%) use ring slab latrines, and 2 (0.75%) use kutcha/hanging latrines.

4.12 FUEL AND GAS UTILIZATION

- One hundred forty-four households use both wood fuel and LPG.
- Thirty-nine affected households use only wood fuel.
- Eighty-four households use only LPG

4.13 HEALTH AND ACCESS SERVICES

152. Mothers and children under five have adequate access to primary healthcare services through the Union Health and Family Welfare Centers in Jashore town. Furthermore, secondary and tertiary healthcare services are available at the Upazila Health Complex, District Sadar Hospital, and Jashore Medical College Hospital in the district headquarters.

4.13.1 TREATMENT COST

153. The census and IOL survey reveal that all 274 PAHs spend BDT 932000 monthly, with an average of BDT 3401.46 per household on treatment. Most households, 250 (91.24%), spend a total of BDT617000 monthly, averaging BDT 2468. Nineteen (6.93%) households spend BDT 190000 and an average of BDT 10000, while 5 (1.82%) households spend BDT 125000 and average BDT 3401.46 on treatment.

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4.14 SEA/SH ISSUES IN JASHORE

154. 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). Early marriage nearly always results in school drop-outs or prevents 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 hinders academic and economic development.

155. The provision of SEA/SH services access to the host communities in RHD has been limited. Only the One Crisis Center (OCC) at District Sadar Hospital (DSH) and a One-Stop Crisis Cell (OSCC) at Jhenaidah and Jashore serve the host communities. **Though OCC and OSCC refer to the same type of facility, while OCCs are established at all medical college hospitals, the project aims to establish 40 One-Stop Crisis Cells at District Sadar Hospitals across Bangladesh to provide services to victims of violence.** 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, law enforcement agencies, and legal organizations. The OCC provides all the necessary services for women who are victims of violence in one location. The **OCC** at the **District Sadar Hospital (DSH)**[28] provides integrated support services for survivors of gender-based violence. Its core services include:

- **Emergency medical care** and treatment for survivors of physical and sexual violence.
- **Psychological counseling** and trauma support through trained counselors.
- **Legal assistance** in coordination with police and District Legal Aid Committees.
- **Social services** and referrals, including safe shelter when necessary.
- **Coordination with law enforcement** to facilitate filing cases and ensure survivor protection.

156. Accessibility is ensured as the OCC operates within the District Sadar Hospital premises, meaning services are **available free of cost**, 24/7 in most centers, and directly connected to government referral systems. Survivors from the project area can reach the Jashore District Sadar Hospital OCC, which is designed to serve both urban and surrounding rural communities.

157. According to the Violence Against Women Survey (VAW) 2024[29] report, in Barishal and Khulna Divisions the highest prevalence of gender-based violence (GBV) in Bangladesh, approximately 70% of women experiencing some form of violence, but neither district-level data nor national reports identified for Jashore as having the highest rates of GBV.

158. The the relevant acts legislation and policies that are applicable to gender-based violence and violence against children in Bangladesh are as follows

- **Domestic Violence (Prevention and Protection) Act, 2010**: This law criminalizes physical, psychological, sexual, and economic abuse within households. It allows victims to seek protection orders and mandates the establishment of support services.
- **Women and Children Repression Prevention Act, 2000**: This act specifically targets crimes like rape, trafficking, and sexual harassment. It provides for special tribunals to expedite trials and includes provisions for the death penalty in cases of rape.
- **Penal Code, 1860**: Sections 375 and 376 address rape and sexual assault, while Section 354A deals with sexual harassment.
- **Children Act, 2013**: This act focuses on child protection, including provisions against child marriage, trafficking, and abuse. It also establishes child-friendly justice mechanisms.

159. Policies and Institutional Framework includes;

- **National Women Development Policy, 2011**: Aims to eliminate all forms of violence against women and ensure their equal participation in all spheres of life.

[28] MSPVAW under the Ministry of Women and Children Affairs (MoWCA), Multi-Sectoral Programme on Violence Against Women
[29] Bangladesh Bureau of Statistics (BBS) and UNFPA. (2024). Violence Against Women Survey 2024: Key Findings. Dhaka, Bangladesh. Available at: https://bangladesh.unfpa.org/en/2024-violence-against-womensurvey

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- **National Child Policy, 2011**: Focuses on the protection and development of children, including measures to prevent child labor and abuse.
- **Ministry of Women and Children Affairs (MOWCA)**: Responsible for implementing policies and programs related to women's and children's rights and welfare.
- **National Centre on Gender-Based Violence**: Established under MOWCA to coordinate efforts and provide services for GBV survivors.

160. International Commitments

- **Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW)**: Bangladesh is a signatory and has committed to eliminating discrimination against women in all forms. Against Women CEDAW is **an international legal instrument that requires countries to eliminate discrimination against women and girls in all areas and promotes women's and girls' equal rights.**
- **Convention on the Rights of the Child (CRC)**: Bangladesh ratified this convention, obligating the state to protect children's rights, including protection from violence and exploitation.

161. Sexual harassment is a significant problem on Bangladesh's public transport, in the study[30] showing that over 94% of women have experienced verbal, physical, or other forms of harassment while using buses and other forms of public transportation. This widespread issue is attributed to factors such as overcrowding, poor monitoring and enforcement of laws, and a lack of designated infrastructure for bus stops and ticket booths. Perpetrators are often men aged of 41-60 older men, with the issue impacting women across different ages. The major causes are lax law enforcement, overcrowded vehicles, and lack of monitoring and the prevalence and impact of sexual harassment are on women's safety and mobility This is masculine norms and attidude towards gender in Bangladeh.

162. The project-specific assessments through conducting several Stakeholder Consultation Meetings, FGDs, and KIIs did not identify the GBV as a significant issue in the Chachra project area. These findings suggest that the baseline risk of GBV in this locality is relatively low compared to the division-level average. While the baseline survey indicated that 50.29% of the affected population is in the 15–45-year age range of which 54.48% are female which is an age group that can be vulnerable to gender based violence.

163. However, The Workplace harassment laws in Bangladesh are governed by Bangladesh Labor Act 2006, Bangladesh Labor Rules 2015, and High Court Verdict 2009. **Under Bangladesh Labour Rules 2015 (Amended 2022), specifically Rule 361 KA (2), workplaces are mandated to establish a five-member Complaint Committee for sexual harassment cases, which must have a majority of women members and a woman as its head. This committee is responsible for receiving complaints, conducting investigations, and making recommendations for addressing sexual harassment within the workplace, following the High Court's landmark guidelines on the subject. This law is applicable for this project.**

4.15 CULTURAL HERITAGE

164. There are several cultural heritages located in the study area of project. The consultants visited the Chachra Shiva Temple, Chachra Rajbari, Martyred Graveyard, and Child Development Center. None of them will be affected by the improvement of the Chachra Intersection.

[30] BRAC Study 2018

5 ANALYSIS OF ALTERNATIVE ALIGNMENTS

5.1 GENERAL

165. The proposed development of the Chachra 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.

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

5.2 CONCEPTUAL DESIGN FOR JUNCTION IMPROVEMENT

167. 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 Chachra 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.
- Chachra, in a change of scope (COS), is extended up to the gate of Medical College on the Benapole side, **Roundabout at Chachra 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.

168. **Grade Separation**: 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 CHACHRA INTERSECTION

169. Based on the above, the following five options have been considered for the Chachra 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

170. As shown in **Figure 5-1, 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)

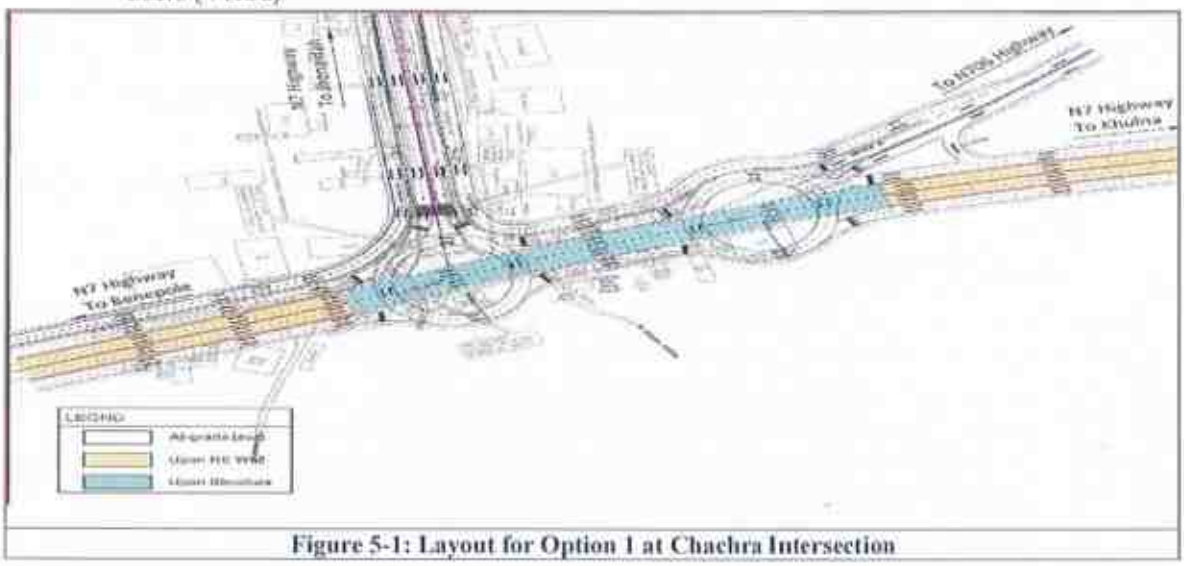

Figure 5-1: Layout for Option 1 at Chachra Intersection

171. 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

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

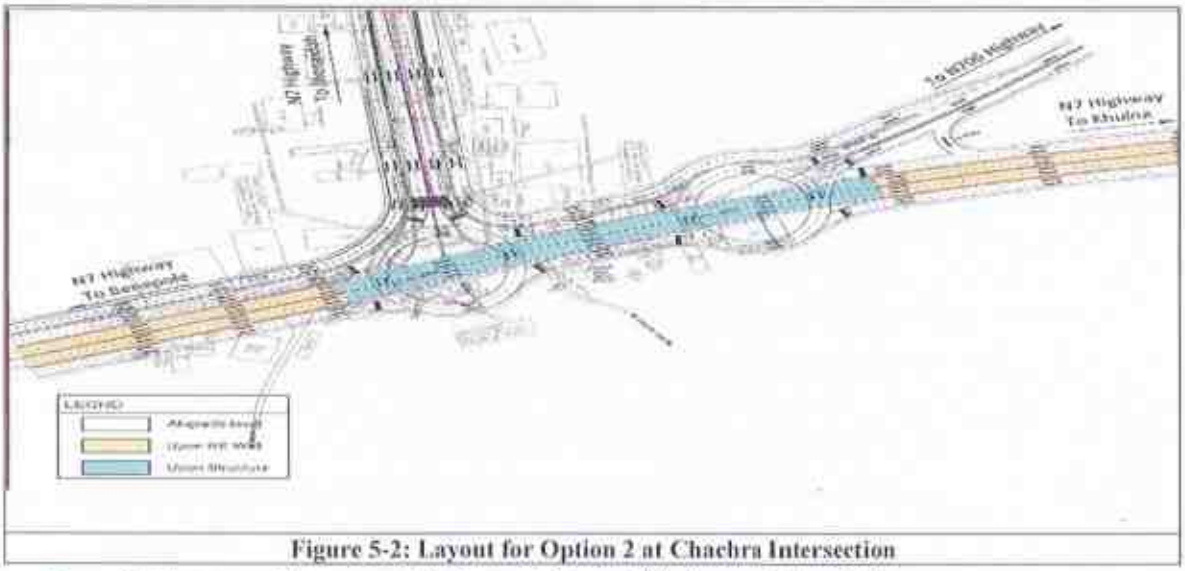

Figure 5-2: Layout for Option 2 at Chachra Intersection

- 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 Benapole to N706 Highway
- Roundabout arrangement for traffic dispersal with N706 Highway

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

C. Option 3: Grade Separation and Elevated Ramp

174. 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.

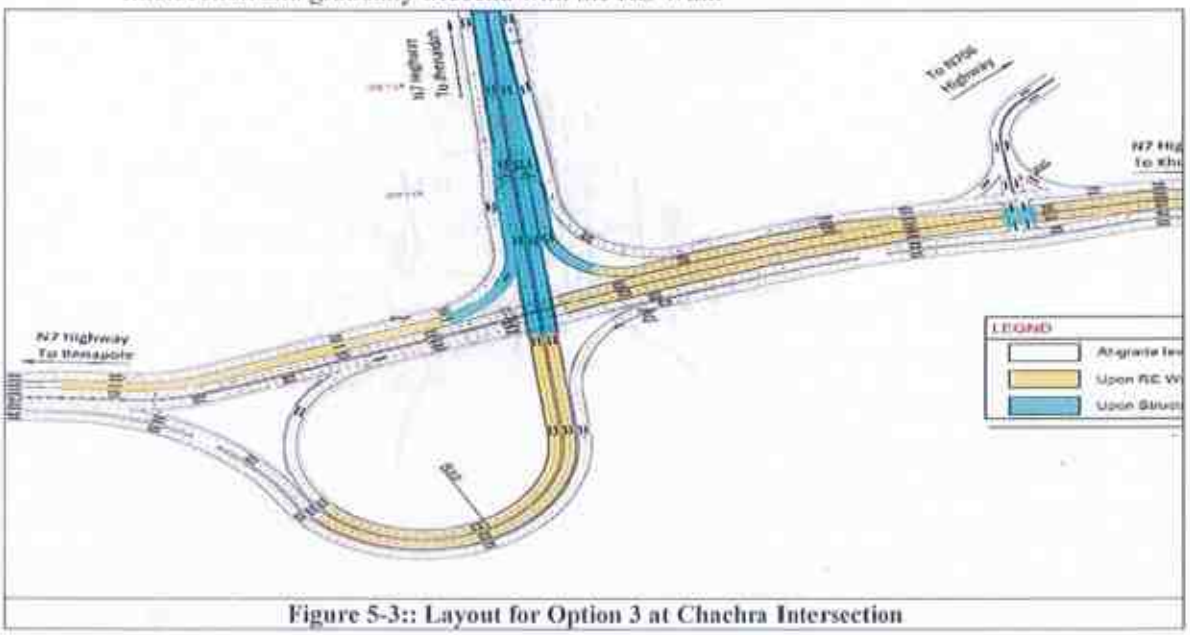

Figure 5-3:: Layout for Option 3 at Chachra Intersection

- 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.

175. 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

176. 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.

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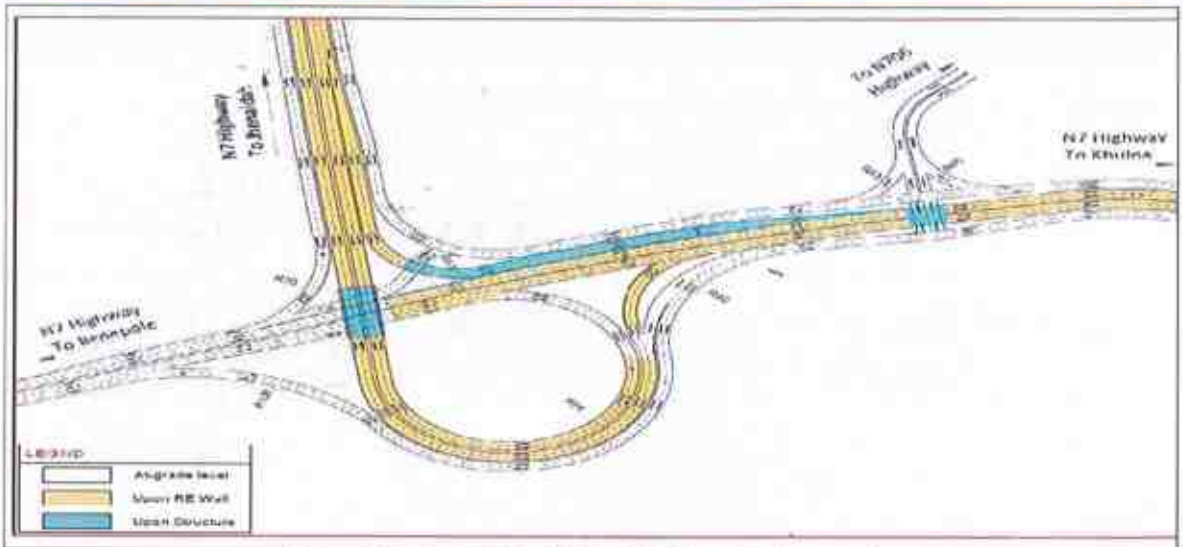

Figure 5-4:: Layout for Option 4 at Chachra Intersection

177. 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

178. 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 Chachra 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.

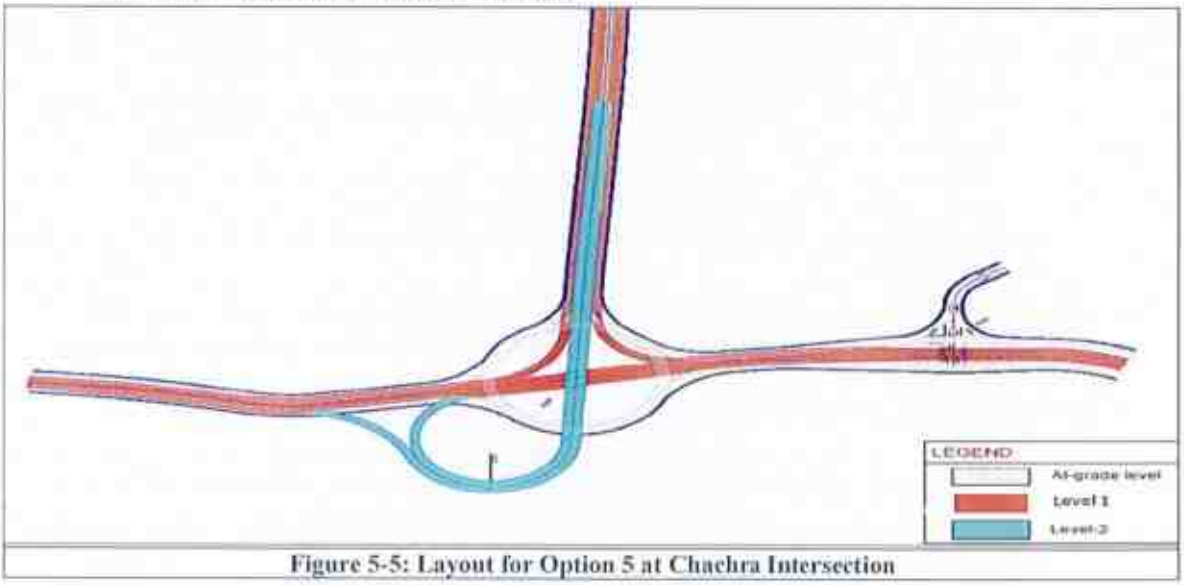

Figure 5-5: Layout for Option 5 at Chachra Intersection

- 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.

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

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

Alternatives	Environmental issues	Other Issues
Option 1	Although 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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180. The above impacts have been scaled down to assess the suitable option from the environmental and social angle using the following scale (refer to the weigh the impact intensity.

Table 5-2 Intensity Scale for Environmental and Social Impacts

No Comment	Low	Moderate	High

181. The following Table (Error! Reference source not found.) compares different options based on the E &S impacts and Risks.

Table 5-3 Comparison of Environmental and Social Risks and Impacts Assessment of Different Options

Options	Description of Options	Air	Noise	Water	Soil	Tree Cutting	Land Acquisition	Community Health and Safety	Road safety	Total	Ranking
1	Grade Separation Between Benapole and Khulna and Roundabout N7 to Jhenaidah									-18	5
2	Grade Separation between Benapole, Khulna, and Jhenaidah									-14	3
3	Grade Separation and Elevated Ramp									-11	1
4	Grade-separated movement between Benapole, Khulna, and Jhenaidah									-15	4
5	Grade Separation and Flyover at the Junction at Level 1 and Level 2									-13	2

5.3 ENVIRONMENTAL IMPACT OF 'WITHOUT PROJECT AND 'WITH PROJECT' ALTERNATIVES

182. 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.

183. 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.

184. 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

185. 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.

186. Thus, an attempt has been made to work out the carbon reduction due to the project scenario, which is presented in . 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 5-4: 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
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

187. 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 5-5: 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	Implementing this project will offer	The existing road network is congested

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

Sl. #	Factors	With the Project	Without the Project
	environmental conditions	improved environmental and social conditions.	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.
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'			

188. 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"

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6 CONSULTATION, PUBLIC PARTICIPATION, AND INFORMATION DISCLOSURE

6.1 INTRODUCTION

189. 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.

190. 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

191. 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 STACKEHOLDERS

192. **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.

193. **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, Councilor, 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, CONSULTATIONS AND PARTICIPATION

194. A total of Fourteen (15) events, comprising two (2) stakeholder consultations, five (5) focus group discussions (FGDs), and eight (8) 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

195. Site and timings for stakeholder consultations, such as Focus Group Discussions and Key Informant Interviews, were chosen using the design team's WeCARE RHD program road map. The stakeholders were informed of the location, venue, date, and time via a variety of channels, including direct conversations, announcements, participant attendance sheets from focus groups, consultation meetings, and key informant interviews. A summary of the total number of participants, including the number of men and women, is given in **Table 6-1**. Details of the Stakeholders' consultation meeting is provided in Annex 4, Volume 2.

Table 6-1: Details of the various Stakeholder Consultations conducted

Sl. 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 8 KII conducted						
			Total Participants		**150**	**76**	**226**

6.5 KEY INFORMANT INTERVIEWS

196. 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,NGOs, 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, councilor, 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.

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

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

198. A total of eight 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 detail in **(Annex 4.1, Volume 2)**

OUTCOME OF KEY INFORMANT INTERVIEWS

a) Concerns:

- 240 business structures and households are affected
- Loss of livelihood

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- 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 dwellers
- Key Informant Interview (KII) with a NGO **Banchte Shekha**, Jashore;
    - Banchte Shekha is a long-standing NGO in Bangladesh, founded in 1976 by Angela Gomes, with a strong presence in Jashore and across Khulna and Dhaka divisions. The organization primarily works with marginalized women, children, and persons with disabilities, aiming to address socio-economic vulnerabilities and strengthen rights-based approaches. During the consultation, Banchte Shekha representatives highlighted several areas of relevance for the project:
    - Gender-Based Violence (GBV) and Human Rights: The NGO emphasized that women and children in Jashore remain vulnerable to domestic violence, sexual harassment, and exploitation. They noted that large infrastructure projects may increase risks of trafficking, harassment, and SEA/SH, particularly with an influx of outside labor. They stressed the importance of prevention mechanisms and referral systems.
    - Economic Empowerment: Through microcredit and skill development initiatives, Banchte Shekha works to enhance women's financial independence, which they believe is key to reducing vulnerability to violence. They recommended linking project-affected women to such programs.
    - Legal Aid and Advocacy: The organization provides legal aid and engages in advocacy for women's participation in Union Parishad and Pourashava committees. They underlined that women often lack knowledge about their rights and available services, and projects like this should strengthen awareness and accessibility.
    - Health, Sanitation, and Education: They run WASH, nutrition, and literacy programs, which they see as closely tied to reducing vulnerabilities. Poor access to sanitation and education often compounds risks for women and youth, especially in project-affected areas.
    - Support for Persons with Disabilities: Since 2002, they have managed a physiotherapy center in Jashore, serving children with disabilities. They cautioned that disabled women and children are at heightened risk of neglect and violence, and should be explicitly considered in project safeguards.
    - Marginalized Groups: Banchte Shekha acknowledged their engagement with vulnerable groups, including youth and gender-diverse populations such as the Hijra community, stressing that these groups face social exclusion and often lack access to protection services.
    - . Disaster and Climate Vulnerabilities: They also connected GBV risks to broader shocks such as natural disasters, where displacement and livelihood insecurity create conditions for increased exploitation.

      Key Suggestions of the NGO for the Project:
    - Establish a clear and accessible Grievance
    - Redress Mechanism (GRM) sensitive to GBV
    - and SEA/SH.

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- Strengthen coordination with local NGOs like
- Banchte Shekha for survivor support and
- referrals.
- Provide awareness sessions for workers and communities on GBV risks and available services.
- Ensure that vulnerable groups—women, children, persons with disabilities, youth, and Hijra communities are explicitly included in project safeguards and monitoring.

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 an 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 a 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

199. 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 this discussion with different groups is presented in section 6.6.1. Details in Annex 4.2, Volume 2.

6.6.1 SUMMARY OF FGDS

200. 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.

201. 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.
- 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.

202. The details of FGDs, participants' list is given in **Annex 6-4.**

6.6.2 SITE VISIT OF THE AREA BEFORE STAKEHOLDER CONSULTATIONS

203. 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.

6.6.2.1 Outcomes of the E&S Consultant Field Visit

204. 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. .

6.7 STAKEHOLDER CONSULTATIONS MEETINGS

205. 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 details of two SCMs, photographs and participants list are documented in **Annex 4.3, Annex 4.4,** and **Annex 4.5,** respectively

Table 6-2: Venue, Date and Participants of Stakeholders' Consultation Meetings

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

6.8 DISSIMINATION OF PROJECT-RELETED INFORMATION

206. The R&R Specialist briefed stakeholders about the purpose of the improvement of Chachra Intersection at a stakeholder consultation meeting held at the venue. They were briefed about the WeCARE program and development proposal of the existing intersection in view of the increase in future traffic due to the following:

- Strategic location of Chachra Intersection because of the 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 connectivity in the south, southwest, and western regions of Bangladesh
- The development of this Intersection will bring positive social and economic benefits, and the ITS will allow authorities to take necessary action faster, e.g., making ambulances available sooner, conducting police patrols, etc.
- The traffic bottleneck at this intersection will be lessened, significantly reducing the number of accidents.

6.8.1 LAND ACQUISITION IMPACTS AND ISSUES

207. The consultant discussed the land acquisition, impacts, and involuntary relocation. The land requirement is discussed with the PAPs. It is explained to them that about 33.48 acres of land are required to be acquired to develop the proposed intersection. This includes land from Chachra Mouza, 30.97 acres (92.49%), and Mondolgati mouza, 2.52 acres (7.51%). The private land to be acquired is 12.8354 acres (38.34%), and the other government agencies' land is 4.6256 acres (13.82%), which will be acquired through inter-ministerial transfer.

208. About the project's resettlement policy framework, which was prepared and approved following WB's ESF and ESS5, will be informed to them and process to determine compensation for affected land, homesteads, and waterbodies, including ponds, structures, trees, CPRs, etc. were also discussed.

6.8.1.1 Social and Resettlement Impacts, Risks and Mitigation Measures

209. It was informed to them that for an efficient and proper disbursement of compensation, the following papers/documents are to be produced.

- 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 need 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 the GoB (PWD schedule of rates).
- It is assured to them that proper compensation will be paid to the landowner, homesteads, affected waterbodies, structures, trees, CPRs, etc., per the GoB rules and, project's Resettlement Policy Framework (RPF). The affected persons and entities will be compensated for the losses they will incur due to the implementation of the project. The DC office will pay the titled PAPs, whereas non-titled PAPs will be paid through RHD, the consultant further explained to them that the Regulatory Framework and Guidelines of the GoB and WB to the stakeholders will be followed.

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

210. About the compensation process was explained to them which would be paid by the concerned DC office to PAP for the loss 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." The following land acquisition process was informed to them.

- 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

6.8.1.2 Environmental Impact Issues

211. The stakeholders discussed the increase in noise level, dust pollution, road safety, drainage, and cross-drainage structures during construction. The concerns raised by the stakeholders are summarized as follows.

- The intensity of the 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 on 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, a 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 stormwater, a proper drainage facility will be provided along the side of the road
- Adequate hydraulic (cross-drainage) structures should be provided to prevent waterlogging
- Underpass and/or foot-over bridge concerns raised by the stakeholders to facilitate the movement of people, school, and college-going students
- Developing a strategy for managing biodiversity and establishing saplings
- Social Management Plan (SMP) ensures community health and safety during the construction of the roundabouts, etc.
- Enough exit and entry points,
- Double-guard the retaining wall to avoid accidents.
- Traffic Management Plan (TMP).

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6.9 OUTCOMES OF THE STAKEHOLDERS' CNOSULTATION MEETINGS

212. An open forum was arranged, where the stakeholders expressed their opinions and views and provided remedial suggestions on adverse environmental and social issues. The meaningful discussion included water logging, decreasing wastewater drains, including rainwater, and cutting down old trees.

6.10 INFORMATION DISCLOSURE

213. 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.

214. **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.

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7 ENVIRONMENTAL AND SOCIAL IMPACTS, RISKS AND MITIGATION MEASURES

7.1 GENERAL

215. 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.

216. 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

217. The anticipated environmental and social impacts and risks 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 SCREENING OF THE ANTICIPATED IMPACTS

218. 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)

7.2.2 METHODOLOGY

219. The methodology of assessing E&S impacts and risks from the project activities includes identifying the E&S components that will be impacted, the type of impacts, the assessment area where the impacts will be felt, and defining the criteria for assessing the significance of each kind of impact. After determining these aspects, E&S impacts and risks arise design and pre-construction, construction, and operation stages, and were carried out to identify the minor, moderate, and significant impacts to guide the development of mitigation measures and ensure no residual impacts. A detailed environmental and social management guideline has been incorporated in the ESIA Chapter 10 (ESMP).

- **Identification of Impacts:** The project has been identified as potentially impacting the physical, biological, and social environments' significant valued components (VC).

220. **Type of Impact on the VCs:** The type of impact can be described as:

- Positive: - Improvement in the quality of the VCs because of the project,
- Negative: - Degradation or reduction in the quality of the VCs because of the project and
- Neutral: - No noticeable change in VCs

221. **Area of Impact Assessment:** The area covered for assessing direct impacts is the proposed RoW and 500 m Corridor of Impact (CoI) for assessing the project's indirect impacts. 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 duration.

- **Impact Severity/Magnitude**: Understanding an impact's severity or seriousness entails understanding its consequences or risks. This subjective criterion 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 degrades a habitat, e.g., wetland filling, or 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 is barely noticeable
- **Impact Physical Extent:** The area of impact entails the spatial scale of impact on one or more of the VCs. The terms limited, local, and regional describe the extent of effects.
  - Major = negative impact can be measured at least 2 times the 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 effects, and recovery is very high
- **Impact Duration:** This indicates the time dimension of the impact on the VCs. The terms permanent, temporary, and short-lived describe the duration of effects.
  - Major or long-term, the impacts are felt throughout the life of the infrastructure. Highly destructive or extending through at least one life cycle if an indicator species is affected
  - Moderate impact not extending to one Lifecycle and not impacting reproductive cycle, or life necessity, or 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.

222. The anticipated environmental impacts are determined at 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 (indicated by the color of the cells in the last column of the table) that need to be mitigated during different implementation phases of the project. Major and moderate impacts have been given priority for the identification of adequate mitigation measures to ensure that they are minimized or taken up with no residual impacts. The color index shows the severity / magnitude of the anticipated impacts as positive and negeative scale, where yellow, orange, and red colors indicate minor, moderate, and major respectively for negative impacts that need to be mitigated during different implementation phases of the project. The Green color with different shade indicated the posive impacts of the ptoject activities as minor, moderate, and major.

Intensity Color Scale for Environmental and Social Impacts

Impact Severity/ Magnitude	Negative	Positive
Major		
Moderate		
Minor		

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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 Phases	Duration	Area	Severity	Significance of Impact
1. Physical Environment (Compliance of WB's ESS 3-Resource Efficiency and Pollution Prevention Management and Bangladesh ECR 1997/2023)						
1.1 Air Quality	Location of project road alignment	D	-ve, T	-ve, L	-ve, L	-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
1.4 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
1.5 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 accidents	C & O	-ve, P	-ve, L	-ve, Lo	-ve, Mi
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	Location requiring removal of private structures/buildings	D	-ve, P	-ve, R	-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 Phases	Duration	Area	Severity	Significance of Impact
and buildings	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
3.3 Gender-based violence (GBV) and SEA and SH risks	The risks may increase to some extent within local communities when there are large influxes of male workers from outside the area.	C	-ve, T	-ve, L	-ve, H	-ve, Mo
	Occurs during payment of the compensation money and resettlement benefits of this project due to discrimination in sharing of compensation between man and woman shareholders.	D/C	-ve, P	-ve, L	-ve, H	-ve, Mo
	The female employment tends to be more concentrated in low-paid and low-productivity occupations.	C	-ve, T	-ve, L	-ve, H	-ve, Mo
	The female SH by using buses and other forms of public transportation	C & P	-ve, P	-ve, L	-ve, H	-ve, Mo
3.3 Noise	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 near project alignment	O	-ve, P	-ve, L	-ve, Lo	+ve, Mi
3.4 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
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
5. **Tradition, Culture** (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, Mi

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

VEC	Impact/Activity	Project Phases	Duration	Area	Severity	Significance of Impact
	Noise levels exceeding baseline levels by more than 3dBA and causing disturbance to sensitive receptors near project alignment	O	+ve, P	+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 safety	Design of road safety features	D	-ve, P	-ve, L	-ve, H	-ve, Ma
	Dust and air pollution	C	-ve, T	-ve, L	-ve, H	-ve, Mo
	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; Ma = Major, Mo=Moderate, Minor=Mi; 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

223. 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.

224. **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.

225. 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 (ESS 5,1)

226. The total amount of land to be acquired is 33.3152 acres, out of which 12.944 acres are Private Land and 20.3704 acres are GoB lands, including 16.01 acres belonging to RHD as shown in

Table 7-2: Land Acquisition Summary for the Chachra Intersection Project

SL. No.	Description		Amount of Land (Acres)				
			Private Land	Government Lands			Total Lands
				Government agency's Land	RHD	Total Govt. Land	
1.	Total land required		12.9448	4.3601	16.0103	20.3704	33.3152
2.	Breakdown of government agency's land	Custom office		1.8918			2.412
		BADC (Irrigation)		1.4963		1.4963	1.037
		Fish Research Institute		0.972		0.972	1.021
	Total		12.9448	4.3601	16.0103	20.3704	*33.3152*
	%		38.86	13.09	48.06	61.14	***100***

227. According to the census, IOL, and socioeconomic survey, the overall adverse impacts of the project are as follows;

- **Affected Households:** A total of 274 households (HHs) with a total population 1205, out of which male are 636 and females are 569.
- **Affected Residential HHs:** 50 residential HHs, including 46 titled and 4 non-titled HHs
- **Affected HHs losing Commercial Premises and/or Business:** Total affected HHs are 172, including 62 titled HHs, 108 non-titled HHs, 2 encroachers' HHs,
- **Affected HHs losing Residential-cum-Commercial Premises and/or Business:** Total affected HHs are 53, including 49 titled HHs, 1 non-titled HH, and 3 encroachers' HHs
- **Affected Community Property Resources (CPRs)** – A total of CPRs are 5 (five), including 4 (four) CPRs in the Chachra mouza and 1 one) CPR in Mondolgati mouza
- **Affected Government and Other Entities:** These are 6 (six).
- **Affected Vulnerable HHs (VHHs):** 20 are VHHs, and all are located at Chachra Mouza
- **Affected Owners of Residential, Commercial, and Residential-cum-Commercial Structures Losing Rental Income:** A total of 125 owners, including 97 titled owners, 25 non-titled owners, 3 encroachers' households.
- **Affected Tenants:** A total of 333 tenants will be affected in the Chachra Intersection. Of them, 311 affected tenants rented structures from 125 households, and 22 affected tenants rented commercial structures from 3 CPRs.
- **Affected Tenants of Residential Structures:** There are 12 affected tenants associated with residential structures owned by 4 titled households in the Chachra mouza
- **Affected Tenants of Commercial Premises:** There are 157 affected tenants of commercial premises owned by 42 titled HHs, 25 non-titled HHs, and 2 encroachers' HHs.
- **Affected Tenants of Residential-cum-Commercial Premises:** There are 142 affected tenants associated with residential-cum-commercial structures owned by 51 titled HHs. These are 3 tenants associated with 1 affected encroacher HH, 139 tenants are associated with 51 titled HHs.
- **Affected Tenants of CPR's Commercial Premises:** 22 tenants are residing in the premises of three CPRs, including 2 CPRs in the Chachra Mouza and 1 CPR in Mondolgati Mouza
- **Affected Laborers:** The project will impact a total of 252 laborers.

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 (ESS 10)

228. 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.

229. 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 laborers 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 discussing with the community and the contractor may organize a Public Awareness Campaign about safety and health issues.
  - Locals shall be informed about the activities 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.
  - 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.

230. Issues Of the CPRs (ESS 5)

- 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.
- 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

7.3.4 REMOVAL OF TREE-CUTTING (ESS 1,2,4)

231. 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 952 private trees are likely to be removed, and 255 are road side trees within RHD land. as shown in **Table 7-4**. The trees include government as well as privately owned trees. Details in Annex 3.14 and Annes 3.15, Volume 2, respectively.

232. 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.

233. 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, Mahogony, Babul, Neem, Mango, Jackfruit, Debar, 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.

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Table 7-3: Affected Trees within the Proposed RoW				
Nos. of Affected Private Trees				
Large	**Medium**	**Small**	**Sapling**	**Total**
198	345	316	93	952
Nos. of Affected Avenue trees				
9	64	177	5	255

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.
- Normal practice at least a 1:3 ratio, i.e., three (3) saplings for one tree cutting shouldbe done. Whereas in this project, since 255 avenue trees of common species are affected, it is proposed that about 900 are to be replanted under the project as 1;3.5 replantation of cut down trees. It is considered that 300 out of 900 trees can be planted as enhancement measures of Rajbari ttemple and Graveyards located within 1500m of the proposed project.
- For private trees 952, 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).
- To prevent the destruction of birds' nests, resting and feeding site, as well as the abandonment of young birds, the cutting of trees during the bird breeding season should be avoided. This sensitive period is often from early spring to late summer, when birds are actively nesting, laying eggs, and raising young.
- Contractor shall prepare the Tree Removal schedule during the preconstruction phase based on site-specific conditions and outside of the breeding season. If that's not possible, pre-construction surveys are essential to identify active nests.

7.3.4.1 Decrease in Carbon Sequestration

234. 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 CO_2 sequestration. As a result, the amount of CO_2 in the atmosphere will increase, and the local temperature will rise. The reduction of O_2 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.

7.3.5 UTILITIES SHIFTING

235. About 261 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

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public.

7.3.6 DRAINAGE IMPACTS-MITIGATION MEASURES

236. 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 Mukteshwary 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.

237. 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.

238. 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.

239. 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.

7.3.7 ENVIRONMENTAL MONITORING FOR BASELINE ESTABLISHMENT

240. 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.

7.3.8 ROAD SAFETY ISSUES

241. 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.

242. 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 7-4: 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
- Community awareness training on road safety, particularly for children, must be considered, such as the use of FOB and POP, etc.

7.3.9 PERMISSION AND CLEARANCES

243. 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

7.3.10 ORIENTATION TO CONTRACTORS

244. 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

245. 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

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- 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. The contractor may organize a Public Awareness Campaign about safety and health issues.
- 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 coordination/consultation with Environmental and Social Specialists in the RHD
- Training includes discussion and review of ESMP and Environmental and Social Monitoring Plan (ESMoP) detailing how specific environmental risks associated with their scope of work, legal compliance, inspection and audits, and progress tracking and reporting are addressed.
- Individual Environmental Consultants under the Project Implementing Unit of RHD will monitor and supervise all training sessions and provide training modules

7.4 ENVIRONMENTAL AND SOCIAL RISKS, IMPACTS, AND MITIGATION DURING CONSTRUCTION PHASE

246. Effective management during the construction stage is crucial to addressing environmental and social risks. Key mitigation measures include implementing site-specific management strategies and monitoring environmental quality across construction sites, focusing on air, noise, water, soil, and sediment conditions.

247. Several E&S issues (risks and impacts) have been addressed as part of good engineering practices, which have been accounted for in the engineering costs. They include roadside drainage improvement, POP, 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

248. Proper implementation requires treating non-compliance as a serious infraction by the contractor, leading to applicable penalties. All lapses on the clearances/NOCs obtained by the contractor shall be deemed as major non-compliance. They must ensure all these approvals/NOCs are valid throughout the construction stage/liability/maintenance period. The contractor needs to follow the conditions stipulated in the environmental clearance (EC) for the Jashore and Jhenaidah, consent to establish (CTE), Consent to operate (CTO), and other approvals given by the regulatory authorities

7.4.1 SITTING HOT MIX PLANT/WMM/BATCHING PLANT/CRUSHERS (ESS3)

249. 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, the contractor should consider the prerequisites and measures for setting up 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 500m from the residential area.
- Batching plants/WMM shall be installed 500m 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.
- Drainage and a sump shall be provided and cleaned regularly to prevent waterlogging in the batching plant.

- Hot mix plant shall be fitted with pollution control devices, Bag filters, etc.
- The stack height shall be at least 10m above 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 entering into a formal agreement with landowners to set up plants/other contractors' facilities.
- 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 (ESS2)

250. A CoC and GBV Action Plan has been prepared separately with provisions to comply with the construction/labor camp management. LMP for the project shall be referred to take necessary action when the construction and labor camps 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 pose hazards to sensitive environmental receptors or existing infrastructures of nearby communities.

251. Though the 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, design, 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 Baors.
- 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 adequately fenced, and an informational board and 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.
- Shaded area for workers' breaks/meals should be considered at the construction sites.

7.4.3 POTABLE WATER AND SANITATION FACILITIES (ESS2)

252. Inadequate potable water supply, unsanitary toilet facilities, and washing areas can lead to waterborne/Faecal disease outbreaks in the workers' camps. Poor sanitation may result in the transmission of communicable diseases among the workers and the host community. Unsafe potable water facilities and washing areas can also lead to waterborne 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 requirements 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 7-5: 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's and Women's toilets shall be clearly demarcated as "For Men Only" or "For Women Only" along with symbols, etc.

Source: National Building Code, India

- As per section 91 (1) (a) of the Bangladesh Labor Rules 2015, the bathroom shall include the following arrangements:
  - At least 2 (two) separate bathrooms for the first 25 (TWENTY-FIVE) male and female workers and 01 (one) bathroom for every subsequent 50 (fifty) workers must be arranged in the working conditions that require instant washing of the whole body of the workers or if the whole body is not washed, there remains a severe health hazard.
  - Bathroom facilities without harming the generality of previous rule:
  - Tap after minimum 0.60 meters of distance or water trough with jets;
  - Wash basin with tap attached;
  - Tap upon the straight tube;
  - Tap controlled shower or fountain
  - And circular water trough with fountain shape;
  - Provided that the inspector shall determine the aforementioned facilities in due proportions after careful observation of the workers' needs and habits

7.4.4 SOLID WASTE MANAGEMENT (ESS3)

253. 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 mosquitoes 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.
- Contractor shall maintain a register for record-keeping of waste generated by type, amount, transportation, and final disposal site approved by RHD.

7.4.5 HAZARDOUS MATERIAL MANAGEMENT (ESS3)

254. 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 (ESS3)

255. 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

- DC/RHD will give the proper compensation with assistance from INGO private ponds
- Contractors shall ensure that construction materials like earth, stone, and ash do not block the water flow of any water course or cross drainage channels/river.
- 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 should be provided near the vehicle washing area/maintenance workshop.
- Drains and soak pits shall be provided in labor camps, construction camps, workshops, and other contractors' facilities.
- 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 (ESS1,3)

256. Clearing and grabbing at the project site will cause fugitive dust emissions and the removal of fertile topsoil. The top 12-15cm of soil is usually rich in organic matter and microorganisms, 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 the 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 (ESS1, ESS3, ESS5)

257. To procure the earth, borrow areas will be open during construction. 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, posing a risk to the nearby habitation, trees, and other vegetation.

Mitigation Measures

- Only approved and identified borrow areas shall be used by the contractor.
- Borrowing of earth from the cultivable land shall not be allowed.
- If there are no other options and a compulsion to choose cultivable land, then depth shall be restricted to 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 the land parcel owner, and must include the photographs of the 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, they should be protected by providing slopes of 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 (ESS1, ESS3, ESS6)

258. Topsoil is the most fertile layer, rich in organic matter and essential nutrients like nitrogen, phosphorus, and potassium. When it's lost, the remaining soil is less productive, leading to lower crop yields and requiring farmers to use more fertilizers to maintain productivity. Topsoil is crucial for absorbing and retaining water. The severe topsoil loss can render land unsuitable for farming, contributing to desertification and a reduction in the total amount of land available for agriculture. Therefore, it increased farming costs. The farmers must spend more money on fertilizers and other inputs to compensate for the loss of nutrients, and the land may become more difficult to cultivate due to the formation of rills and gullies.

Mitigation Measures

- The topsoil (15cm) shall be removed and preserved for reuse for redevelopment purposes.
- 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 run-off.

- 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 m^3 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 (ESS1, ESS3, ESS5)

259. The project corridor is along relatively plain terrain. Soil erosion is not envisaged as a primary 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 parts of the project road, as found necessary. As needed, the contractor will prepare detailed stabilization techniques for various soils. Soil erosion may occur near cutting areas, at steep and un-compacted embankment slopes, bridge locations, and wherever vegetation is cleared. Soil erosion may have a cumulative effect like siltation, embankment damage, bridge pier damage, drainage problems, etc. Soil loss due to runoff from earth stockpiles may also lead to siltation. Gully erosion along the exposed track slope during the rainy season may damage the 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 in 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 (ESS3, ESS6)

260. 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.

261. 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 (ESS3)

262. 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.

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

Pollution from Hot Mix Plant Operations

263. The following assumptions have been made to work out the emission of air pollutants from the Hot Mix Plant (HMP). Emissions rates of air pollutants from the HMP stack are as follows:

- PM10 emissions = 0.09 g/sec, (EPA, AP-42 methodology)
- CO Emissions= 3.8 g/sec (EPA, AP-42methodology)
- 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 tons/m3
- Max duration of operation= 12 hrs.
- Stack Height = 10m
- Efficiency of bag house filters/wet scrubbers 99.5%
- Exit gas velocity= 15 m/sec31
- 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

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

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264. 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

265. 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, equipment/and plants shall be undertaken.
- The construction vehicles/machinery/equipment shall use only designated routes.
- DG sets shall comply with the requirements of the Department of Environment.
- The construction machinery/equipment shall use only designated sites.

7.4.13.1 Movement of Construction Vehicles (Air Pollution)

a. Impact due to Vehicle Movement

266. 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.

267. 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

268. 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)

269. Emission Factor to be worked out using the following formula as per EPA, AP-42[2]

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

270. 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, 0.3**Error! Bookmark not defined.**, S =Silt=5%, W=weight of vehicle=20 tonnes, M=moisture=0.75%

271. 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**.

Table 7-6: PM10 Concentration due to movement of Construction Vehicles on Haul Roads

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

272. Highest incremental concentration of 123.4 µg/m^3 is near the road at 50m whereas it is getting reduced and at 300m the incremental concentration is 28.1 µg/m^3. 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.

7.4.13.2Noise Environment (ESS3)

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

Construction Camps/Yards/Construction Site

274. 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 equipment[32]. 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**.

Table 7-7: Typical Noise from Construction Equipment

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 Inserter	85
Loader	85	Truck	88
Paver	89		

275. 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).

Mitigation Measures

276. 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.

[32] Transit Noise and Vibration Impact Assessment, FTA

- '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)

7.4.14.1Terrestrial flora

277. The proposed activities on the project will remove about 1107 trees and vegetation and fell roadside and private trees, including the 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. The roadside affected trees are 255, and the private trees are 953.

278. 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

- Replantation of at least 1:3 of the cut-down trees should be followed for the affected avenue trees.
- To compensate for affected avenue trees, a replantation plan has been proposed in the ESMP. A total of 952 trees will be replanted, which is a replanting ratio of approximately 1:3.5 for the 255 roadside trees that will be cut. (a typical road plantation listed trees given in Annex 11, Volume 2.),
- 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 private 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)
- An 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 an 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

279. 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, and 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 as per the ECR 2023 before discharging into the aquatic habitat.
- The level of treatment should be based on the assimilative capacity of the receiving water for the load of contaminant being discharged to surface water, as per the General Guideline of the World Bank Group (WBG), Environmental Health and Safety
- 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 into the river water.

7.4.14.3 Terrestrial Fauna/ Wildlife

280. 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

281. In case of fauna, some IUCN concerned species IUCN concerned species such as Herpestesaur opunctatus, Prionailurus viverrinus, Varanus flavescens. 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. In addition, the most immediate consequence of tree and vegetation removal is habitat destruction. Cutting down trees and vegetation is expected to cause losses of bird nesting, resting, and feeding sites.

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.
- To prevent the direct destruction of birds' nests, resting and feeding, as well as the abandonment of young birds, the cutting of trees during the bird breeding season should be avoided. This sensitive period is often from early spring to late summer, when birds are actively nesting, laying eggs, and raising young.
- To avoid destroying nests and disturbing the birds' breeding, the contractor should schedule tree and vegetation removal outside of breeding season. If that's not possible, pre-construction surveys are essential to identify active nests.
- Placing artificial nest boxes or birdhouses can provide immediate nesting sites for species that use tree cavities, particularly those that cannot excavate their own nests, although this isn't standard practice.

269. Wildlife sanctuary, National Park, pristine habitats, natural wetlands with luxurious growth of aquatic vegetation, bats colonies, nesting bush

7.5 SOCIOECONOMIC ENVIRONMENT

7.5.1 COMMUNITY HEALTH AND SAFETY (ESS4)

282. 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

- The contractor shall plan activities in residential areas after discussing them with the community for community health and safety (CHS). The contractor may organize a Public Awareness Campaign about safety and health issues.
- Locals shall be informed about the activities that 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.
- The Occupational Health and Safety Plan, as well as the 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 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.
- Trained drivers with valid licenses shall be allowed to drive construction vehicles/heavy equipment.
- Speed of the construction vehicles/equipment shall be defined by the contractor in the contractor's 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 (ESS4)

283. Around 200-250 skilled/non-skilled laborers are expected to be engaged during the peak period, 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, and Occupational Health and Safety, are of grave concern due to the influx of labor. There would be impacts on the 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 (ESS2)

284. The contractor should follow the code of conduct or the terms of reference for hiring or recruiting the workforce for 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.

7.5.4 PUBLIC SAFETY AND ACCESS (ESS4)

285. 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.

7.5.5 HIV AND STD (ESS2, ESS4)

286. Due to the influx of workers in the Project area, AIDS/HIV may spread in the local community. Different types of diseases related to communicable diseases need to be controlled.33

Mitigation Measures

- Awareness campaigns on HIV/AIDS/STD
- HIV/STD voluntary counselling, testing, and treatment.
- Ensuring that construction workers have access to condoms

[33] FIDIC | HIV-AIDS in the Construction Sector | International Federation of Consulting Engineers

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- Provision of vending machines at the identified location
- Monitoring of outcomes, in collaboration with National HIV/AIDS Authorities

7.5.6 LABOR MANAGEMENT (ESS2)

287. 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). The roles and functions of these GRCs are presented in section 7.6.1 of this ESIA.

Mitigation Measures

- Contractors shall follow the national legislation
- The contractor shall obtain the Labor License from the Department of Inspection and Factories Establishment (DIFE) under MoLE.
- The contractor shall follow the conditions stipulated in the license regarding 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 the prohibition of Child Labor shall be displayed at the construction camps/labor camps, etc.
- All basic facilities shall be provided within the labor camp, such as water supply, cooking gas, sanitation facilities, and a mobile toilet (of adequate capacity for men and women separately).
- 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 devoted to Labor Management Procedures (LMP) to clarify every aspect of labor management and its facilities. Also, included in Annex 6 (Annex 6-1-Annex 6.9) under Volume 2.
- Contractor shall prepare emergency reponse plan and to be implemented, when necessary (Ref to Annex 7

7.5.7 OCCUPATIONAL HEALTH AND SAFETY ASPECTS (ESS2)

288. 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-term impacts for the health and safety of the construction workforce.

289. Contractors' lack of safety training can lead to accidents and lost productivity. Construction workers need training on general health and safety matters and on the specific hazards of their work.

7.5.7.1 Personal Safety (ESS2)

- 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 (as hown in Annex 7) and shall provide training to workers accordingly.
- The Contractor shall establish work zones to separate workers on foot from traffic and equipment, following the Traffic Signs Manual[34] . The basic signs include *Road Works Sign, Road Narrow Sign, Keep left* or *Keep Right*, place a line of *Traffic Cones to* guide the pedestrian, using STOP/GO boards. The Sign plates size should be standard diameters according to Traffic Signs Manual.

7.5.7.2 COVID-19

290. 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

[34] Traffic signs Manual , Volume 1, Appendices, Bangladesh Road Transport Authority, Ministry of Communication

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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.

7.5.7.3 Measures For Labors' Materials Handling And Painting. (Ess2)

291. 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.

7.5.8 SEXUAL EXPLOITATION AND ABUSE (SEA)/ SEXUAL HARASSMENT (SH) (ESS2, ESS4)

292. 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.

293. 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, indiscrimination 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.

294. 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.

295. Sexual harassment is a significant problem on Bangladesh's public transport, with study[35] showing that over 94% of women have experienced verbal, physical, or other forms of harassment while using buses and other forms of public transportation. This widespread issue is attributed to factors such as overcrowding, poor monitoring and enforcement of laws, and a lack of designated infrastructure for bus stops and ticket booths. Perpetrators are often men aged of 41-60 older men, with the issue impacting women across different ages. Their prevalence and impact of sexual harassment on women's safety and mobility.

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 5, Volume 2. 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 on 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.
- 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 the site as presented in Chapter 8 of this ESIA to control the risks at the site.
- Staff shall be encouraged to report suspected or actual GBV.
- A 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 the construction period of the Chachra Intersection project, it is expected that the ESMP will be effectively followed, which will ensure keeping/maintaining a low-risk environment for Gender-Based Violence (GBV) affecting community members, workers, service users, and any

[35] BRAC Study 2018

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other relevant sections of the public.

- Awarenes training shall be conducted with workers for dessiminating the One Crisis Center and One-Stop Crisis Cell at District Sadar Hospital at Jhenaidah and Jashore will serve as the host communities for any gender based violence at construction site. The OCC provides all the necessary services for women who are victims of violence in one location. These services include healthcare, police assistance, DNA testing, social services, legal assistance, psychological counseling, and shelter, etc.
- Accoring to the Bangladesh Labor Act 2006, and High Court Verdict 2009, and Bangladesh Labor Rules 2015 **(Amended 2022), specifically Rule 361 KA (2), workplaces are mandated to establish a five-member Complaint Committee for sexual harassment cases, which must have a majority of women members and a woman as its head.**

7.5.9 GRIEVANCE REDRESS MECHANISM (ESS2)

296. 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 7-8: 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

7.5.9.1 The Scope of Work and the Terms of Reference for The GRM 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 a 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

7.5.9.2 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
- 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

297. 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 7-9: 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

7.5.9.3 The Objectives of ESS2

- To promote safety and health at work
- To promote fair treatment, nondiscrimination, and equal opportunity for project workers
- To protect workers, including vulnerable workers such as women, persons with disabilities, migrant workers, contracted workers, community workers, and workers through contract suppliers
- 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

7.5.9.4 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 ensure their awareness.
- Enforce the workers' Code of Conduct adopted in the contractor's ESMP (C-ESMP). This is prepared regarding the ESIA/ESMP, LMP, and SEA/SH Action Plan project.
- Be aware of the health and safety issues and the precautionary measures they must take to uphold a congenial and healthy atmosphere at the site.
- Ensure the availability of a "First Aid Box" at the labor camp and work site. Inform and keep the laborer acquainted with its use, as and when required. Emergency drugs, gauges, 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 of the PPE technique will be held at work.
- Through regular monitoring, ensure the availability of separate latrines for male and female workers, potable water, a waste disposal system, and a well-ventilated and well-illuminated labor camp.

Mitigation Measures

- Implementation of a SEA/SH-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
- 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 SEA/SH-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 SEA/SH 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 SEA/SH 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 SEA/SH
- Grievance redressal mechanism shall be established at site to address the issues immediately

7.5.9.5 Traffic Diversion and Detouring (ESS4)

298. 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 as shown in Annex 8, Volume 2..
- The traffic management and control plans shall contain details of temporary diversions, traffic safety arrangements for construction under traffic, details of traffic arrangements after cessation of work each day, Safety measures for night-time traffic and precautions for transportation of hazardous materials and arrangement of flagmen

7.6 IMPACTS AND MITIGATION DURING THE OPERATION PHASE

299. 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.

7.6.1 TERRESTRIAL ECOLOGY (ESS6)

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

7.6.2 WATER RESOURCES AND WATER QUALITY (ESS3)

301. Before the onset of the monsoon, side drains will be regularly cleaned, and water quality will be monitored.

7.6.3 IMPACTS ON AIR ENVIRONMENT DURING OPERATION PHASE (ESS3)

302. 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 principal 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 adversely impact 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 road users.

7.6.4 IMPACTS ON NOISE ENVIRONMENT DURING OPERATION PHASE (ESS3)

303. Motor vehicles are inherently noisy, and noise impacts are inevitable in any road development regardless of scale or character[36]. The noise sources during the operation of road projects are namely, vehicle noise, friction between vehicles and road surface, driver behavior, and maintenance of the road. Vehicles noise[36] is generated from engine, transmission, suspension, acceleration, stop and go traffic conditions and rough roads. Poor vehicle conditions are also one contributing factor[36].

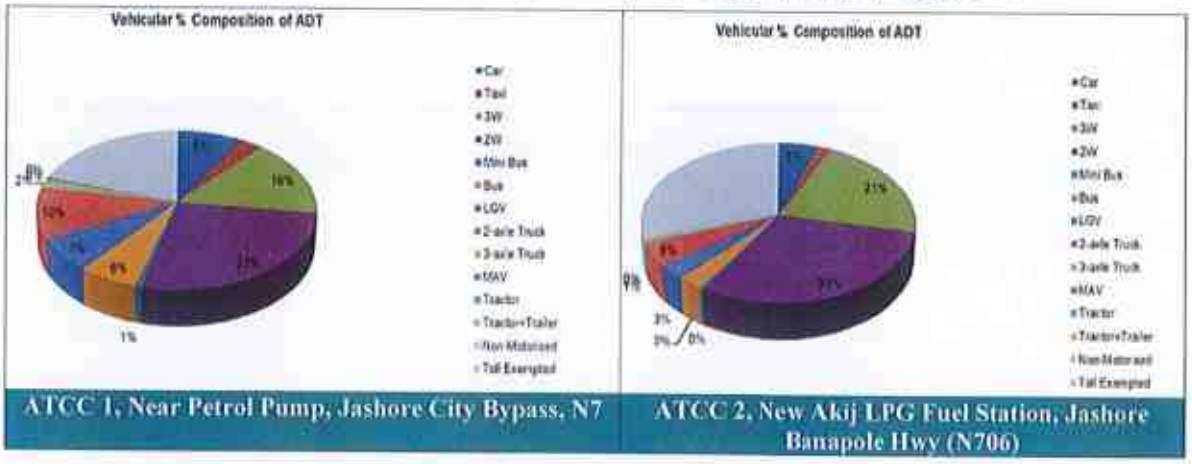
304. During operation stage, rise in noise level will likely arise due to increase in traffic. However, this development will provide a mode to decongest traffic and thereby will help to reduce impacts due to increased noise levels.

305. 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**.

Table 7-10: Average Percentage Composition of Traffic (%)

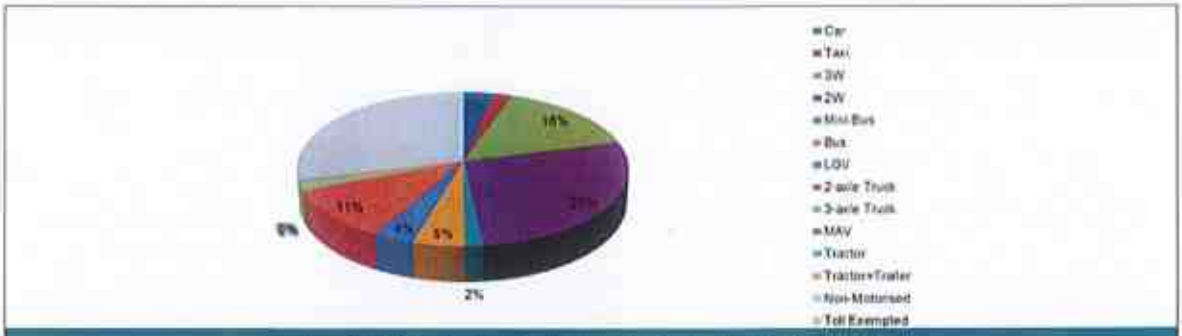
Survey Location	ATCC 1, Near Petrol Pump, Jashore City Bypass (N7)	ATCC 2, New Akij LPG Fuel Station, Jashore Banapole Hwy (N706)	ATCC 3, Saymon Fish Farm, Jashore City Bypass (N7)
Car / Utility	8	5	3
Utility/Microbus	3	2	2
3 wheeler (Passenger)	16	21	16
Mini Bus/Micro Bus	1	0	2
Large Bus	6	3	5
Small 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
Treactor	0	0	0
Tractor with Trailer	0	0	0
Total Exempted	0	0	0
Total	**100**	**100**	**100**

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



ATCC 1, Near Petrol Pump, Jashore City Bypass, N7 | ATCC 2, New Akij LPG Fuel Station, Jashore Banapole Hwy (N706)

[36] Roads and Environment a Handbook. The World Bank, 1997



ATCC 3, Saymon Fish Farm, Jashore City Bypass (N7)

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

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

Table 7-11: 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

308. The results of noise quality modelling for the Navaron intersection (Refer to Figure 7-2), which is 30km ahead of this on the Benapole side, has been used for the Chachra intersection to study the impacts due to the future traffic scenario.

309. It is observed that incremental noise levels near the edge of the road, i.e., 60m to 80m, are more than nighttime noise level standards of ECR 23. However, the incremental noise levels are reducing as the distance from the road edge increases. It can be visualized from the noise level maps which are presented in Figure 7 5 for daytime and nighttime for the year project year 2051-2052. To study the impacts, the highest incremental noise levels have been added to the baseline monitoring results

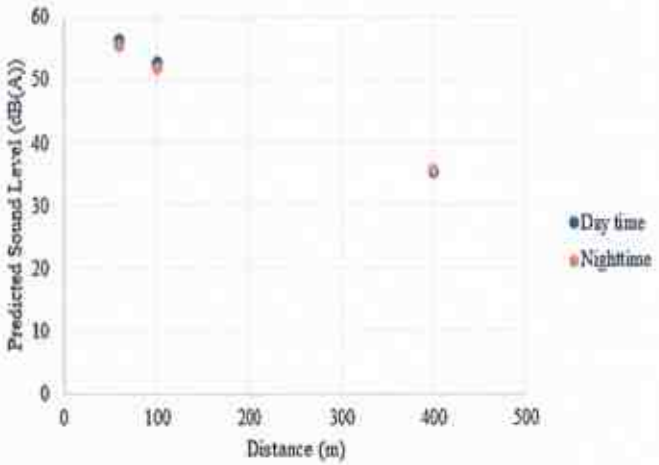


Figure 7-2: Incremental Noise Levels at Different Distances (m)

Table 7-12: Cumulative Noise Levels

Station	Baseline Noise Levels		Incremental noise Levels		Cumulative Noise Levels at a 60m distance from road		Remarks
	Daytime	Nighttime	Daytime	Nighttime	Daytime	Nighttime	
ANL2	58.5	45.1	56.4	55.4	61	55	Noise levels increase by 2dB(A) during the daytime. Nighttime impacts are more due to increased traffic. Noise barriers along the boundary shall be provided as per ESMP.
ANL5	61.9	46.4	56.4	55.4	62	56	

Mitigation Measures

- Vehicular noise and horn use need to be controlled through law enforcement and public awareness. Vehicles should 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 horn honking will be displayed in residential areas, sensitive locations, and silence zones. No honking signboards shall be placed near the sensitive receptors
- Noise barriers shall be installed along the corridor using tree plantation, especially along sensitive receptor sections such as schools, hospitals, etc.
- The noise level will be monitored regularly, as per the environmental monitoring plan suggested in Section ESMP of this report.

7.6.5 SOIL AND SEDIMENTS

- Any Spillages or Accidental Vehicles Shall be Removed Immediately.

7.6.6 ROAD SAFETY (ESS4)

- Road furniture as provided in the operation phase needs to be maintained properly
- Potholes or any other damages shall be rectified immediately after the post-monsoon season
- Highway Petrol/ Police deployment sufficient 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

7.7 CUMULATIVE IMPACT (ESS1)

310. 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.

311. There is currently no major ongoing project on the Chachra Intersection, and the cumulative impact of the project is likely to be during the 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 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.

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8 LABOR MANAGEMENT PROCEDURE

312. This Labor-Management Procedure (LMP) is 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 considered using nationally adopted health and safety norms. The project will require direct and contractual employees for civil and construction work. The LMP applies to all direct, contracted, and major supplier workers working on the project.

313. This section explains the labor-management approach for project aspects while considering national and international norms. The labor laws are governed by the Bangladesh Labour Act 2006, 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	Guidelines on Employment Policy, Manpower Registration, Organogram, Appointment Letters, Registers, Misconduct, Punishment, Bonuses, Provident Fund, Holiday, Safety, and Wages.
3.	Water Supply and Sewerage Authority Act 1996	The act calls for ensuring the public's access to a water supply and sewerage system, preserving the system, and providing other related health and environmental facilities for the community.
4.	Labor Relations Under Labor Laws, 1996 (revision to scattered Acts and Ordinances 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 regarding public health. In emergencies, it is vital to prevent disease spread, safeguard public health, and ensure adequate medical and essential services for communities and workers during construction.
6.	Bangladesh Factory Act, 1979	Workplace provisions require medical facilities, first aid, and emergency arrangements, as well as child care services for women workers.
7.	The Employees' State Insurance Act 1948	Health, injury, and sickness benefits 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 Right to Organize and Bargain Collectively;
	Convention 100 (1951)	Equal Pay for Equal Work for men and women
	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

314. 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 Socials Standard (ESS2) and Community Health and Safety (ESS4) is presented respectively.

8.1 SELECTION AND LAYOUT OF CONSTRUCTION CAMP

315. The selection of labor and construction camps for road construction depends on size, dimensions, and project length. The contractor will choose a location near the project area, considering available government land, barren land, riverbanks, and areas without environmental or social impacts. It's advisable to avoid lands that are socially or environmentally sensitive. A tentative layout for the construction camp specifies the temporary infrastructure. (**Figure 8-1**). Hot mixed plant, stockyard, stone crusher, batch plant, maintenance workshop, and laboratory will be positioned opposite the maximum yearly wind flow. Temporary infrastructure will be established and maintained after agreement with the land owner, along with original photographs site. The contractor will comply with the tentative layout properly. The selection criteria for construction camps are outlined below:

- **Land Selection:** Barren land, government-free land, *khas* land (GoB Land), char land, etc. Avoid agricultural land, private land, vegetation areas, public places, recreational areas, forests, and sensitive areas.
- **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.

316. When selecting or drawing the construction camps in a specific place, a few things should be considered to maximize productivity, reduce areas needed for temporary construction, and maximize utilization, such as safety, Site Accessibility, Security, Environmental Soundness, and Social risks. Economically Sustainable.

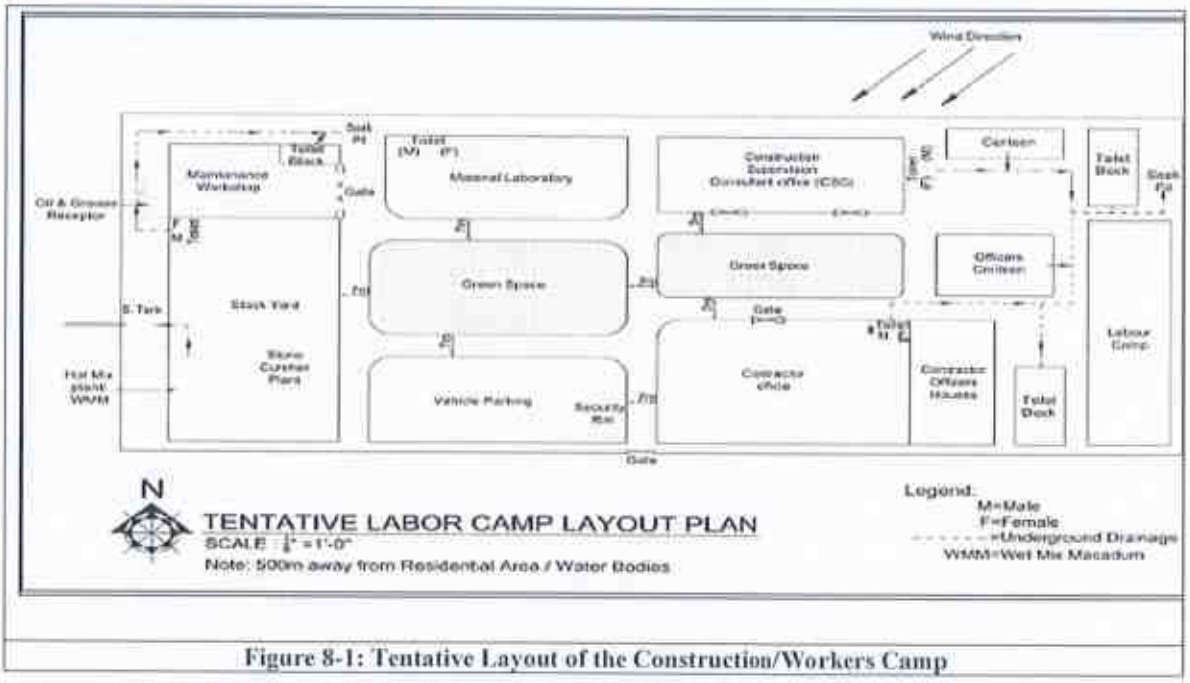

Figure 8-1: Tentative Layout of the Construction/Workers Camp

8.2 HIRING AND RECRUITMENT PROCEDURE

317. Hiring workers will depend on the project size and timeline. According to the WeCARE program, the contractor will recruit direct, contracted, primary supply, and migrant workers based on expertise needs. The process follows the Bangladesh Labor Act 2006, Labor Rules 2015, ILO Convention, and the World Bank's ESS2 and ESS4.

318. Project workers will receive clear information regarding their employment terms and conditions. This includes their rights under national labor law and documentation such as contracts including terms and conditions, code of conduct (CoC), probation details, wage adjustments, work hours, bonuses, overtime, compensation, Leaves including paternity leaves, and benefits, in line with ESS 2 and LMP. This

information will be provided at the start of employment and with any significant changes to terms. Procedures will follow the contractors' CoC, detailed in Annex 6-1.

319. The LMP applies to all project workers, regardless of whether they are full-time, part-time, temporary, seasonal, or migrant. Provisions prevent child labor and forced labor. The main procedures for hiring and recruiting workers are outlined below. A checklist for Contractor's/ Subcontractor's/Primary Supplier's Employees/Workers Profile is given in Annex 6.2. The investigation form is given in Annex 6.3. The employees' database is provided in Annex 6.4. The Contractor/Subcontractor/Supplier Management Audit Checklist and related forms are located in Annexes 6.5 through 6.9

- **Sexual Exploitation and Abuse (SEA)/Sexual Harassment (SH):** The project prohibits all types of SEA/SH and will take appropriate measures to promote a harmonious work environment and protect personnel from prohibited conduct through prevention and effective remedies. During recruitment, the HR Specialist must check candidates' references to ensure those with a history of prohibited conduct are not hired.
- **Non-Discrimination and Equal Opportunity:** Employees must be treated equally regarding gender, age, race, religion, disability, nationality, political beliefs, union membership, ethnic origin, and sexual orientation. Equality in employment means no direct or indirect discrimination for these reasons. The Project's equal opportunity policy ensures fairness in all aspects of employment, including hiring, training, evaluation, performance, compensation, benefits, and termination.
- **Compensation for Damage:** The law requires that an employee who damages equipment or the employer's assets pay compensation. The contractor can deduct the monthly salary to cover the loss. If an employee damages company equipment or assets, an investigation will be conducted.
- **Occupational Health and Safety:** The details are referred to in the ESMP of this report.

320. The contractor should adhere to the code of conduct or terms of reference for hiring or recruiting the project's workforce. Since the contractor will be employing different types of labor, it is prudent to define child and forced labor.

- **Child Labor:** In keeping with internationally recognized standards, the project will distinguish between child labor and young workers. The project strictly prohibits child labor under any circumstances. The employment of young workers, i.e., minors aged from 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.

8.3 FACILITIES AT WORKERS' CAMPS

321. According to national and international labor laws, the contractor will ensure that numerous facilities are provided in the labor camps to promote good practices in environmental and social norms. A list of facilities in the workers' camps includes, Lodging Facilities, Drinking-Water Supply, Sanitation and Waste Disposal, Fuel Use, Fire Prevention Facilities, Medical Services, Construction Safety Personnel Protection Equipment, Food Supply/Kitchen or Dining Facilities, Information Signs, Security, Offices:

8.4 RECORD KEEPING AND MAINTENANCE

322. The contractor and subcontractors will keep essential documents, including employee information, internal regulations, collective bargaining agreements (CBA), and various trade union records, such as labor conference minutes and activity logs. They will also maintain labor contracts, wage scales, pay slips, documents on occupational accidents, grievance records, training logs, and discipline records. Additionally, they will compile monthly, quarterly, and semi-annual self-audit reports on contractor and supplier performance, along with monthly performance reports of subcontractors and suppliers. Reports

regarding labor management, non-local worker utilization, and an annual labor compliance self-assessment will also be prepared quarterly and semi-annually.

323. Documents must be filed for five years or as stricter regulations require and securely stored for authorized personnel only. Records shall be available for inspection and audit by the contractor, project owner, or agents.

8.5 GRIEVANCE REDRESS MECHANISM

324. 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. 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 experts 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 response date 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 analyze the type of complaints, their levels, and the actions taken to reduce them. The PIU expert shall file all documentation related to complaints in a file in his office.

8.5.1 AVAILABILITY OF LABOUR MANAGEMENT PROCEDURES ON WEB

325. The details of LMP may be referred to in the detailed version, which is available on Labor-Management-Procedures-Western-Economic-Corridor-and-Regional-Enhancement-Program-P169880.pdf

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9 EMERGENCY RESPONSE PLAN AND DISASTER MANAGEMENT

9.1 INTRODUCTION

326. This Emergency Response Plan (ERP) follows the same procedures as the Jhenaidah-Jashore Road Section (Phase-1) for WECARE, since it is an improvement proposal of the junction as a variation to the Phase 1 study, because it is an endpoint of the Phase 1 road. Therefore, the ERP discussed in this chapter concisely outlines the procedures to be followed during the emergency. It provides guidelines for the Management Team and Site Construction Team to address any emergencies or crises related to company activities.

327. This ERP applies to all workers (including Direct/indirect or Supply Chain laborers, sub-contractors), employees, project staff, and visitors, including Construction Supervision Consultant (CSC) and RHD staff involved in the road construction site, camp location, or other contractors' facilities within the project boundary.

9.1.1 REGULATORY FRAMEWORKS AND SAFEGUARDS

328. The implementation of the ERP is governed by the national labor laws, including the Bangladesh Labour Act 2006 and the Bangladesh Labour Rules 2015.

9.2 POTENTIAL RISKS

329. This section presents potential risks during the construction phase. The emergency contact number, agency, equipment, training, etc., are presented in Annex 9-1 to Annex 9-5.

9.2.1 FALL FROM HEIGHT

330. Falls from height are one of the most serious risks at construction sites and can lead to severe injuries or fatalities. Per OSHA, if the workers are working at heights of 1.8m or above for general construction activities and 3m for scaffolding, they are required to use mandatory personal protective equipment such as safety belts, helmets, harnesses, Lanyards, etc., and the contractor must provide guard rails

9.2.2 FIRE

331. Fires at construction sites and camps can be caused by various factors, often due to flammable materials, electrical hazards, and human error. Electrical hazards include damaged wiring, overloaded circuits, and improper electrical installations, leading to sparks and fires. Other activities include welding, cutting, grinding, or careless smoking near the prohibited areas where the fuels and chemicals are stored. The following measures are suggested to prevent untoward incidents at sites/camps.

- Placing warning signs or information about flammable material.
- The authorized person shall only be allowed to enter the prohibited areas.
- In any fire, the person who notices it shall activate the nearest fire alarm or inform their line managers to pass the information to the Hazard Safety Environment (HSE) officer.
- Apart from the trained firefighters, no other personnel will be allowed at the place of the incident. The firefighters must ensure that they wear essential PPE such as the safety suit, safety helmet, and self-contained 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 the safety of the firefighters to the extent possible.
- The small fires will be extinguished by using an appropriate fire extinguisher (based on the class of the fire);
- The fire hydrant system and on-site fire tenders will extinguish the big fires. Rescue, attend to the injured personnel, and call the medical emergency number, if required.
- Provide fire and life safety training for all workers and project personnel at site.

332. The fire extinguishers to be used based on the types of fire have been enumerated in **Table 9-2**.

Table 9-1: Types of Fire Extinguisher

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

9.2.3 FUEL AND CHEMICAL SPILLAGE

333. In the event of a large chemical spill:

- Immediately notify the designated official, such as the construction Area Supervisor and SERT.
- The SERT member must wear adequate PPE before starting the spill management procedure.
- Secure the area and alert other personnel. If needed, start an evacuation process.
- No person will be allowed to be involved in a spill containing activity unless they are trained to do so;
- Contain the spill using equipment (e.g., pads, booms, absorbent powder). For acid spills, spray diluted sodium carbonate and water. For caustic spills, use diluted citric acid and water. For oil spills, stop the flow, close the storage tank valve, or isolate the pipeline. Collect the spilled chemical with a spill kit.;
- Do not allow spilled chemicals to flow into the stormwater drain. Dispose of the contaminated material at the identified locations or consult with the DOE.
- Attend to the injured personnel and call the medical emergency number, if required;

9.2.4 LEAKAGE OF GAS

334. Gas leakage at road construction sites could be hazardous, posing fire, explosion, and health risks due to asphyxiation, burns, etc. The following procedure will be followed in case of a gas:

- Anyone smelling gas or identifying a leak must inform the construction Area Supervisor or HSE
- The emergency preparedness plan shall be followed as per the direction of HSE or SERT, considering the level of emergency at the site.

9.2.5 MEDICAL EMERGENCY

335. The following measures shall be taken in case of any medical emergency:

- **Immediate Actions**: If someone **cannot walk**, call emergency services, inform the **Construction Manager**, and provide key details (nature, location, and victim identity).
- **Trained Assistance**: Call **Cardiopulmonary Resuscitation (CPR) and First Aid personnel** to assist before medical help arrives. Use **PPE** if dealing with hazardous material exposure.
- **Burns Treatment**: Cool first—and second-degree burns with water (15–20 mins), avoid chemicals like toothpaste, and do not wear synthetic clothing. Do not use water for water-reactive chemicals.
- **Electrocution Response**: De-energize the source before assisting. Avoid touching the victim until it is safe. Conduct a physical assessment, check for fractures or neurological issues, and provide **respiratory support** if needed. **CPR should be performed only by trained personnel.**
- **Hospital Transfer**: Based on injury severity, ensure **priority transport** to the nearest hospital.

9.2.6 TERRORIST ATTACK OR BOMB THREAT

336. **For a terrorist attack and a bomb threat**: Call emergency services immediately and inform the IC and HSE.

337. **Strengthen site security: To** restrict access, and instruct personnel to avoid interaction with suspicious individuals or objects.

338. **Follow evacuation protocols:** Based on the location of the threat.

9.2.6.1 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 personnel to isolate the agitated workers.
- In case the local community causes agitation, security will close all the camp's entry gates and cordon the construction site until the local administration arrives.

9.2.6.2 Malicious Act Such as Theft and Vandalism

- If there is any information about worker misconduct or vandalism, the responsible individuals will be identified, and site security, area supervisors, HSE, and contractor agencies will be informed. A **show-cause notice** will be issued, followed by a formal hearing.
- Emergency services must be contacted if someone is suspected of carrying a weapon, and the **Incident Controller (IC)**, HSE, and Security personnel must be notified. Security will attempt to **disarm the suspect** if feasible, but no one should engage the individual directly.
- In case of **worker conflicts or physical altercations**, the **IC will activate emergency protocols**, deploying **SERT** and security to contain the situation, seal off affected areas, and document the incident. If the issue escalates, law enforcement will be involved, and the responsible individuals may be handed over to authorities.

9.2.7 EARTHQUAKE

339. Earthquakes strike without warning, making preparedness and quick response essential to minimize risks and protect lives. During an Earthquake event

- Stay calm and await instructions from the Emergency Coordinator or designated official.
- Keep away from overhead fixtures, windows, and electrical power.
- Assist individuals with disabilities.
- Protect your head.
- Evacuate as instructed by the Emergency Coordinator or official.
- After the Earthquake Event:
- Inspect structures like buildings and storage tanks for cracks. Identify critical areas and organize support to prevent collapse.
- Isolate the electrical supply if needed.
- Empty unstable tanks.
- Check hazardous chemicals storage for safety compliance. Inspect and restore secondary containment as needed.
- Inspect firefighting equipment on site.
- Check the electrical panel and ignition sources for faults.
- Store flammable liquids like petrol and diesel under secondary containment with precautions.

340. After such inspection, notify the top management about the damage that has been identified.

9.2.8 FLOODS

341. In case of any flood, the incident flood alert communication procedure will be initiated as discussed below:

- Regular interaction with the Bangladesh Inland Water Transport Authority (BIWAT) and BMD
- **Red Alert** will be triggered when the floodwater level rises within 1 foot of the working site level.
- Providing adequate notice for evacuation before flooding, particularly for those working near rivers, bridges, or culverts.
- Initiate protection of raw materials, finished goods, critical equipment, records, and electronic equipment.
- Take everyday actions for building evacuation and proceed to a safe location;
- **Orange Alert:** This will be triggered when the floodwater level rises within 2 feet of the 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 from wading through flood waters of any depth;

- Do NOT try to leave the building in a car. If anyone needs to evacuate, he/ she must wear life jackets or similar flotation devices.

9.2.9 CYCLONE

342. Cyclones can pose serious risks to construction sites, including structural damage, flooding, and worker safety hazards. The following prevention measures are suggested:

- Installation of weather monitoring regular follow-up with Bangladesh Meteorological Department
- Once a cyclone alert has been issued
- Stay calm and await instructions from the Emergency Controller or the designated official
- Continue to monitor local weather stations and radio stations for instructions.
- Stay away from the riverside.
- 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 poles, scaffolding, cable trays, etc.
- After the cyclone
- Inform the Emergency Management Team to investigate the property loss for further action.
- Immediately notify the SERT of any missing personnel

9.3 EMERGENCY PREPAREDNESS AND DISASTER MANAGEMENT

9.3.1 EMERGENCY CLASSIFICATION

343. The project will differentiate the types of on-site emergency scenarios based on the magnitude and severity of the emergencies considered in the earlier section. The site has categorized three broad levels of emergency scenarios, namely:

- **Level 1:** The emergency is contained in the occurrence area and can be managed effectively with emergency equipment and resources; SERT will be active during this time.
- **Level 2:** The emergency has spread to a small area but can be managed with on-site equipment and resources. Head office management will be involved in this level 2 emergency. .
- **Level 3:** This is an emergency or an incident which:
- Cannot be safely managed at the location with the available resources and equipment.
- Additional support is needed as it can have catastrophic effects beyond the site boundary.
- This incident level will likely impact nearby populations, industries, property, and environmental boundaries.
- Managing this emergency requires support from the country and district administrations.
- The external agency will be involved during this level 3 emergency. As shown in Annex 7 for team information (Annex 7.1-Annex7.5).

9.3.2 LEVEL OF PRIORITY

344. 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:

- First-Priority: People
- Second Priority: Environment
- Third Priority: Assets
- Fourth Priority: Contractual and/or commercial arrangements
- Fifth Priority: Project and Partner Reputation

345. The Incident Commander (IC) and Site Emergency Controller (SEC) will decide upon the level of emergency and deployment of external emergency responders during the 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.

9.4 EMERGENCY NOTIFICATION AND EVACUATION PROCESS

9.4.1 NOTIFICATION

346. The HSE must be informed of any incidents on site immediately. He will tell the Project Manager (Incident Controller during the emergency), who will notify the Project Director of RHD within 12 hours of any incident with actual or potential significant off-site impacts on people or the environment. . The Project Director may require additional measures to address the cause or impact of any incident reported under this condition. Annex 9-1 and Annex 9-3 provide the emergency contact numbers. Bers.

9.4.2 EVACUATION PROCESS

347. If any emergency requires evacuation, the flow chart to be followed at the site is suggested in **Figure 9-3**

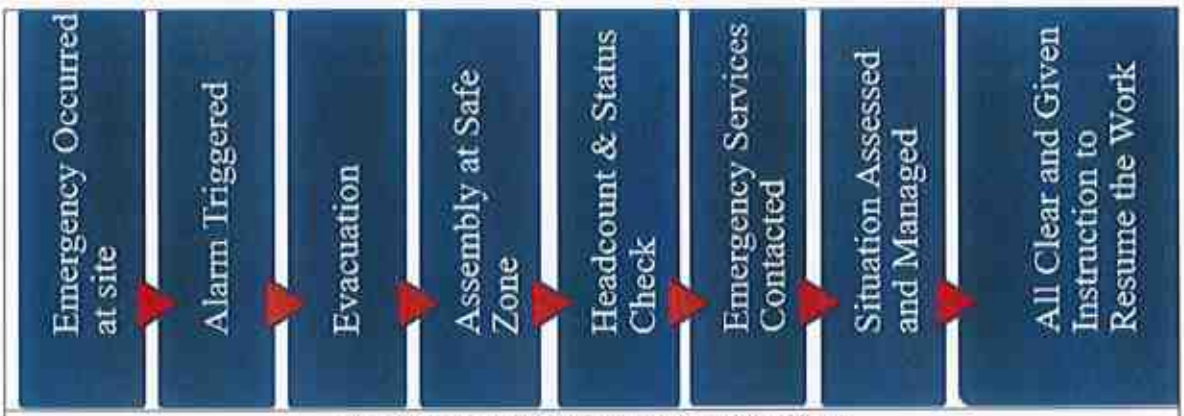

Figure 9-1: Evacuation Process Flow Chart

9.4.3 PUBLIC COMMUNICATION DURING AN EMERGENCY

348. Public communication plays a crucial role in managing emergencies at construction sites, ensuring swift response and safety. Key measures include:

- **Road access control** – Blocking nearby roads for emergency vehicles prevents congestion and facilitates rapid intervention.
- **Community alerts** – Using microphones to announce evacuation procedures keeps nearby residents informed if the situation worsens.
- **Government coordination** – Working with fire services, civil defense, and police ensures order and compliance with emergency protocols.

9.4.4 ASSEMBLY POINTS

349. The assembly points shall be predetermined and accommodate about 300 persons. The assembly point should be identified with suitable signage, which is presented in **Figure 9-4.**

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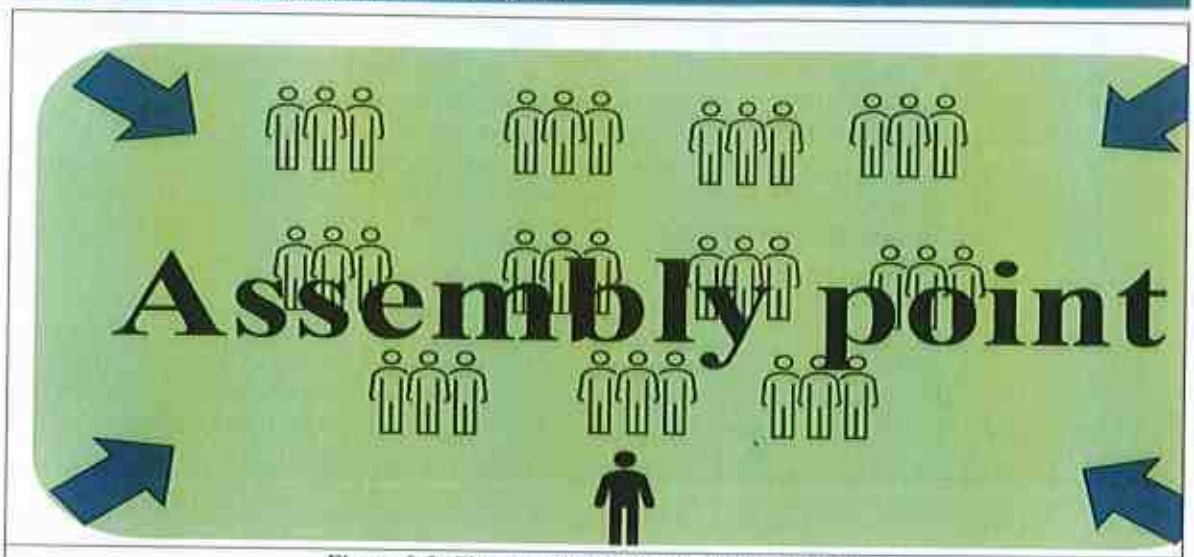

Figure 9-2: Signage of Emergency Assembly Point

9.5 EMERGENCY RESPONSE EQUIPMENT

350. The following emergency response equipment shall be readily available, 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)
- Self-contained breathing apparatus.
- Safety helmet, safety goggles, safety vest. Fire retardant suits
- Medical Aids, First Aid Box, Ambulance.
- Spill Control kit.

351. Annex 9-4 lists the emergency equipment, which shall be regularly checked and validated.

9.6 EMERGENCY RESPONSE TRAINING

352. Emergency response training aims to build project employees' capacity and improve preparedness and response before, during, and after emergencies. It focuses on enhancing participants' technical skills and personnel and team management, coordinating emergency response, and increasing management tools and equipment availability.

353. Per the relevant provision of the Bangladesh Labour Act, 2006 and Bangladesh Labour Rules, 2015, at least 18% of the workers employed shall be trained on the following emergency response aspects:

- Firefighting.
- Emergency rescue operation.
- First aid and Portable fire-fighting equipment usage.

9.7 DISASTER MANAGEMENT PLAN

354. The disaster management plan (DMP) outlines preventive measures, emergency response protocols, and long-term recovery strategies to enhance resilience.

9.7.1 EMERGENCY RESPONSE TEAM

355. It is proposed that the Site Emergency Response Team (SERT) will be formed at the site, a dedicated group that will include the incident manager, construction manager, safety advisor (HSE officer), site engineers, and a trained workers team. This team will manage emergencies at the workplace and the construction site, and a trained team of workers will be in full action during an on-site emergency incident. The role of the SERT is to:

- Provide immediate response and assess the emergency level.

- Make the initial notifications.
- Secure and contain the site.
- Coordinate with the HSE and off-site emergency response personnel.
- Respond to distress calls and assist in rescue and evacuation.
- Administer first aid and, if necessary, arrange medical evacuation and backup.;
- Keep an accurate log of all treatments given and times; and
- Maintain the response until the situation is resolved.

9.7.2 INCIDENT CONTROLLER – PROJECT MANAGER

356. The Incident Controller, who also serves as the Project Manager, is primarily responsible for ensuring project safety and overseeing the Contractor's safety efforts during emergencies. His role is crucial in managing and directing safety protocols, providing swift and effective responses to emergencies.

9.7.3 PUBLIC RELATIONS SPOKESPERSON -DEPUTY PROJECT MANAGER

357. The deputy project manager will be the spokesperson and control the media, personnel, and resources. During the emergency, his responsibilities include supporting and advising the Site Emergency Response Team (SERT) as necessary.

9.7.4 SAFETY ADVISOR- HEALTH, SAFETY, AND ENVIRONMENT OFFICER

358. The Health, Safety, and Environmental (HSE) Specialist will collaborate with the Project Manager and serve as the Safety Advisor during emergencies. His primary role is establishing, overseeing, and ensuring the effective implementation of the Health and Safety Management Plan, fostering a safe and compliant work environment. Key Responsibilities include:

- **Emergency Site Leadership**: Directing and managing health and safety efforts at the incident site during emergencies.
- **Employee Training & Preparedness**: Organizing and mobilizing training programs to equip personnel with essential safety and emergency response skills
- **Safety Initiatives & Compliance**: Implement proactive safety strategies and ensure adherence to occupational health regulations.
- **Safety Management Plan Oversight**: Compiling, reviewing, and continuously improving the **Safety Management Plan** to enhance workplace safety standards.
- **Reporting & Inspections**: Preparing detailed monthly safety reports and conducting routine inspections to maintain compliance and risk management.
- **Incident Investigation & Resolution**: Investigating health and safety incidents, identifying root causes, and implementing corrective measures to prevent recurrence.

9.7.5 CONSTRUCTIONS MANAGER

- To provide support to IC and SERT;
- To manage and assign additional resources to support the construction team.
- Designate site engineers to coordinate SERT.

9.7.5.1 Trained Workers Team

359. The trained workers shall be divided into firefighting, rescue, and first aid teams (6% members in each team), and records related to these shall be preserved following Form 22 (Annex 9-5) of the previously mentioned Rules. The members of the firefighting team, rescue team, and first aid team shall wear the prescribed uniform, which the contractor will provide. The uniform code is as follows:

- Firefighting team: yellow apron with 'FIRE' printed in red on the back.
- Rescue team: yellow apron with 'RESCUE' printed in red on the back.
- First aid team: white apron with 'FIRST AID' printed in red on the back.

9.7.5.2 Security Coordinator

360. This role involves ensuring the safety of onsite personnel by monitoring risks, adapting procedures to evolving situations, controlling access, and providing regular security briefings. These measures help maintain efficiency, prevent unauthorized movement, and foster a culture of awareness and preparedness.

9.7.5.3 Logistics Coordinator

361. The logistics coordinator will manage material requests, follow SERT's advice on logistical challenges, plan transportation needs, and arrange domestic requirements such as food and refreshments. These responsibilities ensure smooth operations, efficient resource allocation, and seamless coordination during emergencies or routine situations activities.

9.8 EMERGENCY DRILLS/EXERCISES

362. Fire and emergency evacuation drills shall be arranged at least once every six months, and records of such drills shall be maintained in Form 22 in Annex 9-5. In addition, the concerned Inspector and nearby Fire Service Station shall be informed at least 15 days before such drills are held.

9.9 EMERGENCY COMMUNICATION

363. Clear communication is essential during an emergency. Multiple methods are necessary, as one method may not adequately inform site personnel and off-site agencies on time. The Site has provided emergency and warning signage at key locations to alert personnel the:

- Potential hazards and risks of their operation and activities;
- Pertinent risks present in a particular area;
- Emergency escape route.

9.10 AUDIT AND EMERGENCY RESPONSE PLAN REVIEW

364. IC will annually review this Plan with the other HSE and ERT members. In addition, IC will also be involved in monitoring the following performance indicators to assess the effective implementation of the procedure:

9.10.1 EMERGENCY DRILL RECORDS; AND TRAINING RECORDS.

Audit: A periodic audit will assess the integrity of the emergency management system. HSE, in consultation with IC (Project Manager), will resolve audit issues and implement corrective action

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10 ENVIRONMENT AND SOCIAL MANAGEMENT PLAN

365. 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.

366. 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.

367. 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 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

368. 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 phases of the project:

- Design/pre-construction phase
- Construction phase
- Operation phase

369. **Design/Preconstruction Phase 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 NGO engagement to support RHD in implementing 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.

370. **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).

371. Several other environmental issues have been addressed as part of good engineering practices, 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.

372. Therefore, these mitigation measures shall be included in the contract document of the contractor for implementation by the contractor and for the project's sustainable development.

373. 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 approvals/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.

374. **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**.

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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
A						
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) 2020, 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 (Revised2005); Bangladesh National Building Code; Road Master Plan; National Road Design Standard and Manual
A-2	Land Acquisition and clearance of Private lands and GOB lands 33.3152 acres. • Affected HHs=274; Total population =1205, male are 636 females are 569; • Affected Residential HHs: 50 including 46 titled and 4 non-titled HHs; • Affected Commercial HHs 172, including 62 titled HHs, 108 non-titled HHs, 2 encroachers' HHs; • Affected HHs losing Residential-cum-Commercial Premises and/or Business: 53 HHs including 49 titled HHs, 1 non-	▶ Approximately 33.3152 acres of land are to be acquired for the proposed development of the Chachra intersection. ▶ Provisions for compensation for squatters and encroachers have been made in RAP. ▶ Payment of CCL by the DC to compensate for the impact due to loss of land as per RAP. ▶ The livelihood of affected persons will be affected by 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 included in LRP. ▶ Special support for the disadvantaged/ marginalized groups is kept in RAP	**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

Table 10-2: Environmental and Social Management Plan

Sl. No	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
	titled HH, and 3 encroachers' HHs • Affected CPR = 5 (five), including 4 (four) CPRs in the Chachra mouza and 1 (one) CPR in Mondolgati mouza • Affected Government and Other Entities =6					
A-3	Issues from stakeholder Consultations	▶ Issues raised during the stakeholders' engagement meetings/FGD/KII were examined in Chapter 6, and mitigation measures are suggested in the standalone RAP for this project.	NGO/RHD	PIU	Pre-Construction Phase	ESS 10
A-4	Tree-cutting: about 952 private tree and 255 avenue trees within Roy of the RHD will be affected Loss of Trees: • Loss of mature tree species • Loss of common species such as Rain tree, Mahogony, 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	▶ For private trees, the DC will compensate titleholders, and RHD will disburse money to non-titleholders as per the RAP. Furthermore, 10-12 saplings will be provided to each affected HH as resettlement benefit of the project. ▶ Tree replantation of 900 trees and shrub will be undertaken during the construction phase in place of an avenue of tree removal as 1:3.5 ratio of the trees that would cut. ▶ It is proposed that about 900 trees are to be planted under the project, since 255 avenue trees of comm 3on species will be cut dwon. It is considered that 300 out of 900 trees can be planted as enhancement measures of Rajbari temple and Graveyards located within 1500m of the proposed project. The rest of trees will be replanted on bothsides of new developed project road. ▶ Necessary permission from the agency concerned should be obtained before cutting the trees.	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

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	▶ Identified/marked trees shall be removed ▶ No trees will be cut beyond the toe lines. ▶ The cutting of trees during the bird breeding season should be avoided to prevent the destruction of birds' nests, resting and feeding site, as well as the abandonment of young birds, This sensitive period is often from early spring to late summer, when birds are actively nesting, laying eggs, and raising young. ▶ Contractor shall prepare the Tree Removal schedule during the preconstruction phase based on site-specific conditions and outside of the breeding season. If that's not possible, pre-construction surveys are essential to identify active nests. ▶ Shrub Plantation and grass carpeting in embankment slopes, including maintenance of trees. ▶ Necessary tree guards should be provided to protect saplings. ▶ The same contractor will carry out the maintenance of trees 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. ▶ 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 carbon sequestration ▶ The contractor shall take reasonable precautions to prevent his workmen or any				

Table 10-2: Environmental and Social Management Plan

Sl. No	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		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 immediately, the work shall be stopped. The name of the species, etc., needs 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. If any electrical or other types of saws are used, necessary safety measures must be taken to prevent accidents. ▶ The trees should be cut down in such a way so that the pavement, nearby structures, utility lines, road furniture, etc., are not damaged by fallen branches/logs. Local electric lines may be disconnected for a short period with prior intimation to the local authority/people if needed. ▶ Tree-cutting must be coordinated with the local authority and Police to control traffic and ensure Community Health and Safety (CHS). ▶ Pits/holes created due to the removal of trees must be filled up to avoid accidents. ▶ Logs/chopped trees are to be kept away from the shoulder and roadside so that they don't hinder the smooth traffic flow.				

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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
		▶ 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 261 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 • 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	▶ 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 responsible agencies like – WGPDCL, 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	Jashore Palli Biddut Samity (JPBS), West Zone Power Distribution Company Limited (WZPDCL), 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
	• 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 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	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 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	▶ Air, noise, soil, and water have been monitored at different locations along the Chachra's alignment. This is presented in Chapter 4, which will serve as a benchmark for monitoring during the 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 ▶ Compliance with International highway for curvature and grading and safety curve at all at	**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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Table 10-2: Environmental and Social Management Plan

Sl. No	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		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 the EPC contractor will further review; ▶ Community awareness training on road safety, particularly for children, must be considered, such as the use of FOB and POP.				
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 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 contractors	▶ Orientation program for the contractor to 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	**Contractor**	**PIU**	**Pre-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
		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., 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 SHE/SE free environment at the construction site or the 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	▶ The hot mix plant shall be installed on the downwind side, 500 m from the residential area. ▶ Batching plants/WMM shall be installed 500m from the residential area on the downwind side. ▶ These plants shall be 500m from the water bodies or rivers/canals. ▶ No batching pant /labor camp/construction camps shall be allowed to be established on the banks of the river/canal. ▶ Drainage and a sump, which shall be cleaned	Contractor	**CSC/ PIU**	Construction Phase before installing the plants	ECR 2023; Environmental Courts Act 2000; 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
		regularly, shall be provided to prevent water logging in the batching plant. ▶ Hot mix plants shall be fitted with pollution control devices, Bag filters, etc. ▶ The stack height shall be at least 10m above 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 land 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 ▶ 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.	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
		▶ Mobile toilets or toilets with septic tanks shall be provided. ▶ Either a canteen facility or cooking gas should 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. ▶ Shaded area for workers' breaks/meals should be considered at the construction sites. ▶ Water logging shall not be allowed at construction camps/batching plants/WMM plants, etc. ▶ Contractor shall display company policy 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. ▶ The Code of Conduct (COC), along with other terms and conditions of employment, shall be provided to the workers in clear and vernacular language. ▶ The LMP should be followed, as shown in Annex 6, Volume 2.				
B-3	**Potable water**	▶ The contractor shall provide potable water that meets the World Health Standards (WHO) in the construction camps, labor camps, and 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	Contractor	**CSC/PIU**	Construction phase (entire period)	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015; and Occupational Health and

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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
		facilities. ► The mobile toilet shall be provided at construction camps/labor camps of adequate capacity. ► If mobile toilets are provided, they shall be periodically replenished with fresh water for ablution purposes. 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.				Safety Policies 2013
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. ► 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 scarified material will be reused in the sub-base preparation. The rest of the material will be disposed of to the approved landfill in consultation with the Zila Parishad, etc. Contractors shall store the usable material properly on impervious platform to prevent mixing with the earth. ► The contractor shall prepare a waste management plan	Contractor	CSC/PIU	Construction phase (entire period)	Bangladesh Solid Waste Management Rules 2021

Table 10-2: Environmental and Social Management Plan

Sl. No	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		▶ 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. ▶ Contractor shall maintain a register for record-keeping of waste generated by type, amount, transportation, and final disposal site approved by RHD.				
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 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. ▶ The authorized/ approved vendors shall dispose of it per the DOE norms. ▶ Tires shall be stored properly under the shed and disposed of by approved vendors. ▶ Hazardous materials from vehicle tanks to storage shall be transferred in areas with surfaces that are impervious to avoid environmental loss and sloped to a collection or containment structure. This shall not be connected to the municipal	**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
		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 ▶ 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 hazardous material operations shall be prepared. ▶ The contractor shall prepare a hazardous waste management plan.				
B-7	Water Resources and Water Quality	▶ Water quality was monitored during the baseline survey. ▶ Contractors shall undertake water quality monitoring as per the environmental monitoring program. ▶ Contractors shall ensure that construction materials like earth, stone, and ash do not block water flow. ▶ If a water body is lost, DC/PIU will provide proper compensation with assistance from an NGO. ▶ Workers should 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	**Contractor**	**CSC/PIU**	**Construction Phase**	National Water Policy 1999; Water Reservoir Conservation Act 2000; The Water Act, 2013; Environment Conservation Rules 2023

Table 10-2: Environmental and Social Management Plan

Sl. No	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		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**	► The contractor shall use borrow areas only identified and approved. ► Borrowing of earth from cultivable land shall not be preferred. ► If there are no other options and a compulsion to choose cultivable land, then depth shall be restricted to 45cm. ► 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	**Contractor**	**CSC/PIU**	Construction Phase	National Land Use Policy, 2001

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Sl. No	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		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 dust-free by sprinkling water. ▶ The borrow areas shall be 500m from the toe line of the road. ▶ To reduce the earth requirement, about 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 the road within the acquired land, or	**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
		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 m^3 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 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	Contractor	CSC/PIU	Construction Phase	

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Sl. No	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		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 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 2023; Environmental Courts Act 2000; Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015; and Occupational Health and Safety Policies 2013
B-14	Movement of construction vehicles (Air Pollution)	▶ Water sprinkling using sprays shall be done on the un-metallic haul roads. ▶ Water sprinkling shall also be carried out on	**Contractor**	**CSC/PIU**	Construction Phase	Environmental Conservation Act 1995; Environment

Table 10-2: Environmental and Social Management Plan

Sl. No	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		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.				Conservation Rules 2023; 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. ▶ 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.	**Contractor**	**CSC/PIU**	Construction Phase	ECA 2023 /ECR 1997; and Noise Pollution Control Rules 2006

Table 10-2: Environmental and Social Management Plan

Sl. No	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		▶ 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.				
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	**Contractor**	**CSC/PIU**	Construction Phase	National Environmental Policy 1992; National Environmental Management Action Plan 1995; ECA 1995; ECR 2023; Bangladesh Wildlife (Conservation & Security) Act, 2012; National Fisheries Policy, 1998; Protection and Conservation of Fish Act 1950

Table 10-2: Environmental and Social Management Plan

Sl. No	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		discharge into the water bodies. ▶ Construction camps/labor camps, etc., shall have a proper drainage system. ▶ To prevent the direct loss of birds' nests, resting and feeding, as well as the abandonment of young birds, the cutting of trees during the bird breeding season should be avoided. ▶ Contractor shall prepare the Tree Removal schedule during the construction phase based on site-specific conditions and outside of the breeding season. If that's not possible, pre-construction surveys are essential to identify active nests.				
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 2023; 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 labor grievance redressal mechanism (GRM) developed by the PIU and run with assistance from the contractor.	**Contractor**	**CSC/PIU**	Construction Phase	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015; and Occupational Health and Safety Policies 2013

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Sl. No	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		▶ 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 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.	**Contractor**	**CSC/PIU**	Construction Phase while recruiting the labor	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015
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.	**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
		▶ 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 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 government licensing or certification and be provided with proper training. ▶ During the operation of construction				

Table 10-2: Environmental and Social Management Plan

Sl. No	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		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 approved by the CSC, to address the issue at the site.	**Contractor**	**CSC/PIU**	Construction Phase	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015
B-22	HIV and STD32F[37]	▶ Awareness campaigns on HIV/AIDS/STD ▶ HIV/STD voluntary counseling, testing, and treatment. ▶ Ensuring that construction workers have access to condoms ▶ Provision of vending machines at the identified location ▶ Monitoring of outcomes in collaboration with National HIV/AIDS Authorities	**Contractor**	**CSC/PIU**	Construction Phase	Occupational Health and Safety Policies 2013

[37] FIDIC | HIV-AIDS in the Construction Sector | International Federation of Consulting Engineers

Table 10-2: Environmental and Social Management Plan

Sl. No	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
B-23	Labor Management	▶ The contractor shall follow national legislation. ▶ The contractor shall follow the conditions stipulated in the labor-management procedures regarding labor management, workplace safety and health, and protection. ▶ Pooled transportation facilities, as may be required, shall be provided by the contractor. ▶ Contractors' company policies on the prohibition of Child Labor shall be displayed at the construction camps, labor camps, contractors' offices, etc. ▶ All basic facilities shall be provided within the labor camp, such as water supply, cooking gas, sanitation facilities, and a mobile toilet (of adequate capacity for men and women separately). ▶ Creech 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.	**Contractor**	**CSC/PIU**	Construction Phase	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015
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. ▶ Contractors shall plan the activities to prevent any untoward accidents at the site. ▶ Induction training for the workers and subsequent training on safety aspects.	**Contractor**	**CSC/PIU**	**Construction phase**	Occupational Health and Safety Policies 2013

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Sl. No	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		▶ 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. ▶ The Contractor shall establish safe work zones to separate workers on foot from traffic and equipment, following the Traffic Signs Manual[38] . The basic signs include *Road Works Sign, Road Narrow Sign, Keep left* or *Keep Right*, place a line of *Traffic Cones to* guide the pedestrian, using STOP/GO boards. The Sign plates size should be standard diameters according to Traffic Signs Manual. ▶ 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 insulation, 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. ▶ The contractor shall ensure that medical staff have first aid facilities and that ambulance services are always available at the site, in				

[38] Traffic signs Manual , Volume 1, Appendices, Bangladesh Road Transport Authority, Ministry of Communication

Table 10-2: Environmental and Social Management Plan

Sl. No	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		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 ▶ The workers and flagmen shall use lifesaving jackets. ▶ Workers working in noisy areas shall be provided earmuffs. ▶ Fall prevention and protection measures shall be implemented for workers 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 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 in construction camps/labor rooms and confined workspaces. ▶ Construction/labor camps must receive natural light and be supplemented with sufficient artificial illumination.				

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		▶ Emergency lighting arrangements for proper illumination shall be installed at identified locations. ▶ Sufficient lighting arrangements shall be provided in toilets with doors and locks. ▶ Eating areas such as canteen must be cleaned, and kitchen, toilet/ human waste must be segregated at source and collected separately 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 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.				

Table 10-2: Environmental and Social Management Plan

Sl. No	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		▶ Contractor shall prepare site specific LMP and ERP to be implement as shown in Annex 6 and Annex 8, Volume 2.				
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 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	PIU/ Contractor/ CSC	PIU	Construction Phase	Bangladesh Labor Act 2006; Bangladesh Labor Rules 2015, SEA-SH

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Sl. No	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		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) should be established at the site to address the issues immediately. ► Provision of separate, safe, and easily accessible facilities (e.g., toilets, sleeping areas) for male and female users, which can be locked from the inside33F[39] ; ► 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. ► Contractor shall prepare Gender Based Violence Prevention Plan to be implemented during construction phase (Ref. Annex-5) ► Ensure the Compliane with Workplace harassment laws under Bangladesh Labor Act 2006, Bangladesh Labor Rules 2015, and High				

[39] 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
		Court Verdict 200 at project site 9. Under Bangladesh Labour Rules 2015 (Amended 2022), specifically Rule 361 KA (2), workplaces are mandated to establish a five-member Complaint Committee for sexual harassment cases, which must have a majority of women members and a woman as its head. This committee will responsible for receiving complaints, conducting investigations, and making recommendations for addressing sexual harassment within the workplace, following the High Court's landmark guidelines on the subject.				
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 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 ▶ The 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.	**Contractor/ CSC**	**PIU**	**Construction Phase**	
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	**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 activities in congested urban areas. ▪ Arrangement of Signaling system and warning Signs system ▪ Traffic routes for construction vehicles/equipment ▪ Construction vehicles/equipment speed limits ▪ 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 ▪ Precautions 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. ► .The Contractor shall establish work zones to separate workers on foot from traffic and equipment, following the Traffic Signs Manual[40] . The basic signs include *Road Works Sign, Road Narrow Sign, Keep left* or *Keep Right*, place a line of *Traffic Cones to* guide the pedestrian, using STOP/GO boards. The Sign plates size should be standard diameters according to Traffic Signs Manual.				
B-28	Archaeology and cultural heritage management	► Contractors shall ensure that all archaeological and cultural heritage sites are protected from construction activities.	**Contractor**	CSC	**Construction Phase**	The Antiques Law of 1968; Environment Conservation Rules 2023

[40] Traffic signs Manual , Volume 1, Appendices, Bangladesh Road Transport Authority, Ministry of Communication

Table 10-2: Environmental and Social Management Plan

Sl. No	Impact/ Issues	Mitigation/ Enhancement Measures	Implementation Agency	Supervision Agency	Timelines	Remarks
		▶ 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 the project authorities. ▶ The 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 2023**
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 2023; 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 undertaken.	Monitoring agency	**Khulna Zone**	**Operational Phase**	National Water Policy 1999; Water Reservoir Conservation Act 2000; The Water Act 2013
C-5	Air Quality	▶ Air Monitoring as suggested in the Environmental Monitoring Plan shall be undertaken.	Monitoring agency	**Khulna Zone**	**Operational Phase**	ECA 1995; ECR 2023; and Bangladesh National Ambient Air Quality

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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
		▶ PIU shall advise DOE to implement Schedule 4: Standards for Emission from Motor Vehicles of Environmental Conservation Rules 2017 (Draft).				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 2023 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 damage shall be fixed immediately after the monsoon season. ▶ ▶ Road safety audits shall be undertaken regularly. ▶ Public awareness campaigns will regularly use various IEC techniques. Such as Media. ▶ Guidelines for Developing Construction Phase Traffic Management Plan in Annex 8, Volume 2.	Monitoring agency	**Khulna Zone**	**Operational Phase**	National Land Transport Policy; RHD's Road Master Plan; National Road Design Standard

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10.2 ENVIRNMENTAL AND SOCIAL MONITORING PROGRAM

375. 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 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	Number of child laborers, forced laborers, Trade Union/Workers' Organization members and activities, dialogues, and issues raised; employees signing labor contracts, paid under regional minimum wage, registered with social, health, and unemployment insurance; types, numbers, and compensation of occupational accidents and diseases; types and numbers of grievances; and instances of disciplinary actions.	Quarterly	Contractor Personnel and HR Specialist.	Employees' information; Internal Labor Regulation; CBA and Trade Union documents (Labor Conference minutes, Social Dialogues, Fund records, activity logs); Labor Contracts; Wage scale and pay slips; Social, health, and unemployment insurance documents; Occupational accident and disease records; Grievance 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

376. 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**.

377. 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

378. 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.

379. 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

380. 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 Grievance Redress Mechanism (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.

10.4 CLOSURE OF THE CONSTRUCTION SITE AND CONSTRUCTION LABOR CAMPS

381. 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.

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10.5 ENVIRONMENTAL MONITORING PLAN

382. 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.

383. From the environmental monitoring point of view, ambient air quality, ambient air concerning noise, water quality, and soil and sediment quality are proposed to be monitored during the project's construction and operation. 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.

384. The following subsections present an environmental monitoring plan covering the parameters to be monitored, sampling locations, and frequency.

10.5.1 AMBIENT AIR QUALITY

385. 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	Chachra Intersection (Near Kamal Super Market, Chachra Bazar), plus one, is for each location, the construction camp, and site. Total 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 six (6) during the construction phase Total number of samples during operation phase 6.

10.5.2 NOISE AND VIBRATION MONITORING

386. 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 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 Quality Monitoring (L_{eqday} and $L_{eqnight}$, L_{10}, L_{90}, L_{max} and L_{min}) and VibrationMeasurements (L_V10, L_{max}, in Vdb)
2	Monitoring Locations	One at Kamal Super Market, ChachraBazar, three (03) locations, such as construction camps/maintenance workshops/labor camps, and one (1) location in sensitive receptors Pulerhat Secondary School)/residential areas near the construction site, 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 = 5-locations x 12-month x 2-years The total number of samples during the operation phase is 6

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Table 10-6: Ambient Air Quality for Noise Monitoring		
Sl. No.	Items	Description of Items
	For Vibration	Total number of samples = 5-locations x 12-month x 2-years The total number of samples during the operation phase is 6

10.5.3 SURFACE WATER QUALITY

387. During the project's construction and operation phase, surface water samples will be collected from the two (02) surface water bodies. The sampling will be done once a season except during the monsoon season. The monitoring details are presented in the Table 10-7.

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-coliform 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 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.

10.5.4 GROUNDWATER QUALITY

388. 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 One from either Construction Camps or Labor camps One Groundwater Source of Baseline Stage Monitoring
3.	Monitoring Frequency	Every season, one sample from each location except for the monsoon season
4.	Total number of samples	Total number of samples = 2 locations x 1 sample per season x 3-season x 2-years=12 samples per contract The total number of samples during the operation phase is 12 in consultation with DOE officials.

10.5.5 SOIL AND SEDIMENT QUALITY

389. The soil samples will be collected from three locations during construction. They will be analyzed each season except monsoon, 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), phosphorus (mg/1000g), sulfates and sodium sulfates, and oil & grease
2	Monitoring Locations	3 Soil samples 1 soil Sample from Construction Camps or Labor camps 1 from the Maintenance workshop 1 from the Baseline Stage Monitoring location
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

390. The sediment samples will be collected and analyzed every season except monsoon season from the two (02) sediment samples near the bridges of the river/canal, as presented in **Table 10-10**.

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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 the river
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

391. The above monitoring plan has been summarized in the following **Table 10-11.**

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Table 10-11: Summary Matrix of Environmental Monitoring during Construction and Operation Phases

Environmental Factors		Monitoring Locations	Sample Strategy		Implementation and Monitoring	
Attribute	Pollutants		Quality	Frequency	Implementation	Supervision
Construction Phase Environmental Monitoring						
Ambient Air Quality	PM_{10}, $PM_{2.5}$, SO_2, NO_X, CO	Kamal Super Market, Chachra Bazar (AAQ1), plus at construction sites/construction camp	36	Twice in a week for 6 seasons, excluding monsoon	Contractor through the approved Lab	CSC/PIU
Noise Quality	L_{eq} (day) and L_{eq}(night), L10, L90, Lmax, and Lmin	One at Kamal Super Market, ChachraBazar, three (03) locations, such as construction camps/maintenance workshops/labor camps, and one (1) location in sensitive receptors, Pulerhat Secondary School)/residential areas near the construction site,	120	At five locations each month for two years, or as needed based on the advice of CSC.	Contractor through the approved Lab	CSC/PIU
Vibration Measurements	Lv10, Lmax, in Vdb	One at Kamal Super Market, ChachraBazar, three (03) locations, such as construction camps/maintenance workshops/ labor camps, and one (1) location in sensitive receptors, Pulerhat Secondary School)/ residential areas near the construction site,	120	At five locations each month for two years, or as needed based on the advice of CSC.	Contractor through the approved Lab	CSC/PIU
Groundwater	pH, EC, TDS, Temperature, Taste, TSS, Oil and grease, Heavy metals	2 Groundwater samples (One sample each is from construction or labor camps and a groundwater source of baseline stage monitoring)	12	Once a month for 7 seasons, excluding monsoon	Contractor through the approved Lab	CSC/PIU
Surface Water	pH, DO, BOD5, Temperature TSS, Oil and grease, free ammonia, etc. Total Coliforms, and E-coliform per 100ml	2 surface water bodies	12	Once in a season for 2 years, excluding monsoon for 2 years	Contractor through the approved Lab	CSC/PIU
Soil Quality	pH, electrical conductivity, organic matter (%), nitrogen (mg/1000g), potassium (mg/1000g), phosphorous (mg/1000g), sulfates and sodium sulfates, and oil & grease	Total 2 locations (One construction camp and one from agricultural field)	12	Once in a month during construction.	Contractor through approved Lab	CSC/PIU
Sediment Quality	pH, electrical conductivity, organic matter (%), oil & grease, Heavy metals	2 Mukteshwarei River (Upstream/down stream) from the baseline stage monitoring locations	12	Once in a season for 2 years, excluding monsoon for 2 years	Contractor through approved Lab	CSC/PIU

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Table 10-11: Summary Matrix of Environmental Monitoring during Construction and Operation Phases

Environmental Factors		Monitoring Locations	Sample Strategy		Implementation and Monitoring	
Attribute	Pollutants		Quality	Frequency	Implementation	Supervision
Operation Phase Environmental Monitoring per Annum						
Ambient Air Quality	PM_{10}, $PM_{2.5}$, SO_2, NO_X, CO	Kamal Super Market, Chachra Bazar (AAQ1), Chachra Check post Jame Mosque (AAQ2), Pulerhat Secondary school (AAQ3)	3	Every season for two days except the monsoon	Contractor through approved Lab	Khulna Division
Noise Quality	L_{eq} (day) and L_{eq}(night), L10, L90, Lmax, and Lmin	Kamal Super Market, Chachra Bazar (ANL1), ChachraCheck post Jame Mosque (ANL2), Pulerhat Secondary school (ANL3)	3	Every season for two days except monsoon	Through approved Lab	Khulna Division
Vibration Measurements	L_V10, Lmax, in Vdb	Kamal Super Market, Chachra Bazar (ANL1), ChachraCheck post Jame Mosque (ANL2), Pulerhat Secondary school (ANL3)	4	Every season for two days except monsoon	Through approved Lab	Khulna Division
Groundwater	pH, EC, TDS, Temperature, Taste, TSS, Oil and grease, Heavy metals	At 2 location (Pulerhat Secondary school, Chachra, Jashore, and Residential areas)	2	Once in each season except monsoon season	Through approved Lab	Khulna Division
Surface Water	pH, EC, TDS, Temperature, Taste, TSS, Oil and grease, Heavy metals	surface water body (Mukteswari River (Upstream and one pond)	2	Once in each season except monsoon season	Through approved Lab	Khulna Division
Sediments	pH, electrical conductivity, organic matter (%), oil & grease, Heavy metals	One location (Mukteshwari River)	1	Once in each season except monsoon season	Through approved Lab	Khulna Division
Soil Quality	pH, EC, TDS, Temperature, Taste, TSS, Oil and grease, Heavy metals	Total at 2 locations (agricultural fields)	2	Once in each season except monsoon season	Through approved Lab	Khulna Division

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10.6 INSTITUTIONAL ARRANGEMENT FOR ESMP IMPLEMENTAION

392. 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.** The institutional setup is as follows:

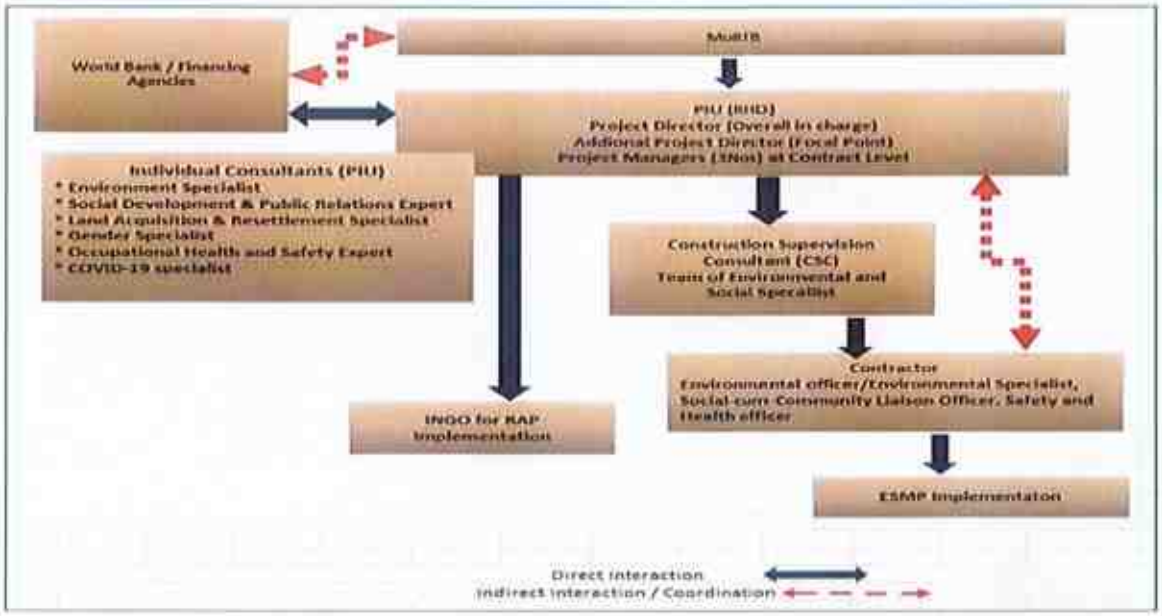

Figure 10-1: Organogram for the Implementation of ESMP

393. 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.

394. 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.

395. 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.

396. MoRTB is an umbrella agency responsible for ensuring the project is developed sustainably and meets the World Bank's environmental and social safeguards.

397. The roles and responsibilities of the different designated staff on the project are given in **Table 10-12.**

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Table 10-12: 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 the 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 the 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 the 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 ► 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

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Table 10-12: Roles and Responsibilities of Different Designated Staff

Institution	Designation	Role and Responsibility
		► Guide PIU, CSC, and contractors in conducting subsequent monitoring and reporting and in undertaking corrective options ► Imparting training for the field staff and contractors 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.
	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

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Table 10-12: Roles and Responsibilities of Different Designated Staff

Institution	Designation	Role and Responsibility
		► 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 in skilled and unskilled labor force, day-care centers at worksites, etc.
	Occupation health and Safety (OHS) expert (PIU)	► Review and prepare the project OHS plans ► Review the progress of OHS implementation at the site and the safety arrangements made by the contractor to prevent untoward incidents. ► To interact with regulatory agencies on environmental, social, occupational, and safety issues, including safety aspects ► Review of 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 the COVID-19 situation in the 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 ► 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	► 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

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Table 10-12: Roles and Responsibilities of Different Designated Staff

Institution	Designation	Role and Responsibility
	Rehabilitation (R&R) Expert/Gender Specialist, Public Health Expert)	► 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. ► 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.

Table 10-12: Roles and Responsibilities of Different Designated Staff

Institution	Designation	Role and Responsibility
		► 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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10.7 REPORTING

398. The rerporting system includes-

- 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 regularly transmit the monthly progress report to the World Bank as stipulated in the Environmental and Social Commitment Plan (ESCP). Besides, the quarterly reports on monitoring the ESHS performance of the PIU will be submitted regularly to WB by the PIU as per the requirement of ESCP.

10.8 CAPACITY BUILDING

399. To strengthen the capacity of Staff, the following training of target groups such as PIU staff, stakeholders, community, project workers, consultants, contractors, and subcontractors is suggested as per the Environmental and Social Commitment Plan (ESCP). An individual consultant of PIU will carry out the proposed capacity-building training for different target groups. The total training budgetary cost for capacity building has been worked out to be BDT52,000 in **Table 10-12.** The RHD will bear the cost.

Table 10-13: Training Schedule and Training Cost for 2 days

Target Group	Subject(s)	Method	Time Frame	Cost (BDT)
All concerned PIU /project staff (4 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 the beginning of the implementation of the project	100,000
Project Workers, Environmental Engineers, field officers, contractors, Sub-contractors' stakeholders, community, supervision consultants (20 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 ▶ Enhancement measures, ▶ monitoring and evaluation of environmental conditions – during construction and operation ▶ ERAP on COVID-19, including prevention, mitigation, and response	Workshops and Seminars	Before the construction	200,000
Project staff include field officers, contractors, subcontractors, stakeholders, and the community, who deal with 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	200,000
Total training budgetary cost for capacity building for				**500,000**

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10.9 CHECKLIST FOR MONITORING ESMP

400. 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 10-2.** Flow Chart and Reporting Mechanism of Incidents for Development Emergency Response Action Plan is presented in Annex 10.3

10.10 ENVIRONMENTAL AND SCOIAL MANAGEMENT COST

401. 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 10-14: Summary cost of the Environmental Monitoring and Training

S. No	Component	Cost
A	Training on Safeguards	500,000
B	Construction Camp Management	**1,432,000**
C	Environmental Monitoring	**2,760,000**
D	Pollution Control Measures at Work Zones	**1,437,800**
E	Safety Measures for Workers	1,360,000
F	Operation Phase Safeguards	1,265,000
	Total	6,129,800
	Contingency (10%)	612,980
	Grand Total	6,742,780
In words: Six million, seven hundred forty-two thousand, seven hundred eighty Taka only		

402. The budgetary cost estimates for the implementation of the construction and operation phase EMP for the Intersection of Chachra, Jashore, are presented in **Table 10-14.**

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Table 10-15: 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	Training in the Environment, Health, & Safety, Social awareness on land acquisition and compensation-related Grievance Redressal Mechanism (GRM) and SEA/SH-related GRM, Redressal Mechanism	Lump sum				500,000
	Sub Total					500,000
B.	**Construction Camp**					
B.1	Establishment of Construction Camp		Sft.	2,000	400	800,000
B.2	Provision of potable water supply in the construction camps		Month	48	2,000	96,000
B.3	LPG Cylinder at the construction camp for cooking	(5 cylinders/ month for 48)	No.	4	2,000	8,000
B.4	Provision of Wastewater Treatment Facility (Package treatment Plant @50KLD) at Construction Camp		Month	48	10,000	480,000
B.5	Providing a solid waste management facility in the construction camp		Month	48	1,000	48,000
	Sub Total					1,432,000
C.	**Environmental Monitoring**					
C.1	Air Quality Monitoring	(3 locations x 2-day week for x 3 seasons *2 years)	Samples	36	20,000	720,000
C.2	Noise Level Monitoring	(5 locations x once a month x 24 months)	Samples	120	5,000	600,000
	Vibration Measurements	(5 locations x once in a month x 24 months)	Samples	120	5,000	600,000
C.3	Surface Water Sampling & Analysis	(2 locations x once in a season x 3 seasons x 2 years)	Samples	12	25,000	300,000
C.4	Ground Water Sampling & Analysis	(2 locations x once in a season x 3 seasons x 2 years)	Samples	12	25,000	300,000
C.5	Soil Sampling & Analysis	(2 locations x once in a season x 3 seasons x 2 years)	Samples	12	20,000	240,000
C.6	Sediment Sampling & Analysis	(2 locations x once in a season x 3 seasons x 2 years)	Samples	12	25,000	3,00,000
	Sub Total					2,760,000
D.	**Mitigation Measures**					
D.1	Dust Suppression at construction sites /stockyards/construction camps/haul roads	(2 trips/day x 60 days in a year for 1.5 years of 10000-liter water tanker)	Trips	180	210	37,800
D.2	Plantation of trees & their maintenance for 6 years	Refer to Annex 10.4	No.	1,500	500	750,000

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Table 10-15: Budgetary Cost Estimates for ESMP Provisions

Sl. No.	Description	Unit Type	Unit	Quantity	Unit Cost (BDT)	Amount (BDT)
D.3	Shrubs Plantation on the median, including maintenance for 6 years		No.	500	400	200,000
D.4	Oil Interceptors	Lump sum	No.	1	25,000	25,000
D.5	Noise Mitigation Cost		Sft.	150	1500	225,000
D.6	Silt Traps for roadside water bodies	Lump sum	No.	5	40,000	200,000
	Sub Total					1,437,800
E.	**Safety Measures**					
E.1	Demarcation of the borrow area using fencing, if needed.	Lump sum				150,000
E.2	Traffic Management during Construction Phase		Month	48	10,000	480,000
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 helmets, gumboots, jackets, goggles for laborers		No.	100	2000	200,000
E.5	Disposal of construction debris and other waste materials & Transportation		Month	48	10,000	480,000
	Sub Total					1,360,000
	Grand Total of ESMP Cost during Construction n Phase					
F.	**ESMP Cost during Operation Phase**					
F.1	Air Quality Monitoring	(1 location x 1 day per season x 3 seasons)	No.	60,000	20,000	60,000
F.2	Noise Level Monitoring	(1 location x 1 day per season x 3 seasons)	No.	30,000	10,000	30,000
F.3	Surface Water Sampling & Analysis	(2 locations x once in a season)	No.	50,000	25,000	50,000
F.4	Ground Water Sampling & Analysis	(1 location x once in a season)	No.	25,000	25,000	25,000
F.5	Shrubs maintenance			500,000	LS	500000
F.6	Sanitation and sanitary facilities including waste (liquid and solid) as per DOE requirement			600,000	LS	600000
	Sub Total					1,265,000

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