



Initial Environmental Examination (IEE)

Project Number: 55148-001
August 2025

BAN: Skills for Industry Competitiveness and Innovation Program (SICIP)

Construction of Kumudini Nursing Institute (Academic Building) at Kumudini Welfare Trust (KWT), Mirzapur, Tangail, Bangladesh

Prepared by the Finance Division under the Ministry of Finance for the Asian Development Bank.

Asian Development Bank

ABBREVIATIONS

ADB	-	Asian Development Bank
DoE	-	Department of Environment
EARF	-	Environmental Assessment and Review Framework
ECA	-	Environment Conservation Act
ECoP	-	Environmental Code of Practice
ECR	-	Environmental Conservation Rules
EDC	-	Executive Development Centers
EMP	-	Environmental management Plan
FGD	-	Focus Group Discussions
IEE	-	Initial Environmental Examination
IT	-	Information Technology
KWT	-	Kumudini Welfare Trust
MoF	-	Ministry of Finance
MoFCC	-	Ministry of Environment, Forest and Climate Change
MoLE	-	Ministry of Labour and Employment
MoTJ	-	Ministry of Textiles and Jute
NEMAP	-	National Environmental Management Action Plan
NEP	-	National Environmental Policy
NHRDF	-	National Human Resource Development Fund
NOC	-	No Objection certificate
NSDA	-	National Skills Development Authority
R&S	-	Research and Development
RBL	-	Result Based Lending
REA	-	Rapid Environmental Assessment
RMG	-	Ready-Made garments
SDCMU	-	Skills Development Coordination and Management Unit
SICIP	-	Skills for Industry Competitiveness and Innovation Program
SME	-	Small and Medium Enterprises
SPS	-	Safeguard Policy Statement
TMP	-	Traffic Management Plan
CEMP	-	Contractor's Environmental Management Plan
PD	-	Project Director
DSC	-	Design Supervision Consultants
GRM	-	Grievance Redress Mechanism

WEIGHTS AND MEASURES

Ha	hectares
Km	kilometers
M	meters
masl	meters above sea level
MT	metric tons

CURRENCY EQUIVALENTS

(as of 8 August 2025)

Currency unit	–	taka (Tk)
Tk1.00	=	\$0.0083
\$1.00	=	Tk 121

NOTE

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EXECUTIVE SUMMARY

INTRODUCTION

Background and Project

In line with the Bangladesh Country Partnership Strategy 2021–2025 and the government’s broader initiative, “Human capital enhanced for sustainable economic development and inclusive growth,” the proposed Skills for Industry Competitiveness and Innovation Program (SICIP) aims to strengthen the country’s supply of skilled workers to foster industry growth and innovation. The Result Based Lending (RBL) approach for this program will focus on four main outcomes: (i) Improving advanced technical skills training in both priority and emerging sectors; (ii) Strengthening management skills and capacity for green innovation; (iii) Expanding socially inclusive skill-building and upskilling opportunities; and (iv) Enhancing institutional capacity to monitor and manage skill development. The RBL program also supports several operational priorities of ADB’s Strategy 2030, including reducing poverty and inequality, advancing gender equality, addressing climate change, building resilience, promoting environmental sustainability, and bolstering governance and institutional capacity.

Under Output 1 the proposed RBL program aims to cultivate higher-level technical skills and enhance institutional capacity to produce skilled workers to adapt with emerging technologies including green technologies. To achieve this aim, under current scope, the RBL program will construct/establish smart textile technology living labs (STTLs) in two textile engineering colleges (Bangabandhu Textile Engineering College in Tangail and Chittagong Textile Engineering College in Chattogram), Narsingdi Auto-Tech Training Institute (NATI) at Narshingdi Polytechnic Institute (NPI) and construct one academic building (10 story) in the East West University. In addition, extension of classrooms and some renovation work will be carried out at the Institute of Business Administration (IBA), Dhaka University. Additionally, Kumudini Nursing Institute (Academic Building) at the Kumudini Welfare Trust (KWT) has been proposed.

Implementation arrangement

The Finance Division in MOF will be the executive and implementation agency. The Skills Development Coordination and Management Unit (SDCMU)—established under SEIP—will continue to serve as the program management unit to facilitate, coordinate, and monitor all project activities. The key implementing partner agencies include the Technical and Madrasa Education Division in the Ministry of Education; Ministry of Expatriate Welfare and Overseas Employment; Ministry of Industries; and Ministry of Textiles and Jute. An inter-ministerial project steering committee, chaired by the Secretary of Finance Division, will provide overall policy advice and oversight, approval of annual operation plans, review of achievements against targets, and ensuring compliance with fiduciary oversight arrangements.

The Initial Environmental Examination (IEE)

This Initial Environmental Examination (IEE) has been prepared, in accordance with the environmental assessment requirements of the Asian Development Bank (ADB) and the Government of Bangladesh, as well as the guidance provided by the EARF developed for guiding the environmental safeguards principles adopted for SICIP, to help ensure that the infrastructure proposed under the Investment Project part of the Program meets a high standard for environmental and social responsibility. As proposed investments are dispersed across many locations within Bangladesh, it is considered appropriate for each location to be covered by a

context-specific IEE. **This IEE report is applicable to “Construction of Kumudini Nursing institute (Academic building), Mirzapur, Tangail”.**

LEGAL AND POLICY FRAMEWORK

Institutional framework

The lead environmental agency in Bangladesh is the Department of Environment (DOE), under the Ministry of Environment, Forests and Climate Change (MOEFCC). DOE is charged with furthering environmental conservation, improvement of environmental standards, and control and mitigation of environmental pollution. This mandate positions DOE as a key regulator of a broad range of developments in the infrastructure, industrial and commercial sectors, including both publicly and privately funded initiatives. DOE is responsible for administering the country's central environmental law, which provides the framework for environmental impact assessment.

Other agencies with important environmental mandates include the Bangladesh Forests Department (also under MOEFCC), the Ministry of Water Resources, the Ministry of Fisheries, and the Ministry of Land. The laws and regulations administered and enforced by these other agencies do not structure the environmental assessment process directly but may often come into play in the consideration of the suitability and permissibility of proposed infrastructure developments by DOE.

Occupational health and safety are key considerations of the environmental assessment of proposed infrastructure. The Ministry of Labour and Employment (MoLE), particularly its Department of Labour and Department of Factory and Establishment Inspection, is of direct relevance to the environmental assessment process, as it administers and enforces the country's legislation, rules and standards governing industrial workplaces, including construction sites and most industrial facilities where physical labour is undertaken.

National policies, laws and rules applicable to the project

- a. National Environmental policy 1992 (revised in 2018)
- b. National Environmental Management Action Plan (NEMAP), 1995
- c. National Bio-safety Strategy & Action Plan 1995
- d. A Roadmap for Clean Fuels and Vehicles in Bangladesh, 2011
- e. National Action Programme on Desertification, Land Degradation and Drought (DLDD) 2016-2024
- f. Ecologically Critical Area Management Rules, 2016.
- g. Medical Waste (Management and Processing) Rules, 2008
- h. Bangladesh Biosafety Rules, 2012
- i. Bangladesh Biological Diversity Act 2017
- j. Natural Water Reservoir Conservation Act, 2000
- k. National Forestry Policy 2016
- l. National Conservation Strategy 1998 and Draft Update 2013
- m. National 3R (Reduce, Reuse & Recycle) Strategy 2010
- n. Bangladesh Climate Change Strategy & Action Plan (BCCSAP) 2009
- o. Bangladesh Delta Plan 2100
- p. National Disaster Management Plan 2010.
- q. Nationally Determined Contributions (NDCs)
- r. Five Year Plan
- s. Sustainable Development Goals (SDGs)
- t. National Adaptation Plan (NAP) 2022

- u. Other Sectoral Policies/Strategies like Industry, Agriculture, Energy, Water, Health, etc.
- v. National Bio-safety Framework and Guidelines
- w. Guidelines on Environmental Management, Waste Treatment and Workers' Occupational Health and Safety for Ship Breaking Yard in Bangladesh
- x. Establishing National Landuse and Land Degradation Profile 2018 (proposed)

Anticipated DoE assessment category. The infrastructure development proposed for the Kumudini Nursing institute at Kumudini Welfare Trust (KWT) under the project will appropriately be considered to fall into the 'Orange' assessment category. The investments do not include any components that would trigger assignment to the 'Red' category, but do encompass components (multi-storied buildings, diagnostic laboratory) included in the 'Orange' list in Schedule 1 of the Environment Conservation Rules 2023. This IEE report will be reviewed by DoE, and the anticipated categorization will be confirmed at that time.

Updated ADB categorization. Based on the findings presented in this IEE, it is confirmed that some of the infrastructure components proposed at KWT will have at least some negative impacts requiring mitigation, but also unlikely that any will generate impacts of a scale, complexity or severity that would warrant detailed environmental research or development of highly novel mitigation strategies. Accordingly, the Category B classification, assigned to the project at the early concept stage based on ADB screening, is considered valid for this investment location. This could change if the design, scale, nature or location of any proposed components undergoes significant modification before or after project approval.

PROJECT DESCRIPTION

Project Location

Proposed Kumudini Nursing Institute is located within Kumudini complex, beside the River Louhajong, with coordinates 24.0975°N, 90.0940°E. Administratively, the institute is under Mirzapur upazila of Tangail district in Dhaka division. The hospital is 51 kilometers from Hazrat Shahjalal International Airport, Dhaka the largest airport of Bangladesh and 53 kilometers from Bangabandhu Bridge over the river Jamuna. The district headquarters Tangail is 29 kilometers away from the hospital. Currently, north to the site, construction of dormitory for the Nursing and caregiving students of Kumudini Welfare Trust (KWT) is ongoing, funded by the ADB SEIP, the predecessor of ADB SICIP.

Proposed Infrastructures

Built-up area. Built-up gross floor area totals 25 804 m² across six teaching storeys. Each typical plate hovers around 4 400–4 900 m², enabling phased commissioning (Phase-1 UG–3F; Phase-2 4F–5F). Floor-wise Functional Zoning includes: (i) Lower podium (GF–2F) houses labs, lecture theatres, library, café and student commons; (ii) Mid band (3F) carries tutorial suites and twin 100-place tiered halls; and (iii) Upper academic deck (4F–5F) integrates MSc classrooms, midwifery labs and a 500-seat graduate library.

BASELINE ENVIRONMENT

Location setting

Siting. Kumudini Welfare Trust complex is situated on the banks of the Louhajang River in Mirzapur, Tangail—a semi-rural area approximately 70 km northwest of Dhaka. The hospital's proximity to the river once enabled access by boat, and its scenic, green campus stands out in a region characterized by both agricultural land and small towns.

Topographic relief. KWT campus occupies a narrow river valley cut into the eastern rim of the Madhupur Pleistocene terrace. This setting gives the site two contrasting physiographic influences: (i) a slightly elevated, red-brown upland spine (the ancient Madhupur Tract) that protects it from deep, long-duration flooding, and (ii) A bordering alluvial lowland carved by the Louhajang River that brings seasonal floodwater, fertile silts and occasional erosion. Therefore, the KWT campus region exhibits two major physiography: the Madhupur Pleistocene Terrace and Louhajang–Bangshi Valley System.

Seismicity. According to the GSB, the study area is located within Zone II with seismic coefficient of 0.05g. According to the BNBC (2010) zoning, the project site is located in Zone 3 with $Z = 0.28$ (moderate to high vulnerability zone). Hence, the proposed structure has a high vulnerability to earthquakes, and the design of civil structure needs to comply with relevant provisions on earthquake Bangladesh National Building Code 2020 (latest). Historical record of major earthquakes for the last 450 years from the Department of Disaster Management (2012) show that from 1762 to 2016, earthquakes originating in Bangladesh had a Richter scale magnitude ranging from 4.2 to 8.8. A maximum of about 8.8 originated from Chittagong-Arakan in 1762.

Rivers and channels. Bangshi River serves as the primary waterway of the region, flowing along the northern boundary of Mirzapur upazila. This 238-kilometer river originates from the old Brahmaputra near Jamalpur and flows southward through Tangail and Gazipur districts . The Bangshi is part of the larger Jamuna River system and eventually joins the Turag near Aminbazar before connecting to the Buriganga.

Drainage system and waterlogging. The Mirzapur Township is positioned on higher ground above the annual flood level, but surrounding areas face chronic drainage issues . The region's topography includes basins that are moderately to deeply flooded and often remain wet during monsoons. This natural characteristic creates inherent challenges for effective drainage, particularly during the extended monsoon period from June through October. The upazila's location within the Young Brahmaputra and Jamuna Floodplain zone makes it susceptible to both riverine flooding and localized waterlogging . The flat terrain with minimal gradient creates conditions where surface water accumulates in low-lying areas, overwhelming natural drainage capacity during heavy rainfall events.

Flooding. Mirzapur upazila regularly experiences monsoon flooding from June through October, with flooding affecting 11 of its 15 unions . The 2020 monsoon floods alone affected over 600,000

people across Tangail district, with Mirzapur ranking among the worst-affected upazilas. Educational infrastructure suffered extensively, with 86 primary schools, 31 high schools, and 5 madrasas damaged in Mirzapur upazila alone . The agricultural sector faces recurring devastation, with 18,126 hectares of standing crops including Aman paddy, vegetables, lemon, and sugarcane washed away during typical flood seasons . Lemon growers in Mirzapur upazila face particular vulnerability, with 380 hectares of lemon orchards fully damaged during severe flood years, causing 50% plant mortality due to prolonged waterlogging.

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION

Approach and Methodology

The IEE study has been conducted following the ADB SPS (2009), World Bank's Environmental and Social Framework (ESF) 2018, EIA Guidelines for Industries, prepared by the DoE in 2021 in accordance with the requirement of the Environment Conservation Rules (ECR 2023). The IEE process adopted in this study involves identification of the key impacts on natural and social environment and evaluation of the significant impacts along with recommendation of initiative measures as well as listing of unresolved environmental issues. The IEE includes collection of baseline information, setting of boundaries, impact assessment, suggestion of mitigation measures and alternative sites providing an environmental management plan.

Findings of Impact Assessment: Pre-construction phase

Climate change, drainage and waterlogging

Impacts. The Kumudini Hospital region in Mirzapur, Tangail represents one of Bangladesh's most climate-vulnerable areas, situated strategically on the banks of the Louhajang River in the north-central hydrological zone . The region experiences a tropical monsoon climate with annual rainfall averaging 2,014mm, with 68% concentrated during the monsoon season from June to September. This concentrated precipitation pattern, combined with the area's low-lying topography and proximity to major rivers including the Jamuna, Dhaleswari, and Louhajang, creates significant challenges for any architectural development in the region. Climate change has intensified these vulnerabilities, with Tangail district experiencing increasingly erratic rainfall patterns, untimely floods, cyclones, and prolonged waterlogging . The region has witnessed devastating floods affecting over 175,000 people in 196 villages across six upazilas, with river erosion devouring hundreds of houses . These climatic stresses directly impact on the design considerations for the proposed six-storied Nursing Institute academic building, necessitating comprehensive climate-responsive architectural strategies

Mitigation: The design phase presents crucial opportunities to implement climate-resilient features that can significantly reduce the building's vulnerability while contributing to regional flood management. Elevation and flood-proofing measures should be enhanced beyond the current +750mm ground floor elevation. Best practices from Bangladesh's climate-resilient housing initiatives suggest elevating critical infrastructure and utilities to at least the 100-year flood level

plus projected sea-level rise impacts. The building's mechanical, electrical, and plumbing systems should be relocated to upper floors or adequately protected flood-resistant enclosures.

Waste management

Impacts: The design phase of the proposed Nursing Institute Academic Building presents significant opportunities and challenges for sustainable waste management in the Kumudini Hospital region of Mirzapur, Tangail. Based on the architectural drawings, the six-story structure with a total built-up area of 277,655 square feet will generate substantial construction and demolition waste during its construction phase, which research indicates can account for up to one-third of all construction waste if not properly managed. The building's complex program, including specialized laboratories, clinical spaces, examination halls, and administrative areas, requires careful consideration of waste management systems from the earliest design decisions.

Mitigation: The architectural design can incorporate several critical mitigation measures to minimize waste generation and optimize management systems throughout the building's lifecycle. First, the design should integrate dedicated waste management infrastructure, including segregated collection points with color-coded systems consistent with WHO guidelines, centralized storage areas with adequate ventilation and security features, and appropriate routing for safe waste transport that separates clean and contaminated pathways.

Site enhancement

Based on the analysis of the proposed Nursing Institute academic building project in Mirzapur, Tangail, Bangladesh, several comprehensive site improvement schemes can enhance the functionality, sustainability, and user experience of this educational facility. The current site encompasses 85,274 square feet with a six-story academic building serving nursing education, and strategic improvements can transform it into a model campus for healthcare education.

Findings of Impact Assessment: Construction phase

Water quality

Impacts. The construction phase poses multiple threats to water quality in the Kumudini Hospital region. Excavation activities for the building's 10-storey foundation (though initially constructing only 6 storeys) will generate substantial amounts of disturbed soil and sediment, which can easily migrate to nearby water sources during monsoon periods. The project area's location within the Madhupur tract, characterized by non-calcareous dark grey floodplain soils, makes it particularly susceptible to erosion and sediment runoff. During the excavation of foundation trenches and installation of underground utilities, loose soil particles can be transported by surface runoff directly into the Louhajang River, which serves as a critical water source for the hospital and surrounding communities.

Mitigation. To address drainage congestion issues, the project must implement a multi-layered approach combining temporary and permanent solutions. Installation of temporary pumping systems will be essential for removing accumulated rainwater from foundation excavations during

monsoon periods, preventing the creation of stagnant pools that can become contaminated and eventually overflow into surrounding areas. The construction of temporary earth or brick-lined drainage channels around the perimeter of the construction site will direct runoff away from sensitive areas and toward appropriate treatment or infiltration zones. These temporary drains must be regularly maintained and cleared of sediment accumulation to remain effective throughout the construction period.

Air quality

Impacts: In any construction site, dust generation is inevitable. Since the location is set in a busy urban premises with lots of pedestrian movement, generations of dust might create havoc. Additionally, a few other constructions are ongoing near the site. This means, during construction when sand and cement are brought in for mixing, dust generation can be elevated.

Mitigation: Dust is easily minimized by implementation of a regular routine of light spraying with water. All dust-generating surfaces, including those on the construction site and the haul road for at least 200 m from the site, should be treated as frequently as is needed to avoid dust reaching nuisance levels. Structures undergoing demolition should also be misted throughout the process. All stockpiles of sand and soil should be kept tightly covered with tarpaulins whenever they are not in active use. All haul trucks should be equipped with tightly fitted tarpaulins to prevent releases of dust from dry materials during transport. Ambient air quality at the perimeters of the two construction sites should meet the standard indicated in Air Pollution (control) Rules 2022.

Traffic Congestion

Impacts. The proposed Nursing institute academic building is located in Mirzapur Upazila, Tangail, directly on the Old Dhaka-Tangail Highway (Mirzapur Road), which serves as a critical transportation artery connecting Dhaka to northwestern Bangladesh. This highway already experiences significant traffic challenges, with frequent 20-30 kilometer tailbacks during peak periods and holiday seasons. The region witnesses heavy traffic congestion particularly at Mirzapur sections, where vehicles often move at crawling speeds due to inadequate road capacity and ongoing infrastructure development projects.

Mitigation. A traffic management plan (TMP) must be devised prior to construction and approved by the environmental specialist from SDCMU and approved from local zilla parishad/police station. A sample TMP has been attached with this IEE as Appendix 4.

Noise and vibration

Impacts. As noted in the baseline section of this report, the proposed site is located in the urban busy Zone, by the side of semi-busy roads. Therefore, the site is not exposed to high pitch noise. Noise and vibration from construction activity can be a serious nuisance for people living near active construction site, the potential for impacts is quite high due to high population density, and there are in fact residences in close proximity to some parts of the development site. Depending

on the particular configuration of the site, construction activity may end up being carried out close to these buildings. People living in nearby structures will experience some measure of nuisance during busy construction periods, particularly if any pile-driving is carried out, or if construction activity is conducted at night. People living along the roads, that will inevitably be used to bring bulk materials to the building sites, may notice an increase in noise from haul trucks and construction activities such as mixing, hammering etc.

Mitigation. To minimize noise and vibration impacts for residents living within earshot of the vicinity of construction site, construction activity should be strictly limited to daylight hours. To avoid adding to the traffic noise for roadside residents, all haul trucks must be kept in good repair, and fitted with functional mufflers. Proper maintenance of machinery and trucks shall be done not to cause extra vibration. Emissions of noise from the project construction sites should not be of a level sufficient to cause an exceedance of maximum ambient noise levels as specified in the Noise Pollution Control Rules 2006. Emissions from individual pieces of machinery and vehicles used in construction should not be allowed to exceed the maximum acceptable levels indicated in Noise Pollution Control Rules 2006.

Occupational health and safety

Impacts: Construction activity and construction sites carry inherent risks for workers. These risks include falls, contact with moving machinery, flying and falling objects, dust, burns, cuts, exposure to intense light from arc welding, electric shock and electrocution, and crushing from collapsing earth walls, amongst other things. Where construction is conducted in public rights-of-way, there are also dangers associated with vehicles moving past the work site.

Mitigation. Risks to worker safety on the job site can be successfully minimized through proper worker training, and by strict use of task-appropriate personal protective equipment (PPE). All workers and site supervisors should be provided workplace safety training prior to the start of construction, and at regular intervals thereafter. Training should be repeated whenever new crews are brought on to the site, and whenever monitoring by the primary Contractor or construction supervision consultant reveals declining standards of practice on the site. The primary Contractor should ensure that all workers are provided with adequate PPE suited to any task they may be given, and also strictly enforce its use at all times.

Construction waste

Impacts. Waste generated during construction will consist mainly of packaging, from both construction materials and food products consumed by workers. The volume of waste produced is likely to be relatively small but can easily get strewn and blown across the landscape and end up in local water bodies, if not appropriately managed.

Mitigation. Suitable receptacles should be positioned at strategic locations around the work sites to facilitate containment and collection of solid waste. Construction waste should be sorted to segregate recyclables, and regular pickup of these by a local recycling business should be

arranged. Non-recyclable waste should be transported to the nearest legal landfill site, and never burned, buried or dumped on the site. Waste oil and other noxious fluids and associated used containers should be recycled through a reputable business providing this service. The primary Contractor should be required to specify all waste management arrangements - including the identity of recycling enterprises and legal landfill operators able to accept expected wastes - in a site-specific Waste Management Plan embedded within the CEMP. Appropriate contents of a Waste Management Plan are specified in the sample CEMP outline provided in Appendix 9.

Cumulative Impact Assessment

263. Construction phase impacts are anticipated to be the most significant environmental concerns for this academic building project. These impacts include air quality degradation due to dust generation from excavation, material handling, and vehicular movements; noise pollution from construction machinery and transportation activities; soil disturbance and potential contamination from construction materials and equipment; waste generation from construction activities including concrete, steel, wood, and packaging materials; and temporary disruption of local drainage patterns. The construction of specialized facilities within the nursing institute, such as laboratories, clinical training areas, and technical spaces, may involve handling of specific materials that require additional environmental precautions. Water quality impacts may occur through runoff from construction sites, particularly important given the area's vulnerability to flooding and the need to protect local water bodies.

PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Consultation with officials of the Finance Department, MoF

Consultations with the Finance Department, Ministry of Finance took place in November 2022 at SDCMU established under SEIP. The Project Director (PD) of SEIP who is in charge of SICIP, officials from Finance Departments relevant to the project and ADB project team attended the meeting and discussed various aspects of the proposed Kumudini Nursing Institute and possible safeguards system. Discussions on possible 'green building' components and locations of establishment of the Nursing Institute within the KWT campus were held.

Meetings with Finance department and KWT officials. Consultations with the Finance Department, Ministry of Finance (MoF) took place in April 2025 at SDCMU established under SEIP (later SICIP). The Project Director (PD) of SEIP who is also in charge of SICIP, officials from Finance Department relevant to the project and ADB project team attended the meeting and discussed various aspects of the proposed Nursing Institute and possible safeguards system. Discussions on possible 'green building' components and locations of establishment of the Nursing Institute within the KWT campus were held.

Table: Summary of the point of discussions with KWT teachers and students

Environment-related questions	Summary of salient points of discussion
Is there any environmental problem within the campus or nearby the campus?	Generally, the KWT campus is not flood prone, but due to unplanned development around, highwater drainage has been very slow in recent years. The flood water can come from the north and recede towards the south – towards the Louhojong river. The in-campus drain are well maintained and can attain heavy flow during extreme rainfall events.
Our natural surroundings (air, water, trees and other plant life, land, open space) generally affect the quality of our lives, including our ability to make a living. How do you feel about the current quality of the local environment?	Within the KWT campus, the campus has some vegetation, although not so thick. The campus is not that noisy.
Are you aware of any problems having to do with natural resources (air, water, farmland, trees, animals, open space) in this area?	We have a filtering system installed on the campus. The drinking water quality is generally good in Tangail, and salinity/arsenic is not yet an issue in the area. Yet, due to safety of the patients and staff filtering systems always run at campus.
Thinking about the construction work that may happen here under the project (list infrastructure that may be built at this campus), how do you think this will affect the quality of the local environment, or your quality of life?	The area is currently barren. The proposed site is on low land, which is currently sand filled and elevated.
Traffic may increase as a result of this project, once construction has been completed. How do you think this will affect the local environment, or the quality of life in the community?	The main road is already busy with vehicles and pedestrians. There are also some construction works nearby. Hence the traffic is already elevated. Anyway, we think during construction work, we need to adopt proper precautions.
What additional considerations can be taken to enhance the quality of KWT and the campus?	- Installing a higher capacity water filtering system, since higher number of students are expected - Installing drainage system and raising the overall plinth of the Nursing Institute. - Connect the Nursing Institute to the current STP. We can consider to connect newly proposed STP for the two new buildings.

GRIEVANCE REDRESS MECHANISM

A well-defined grievance redress and resolution mechanism will be established to resolve grievances and complaints in a timely and satisfactory manner. All affected persons will be made fully aware of their rights, and the detailed grievance redress procedures will be publicized through an effective public information campaign. The grievance redress process includes three levels:

First level of GRM: The first level and most accessible and immediate contact for the fastest resolve of grievances are the Contractors, with assistance from Design Supervision Consultants (DSC) on site. Prior to construction of any works, the PIU will ensure local community meetings are held to notify residents and businesses of any temporary disturbances, and to inform them of the Project and the GRM. If any complaints arise, the Contractors, with assistance from DSC can immediately resolve the complaint on site. The Contractor's and DSC's office phone number will be posted in public areas within the subproject areas and construction sites. Any person with a grievance related to the project work can contact the project to file a complaint. The Contractor may seek the assistance of the DSC safeguards specialists (the environmental specialist or social safeguards specialist) to resolve the issue. The DSC safeguards (environment and resettlement)

focal person will immediately address and resolve the issue with the Contractor within 1-2 days, if the complaint remains unresolved at the field level. The PIU safeguards focal person will fully document the following information: (i) name of the person; (ii) date complaint was received; (iii) nature of complaint; (iv) location, and (v) how the complaint was resolved.

Second level of GRM: Should the grievance remain unresolved; the Contractor with assistance from DSC will forward the complaint to the PIU safeguards focal person. The person filing the grievance will be notified by DSC safeguards focal person that the grievance was forwarded to the PIU safeguards focal person. The PIU will address the grievance. Grievances will be resolved through continuous interactions with affected persons, and the PIU will answer queries and resolve grievances regarding various issues including environmental or social impacts. Corrective measures will be undertaken at the field level by the PIU safeguards focal person within 7 days. He/she will fully document the following information: (i) name of the person; (ii) date the complaint was received; (iii) nature of complaint; (iv) location and (v) how the complaint was resolved.

Third level of GRM: Should the grievance remain unresolved, the PIU's project director will activate the third level of the GRM by referring the issue (with written documentation) to a Grievance Redress Committee (GRC), which will, based on review of the grievances, address them in consultation with the PIU, Contractor, DSC, and affected persons. The GRC will consist of TMED/IA representative as chairperson, and other relevant stakeholders. A meeting will be called with the GRC, if necessary, where the affected person can present his/her concern and issues. The process will promote conflict resolution through mediation. The GRC will meet as necessary when there are grievances to be addressed. The GRC will suggest corrective measures at the field level and assign clear responsibilities for implementing its decision within 15 days. The functions of the GRC are as follows: (i) to provide support to affected persons on problems arising from environmental or social disruption, asset acquisition (where required), and eligibility for entitlements, compensation, and assistance; (ii) to record grievances of affected persons, categorize and prioritize them, and provide solutions within 15 days; and (iii) to report to the aggrieved parties' developments regarding their grievances and decisions of the GRC. The TMED/IA safeguards focal person will be responsible for processing and placing all papers before the GRC, recording decisions, issuing minutes of the meetings, and taking follow-up action to see that formal orders are issued, and the decisions carried out.

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

Grievance Redress Mechanism for Workers

An additional mechanism shall be set up by the SOU to accept and address complaints from workers employed in the construction works, concerning working conditions, living conditions in construction camps, safety and health issues, labor rights violations, mistreatment, or any other matter. All laborers, skilled workers, and site engineers employed on site by the primary Contractor or by any of its sub-Contractors shall have access to the mechanism. All workers will receive an orientation to the workers' GRM during pre-construction induction training. Workers

will be able to lodge grievances with on-site personnel of the CSC, who will record the complainant's name, position, employer, and contact information, as well as a description of the complaint and the time, date and place at which the complaint was reported. The CSC will inform the SOU, which will record the grievance in a grievance register. The CSC will convene a meeting of the complainant or complainants, the sub-Contractor involved, the Primary Contractor, and any labor syndicate to which the complainant(s) may belong, in an effort to decide on an appropriate resolution of the complaint.

ENVIRONMENTAL MANAGEMENT PLAN

The EMP for the project defines mitigation and monitoring measures and identifies the institutions, responsibilities and mechanisms that will ensure their implementation. Such institutions and mechanisms will seek to ensure continuous improvement of environmental protection activities during the pre-construction, construction, and operation phases of the project, in order to manage adverse impacts.

Responsibilities in EMP Implementation

Each of the entities identified above has multiple responsibilities, the fulfilment of which is required for full and effective implementation of the EMP. These responsibilities are detailed in Table below.

Table: EMP implementation responsibilities

Entity	Responsibilities in EMP Implementation
Skills Development Coordination and Management Unit (SDCMU)	• Prepare operations and maintenance procedures for facilities under construction, ensuring their compliance with the EMP • Work with the SOU to train facility personnel on EHS aspects of facility operation in advance of commissioning, to ensure effective EMP implementation during the operation period
Project Implementation Unit (PIU) at KWT	• Ensure that EMP implementation is recognized as a critical element of overall project implementation • Enable and adequately staff SOU • Oversee rigorous review of bids and prioritize selection of Contractors with strong environmental compliance track records • Coordinate with SDCMU as needed to ensure smooth implementation of EMP
Safeguards Oversight Unit (SOU) under SDCMU	• Ensure EMP provisions are fully reflected in civil works bid documents • Advise and support PIU on Contractor selection and other procurement decisions • Guide and support ESFP and EHSOs to ensure timely and competent execution of site-level oversight activity • Collect and collate progress reports and environmental monitoring reports for each location to assemble comprehensive quarterly monitoring reports for submission to ADB. • Work with CSCs and primary Contractors to develop and deliver periodic EHS training for sub-Contractors and their workers • Work with CSCs to train facility managers or their EHS personnel in advance of commissioning, to ensure effective EMP implementation during the operation period • Administer the GRM

Entity	Responsibilities in EMP Implementation
	Support PMUs in obtaining environmental clearances and renewals
Environmental Safeguards Focal Person (ESFP) under SDCMU	- Oversee the safeguards compliance process for all Investment Project sites under the PMU's control, liaising with the PIU-appointed Project Manager and with support from SOU and EHSO - Prepare and submit quarterly progress reports for the sites owned by their home agencies to the PIU and SOU - Chair LGRC when needed to address Level 2 grievances regarding project implementation activities
Environmental coordinator/manager at KWT	- Oversee the safeguards compliance process for the investment site at KWT - Liaison with the ESFP for monthly report and day to day update - Supervise the EHSO
Environment, Health and Safety Officer (EHSO)	- Conduct regular monitoring of conditions on site, including compliance with prescribed mitigation strategies, and submit EHS monitoring reports on a monthly basis to the Environmental Coordinator at PIU - Identify worker training needs and support SOU and CSC in development and delivery of training
Construction Supervision Consultants (CSC)	- Review and approve CEMPs and quarterly environmental monitoring reports submitted by Contractors - Guide and assist PMUs, through ESFPs, in monitoring of CEMP implementation and site conditions, including preparation of quarterly progress reports for submission to SOU - Direct and supervise corrective action by Contractors as needed - Collaborate with SOU on development of safeguards training for sub-Contractors and workers
Contractors	- Prepare and implement CEMP for each site, based on EMP prescriptions and international best practices - Conduct quarterly EHS monitoring on all sites under their control and submit quarterly monitoring reports to CSC for review - Implement corrective actions as directed by CSC and/or ESFP
Department of Environment (DOE)	- Review environmental clearance applications, including IEE and EMP - Review annual environmental monitoring reports submitted by SOU during construction phase - Review applications for environmental clearance renewals
ADB	- Review and approve IEE and EMP - Publicly disclose IEE on ADB website - Review quarterly environmental monitoring reports prepared by PMU and publicly disclose them on ADB website

Environmental Impacts and Prescribed Mitigation and Enhancement Measures

The findings of the environmental impact analysis are presented in Section VI of the IEE report. The potential impacts and corresponding measures that are prescribed in order to mitigate the negative impacts or enhance positive ones are collected in Table IX 3 below. The measures prescribed apply to the pre-construction, construction and operations phases of the infrastructure development at the KWT Nursing institute site. All measures listed in Table IX 3 are requirements, based on the infrastructure plan as proposed at the time of preparation, whose fulfillment is

assigned. All measures assigned to Contractors should be reflected in bidding documents, and serve as the basis for the CEMPs, which must be prepared to cover all sites at this investment location.

Environmental Monitoring and Reporting

Environmental monitoring consists of assessing both the degree to which Contractors and facility operators are fulfilling their responsibilities to implement measures specified in the EMP to manage impacts (compliance monitoring), and the degree to which their impact management efforts are successful in preventing harmful environmental conditions from arising (effects monitoring). Compliance monitoring typically makes use of checklists to confirm or disconfirm that prescribed measures are being properly implemented, while effects monitoring involves quantitative and/or qualitative sampling at designated locations. Both types of monitoring need to be conducted on a regular and consistent basis, to ensure comparability of results across monitoring periods. Monitoring should begin before site clearing, so an environmental baseline (i.e., pre-project conditions) can be established for key environmental parameters.

Monitoring parameters for each prescribed mitigation and enhancement measure are identified in Table IX 3. Specific monitoring responsibilities, including the monitoring and reporting timetable for each, are detailed in Table IX 4.

As will be noted from the preceding table and figures, several entities are expected to submit regular monitoring reports as a fundamental contribution to effective implementation of the EMP. These reporting processes are summarized in Table IX 5 for clarity. A sample outline of a semi-annual monitoring report as must be prepared by the SOU for submission to ADB (which can also be adapted for quarterly monitoring reports as must be prepared for DOE) is provided in Appendix 18.

Institutional strengthening and training requirements

A capacity building program for EHS units within SDCMU and KWT should be developed and delivered in the interval between the project's approval and the end of construction on the first round of investments. The capacity development program should aim to establish stable, sustainable EHS units capable of (i) proactively and professionally driving compliance with National and multilateral-mandated environmental clearance and environmental assessment requirements in relation to proposed, under-construction and operational infrastructure investments; (ii) collaborating productively with specialists hired under the auspices of major investment projects; (iii) carrying out long-term EHS monitoring for all agency facilities; and (iv) building a culture of sustainability and safety across their home agencies through awareness-raising and educational campaigns.

Capacity investments should include support for hiring and resourcing adequate staff commensurate with the needs of the agency, and staff training. The capacity building program should include the following elements: (i) needs assessment; (ii) capacity-building plan including

recommendations for staffing and resources; and (iii) training program for each EA's EHS unit. Design, development and delivery of the capacity building program is appropriately included in the mandate of the CSC engaged to oversee implementation of the project works. The CSC should be supported in this work by the SOU, and the ESPFs of SDCMU and KWT.

EMP Implementation cost

Cost estimates for mitigation measures, environmental monitoring, public consultations, and capacity building are summarized in Table IX 8. Contractors will bear the direct costs of all mitigation measures during construction, which will be included in the tender and contract documents; this includes features built into facility designs in order to prevent environmental impacts from arising. The MoF SDCMU and KWT will bear the costs related to mitigation measures during operation. Costs related to environmental supervision during construction will be borne by the SDCMU (for hiring a licensed laboratory to conduct quarterly monitoring), the PMU (for the activities of the environmental consultants) and by the contractors (for monitoring work carried out by the EHSOs). During the operation phase and monitoring costs will be borne by the SDCMU and KWT (for regular monitoring activity of their site EHSOs). The EMP cost shall be included in the BOQ as a provisional sum (non-competitive) item.

CONCLUSION AND RECOMMENDATION

Minor negative impacts of the project will be felt during the construction phases which may involve minor sand erosion, water and waste pollution. The major significant impacts can come from disrupting local hydrological system and waste pollution. The impacts of noise and increase in traffic are expected to be within the existing level experienced by the local people. The contractor will be under specific orders for providing PPE to the workers engaged in the job. Strict site and labour camp health and safety regulation will be forced as per government and ADB guidelines. Site specific EMPs will be developed after detailed design is developed and this IEE should be updated as well.

The monitoring plan, if properly implemented during the pre-construction, construction and post-construction and operation phases will ensure taking corrective measures. The proposed project will have no residual adverse impact on the environment or the eco-system if mitigation measures are properly followed. MoF and KWT are required to take clearance from the DoE for implementing the construction works and other ancillary works. The IEE report has been prepared with this end in view.

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I. INTRODUCTION

A. Background

1. In line with the Bangladesh Country Partnership Strategy 2021–2025 and the government’s broader initiative, “Human capital enhanced for sustainable economic development and inclusive growth,” the proposed Skills for Industry Competitiveness and Innovation Program (SICIP) aims to strengthen the country’s supply of skilled workers to foster industry growth and innovation. The Result Based Lending (RBL) approach for this program will focus on four main outcomes: (i) Improving advanced technical skills training in both priority and emerging sectors; (ii) Strengthening management skills and capacity for green innovation; (iii) Expanding socially inclusive skill-building and upskilling opportunities; and (iv) Enhancing institutional capacity to monitor and manage skill development. The RBL program also supports several operational priorities of ADB’s Strategy 2030, including reducing poverty and inequality, advancing gender equality, addressing climate change, building resilience, promoting environmental sustainability, and bolstering governance and institutional capacity.

2. Bangladesh’s priority industries for future growth—such as ready-made garments (RMG), textiles, light engineering, leather goods and footwear, information technology, and construction—remain the focus under initiatives like the ongoing Skills for Employment Investment Program (SEIP). With rapid technological progress, especially in IR 4.0, the skills needed in these sectors are evolving at a fast pace. Although the RMG and textile industries drive over 80% of the country’s exports, they still predominantly operate at the lower tiers of the global value chain. Elevating their position within this chain will require a workforce skilled in advanced technologies, capable of producing higher-value goods and services. Through the RBL program, the Ministry of Finance (MOF) will implement targeted measures aligned with its strategic framework, working in close coordination with other development partners to foster this transition.

B. The project

1. Project aim

3. The impact of the program is aligned with increased technology-ready workforce for diversified and innovation-driven economy. The outcome will be equitable access to skills training in priority and emerging industries expanded across skill levels. The outcome will be measured by (i) the number of men and women trained from basic to advanced skill levels in priority industries; (ii) share of trainees placed in jobs within 6 months of training completion; and (iii) number of skills courses implemented specifically for women across skill levels. The program is expected to benefit at least 250,000 men and women over 5-year implementation.

2. Outputs and outcomes of SICIP

4. The outputs of the proposed RBL are:

5. **Output 1: Training for advanced technical skills improved.** This output will cultivate higher-level technical skills for existing priority and newly emerging sectors, through partnerships between industries and education/training institutes. The skill requirements will be identified by leading industries, particularly for high-demand technology-related skills. Industries will be involved in developing the curriculum and instructors as well. The Finance Division is setting up an Industry Advisory Board consisting of leading industries to advise on the program. Some

polytechnics—including women polytechnics—in industrial areas will be converted into specialized polytechnics to offer customized skills courses for emerging industries (e.g., automobiles, electronics)¹. This output will also enhance the institutional capacity to produce skilled workers adept at emerging technologies including green technologies, by establishing smart textile technology living labs (NATIs) in two textile engineering colleges², setting up high-demand technology-based courses in garments universities, and delivering higher-level technical courses in a renovated light engineering institute. All these technical courses will have international partnerships for transfer of knowledge and training of instructors³.

6. Output 2: Managerial capabilities and green innovation capacity strengthened.

Building on SEIP's introduction of Executive Development Centers (EDCs) that impart customized mid-level managerial training through university-industry partnerships, the government will further institutionalize the EDCs in partnering universities (e.g., Dhaka University, BRAC University, East West University, and Bangladesh University of Textiles)⁴. EDC courses will be updated to align with industry's technology trends and global environmental standards, including green technologies and business practices. This output will also support selected universities to promote applied R&D for industry solutions, especially small and medium enterprises (SMEs), as well as incubation opportunities. R&D activities to help SMEs develop climate resilient products or services will be prioritized. The government will bring overseas scientists and engineers of Bangladesh origin to contribute to the transfer of knowledge and skills, while connecting local industries and academies to the global network.

7. Output 3: Socially inclusive skilling and upskilling expanded.

This output will continue to support basic- and mid-level skills training of new entrants or existing workers, following on SEIP's sector-focused skills training models. These programs will be implemented in close coordination with the National Skills Development Authority (NSDA) and the National Human Resource Development Fund (NHRDF). It will also create specially targeted skills programs for socially disadvantaged groups (e.g., people with disabilities, minorities, other marginalized groups), women garment sector workers who are at high risk of job loss due to automation, and those who may be negatively affected by transition to low-carbon economy. For women, upskilling and multi-skilling for future garment work or alternative livelihoods, community-based support for empowerment, and green entrepreneurship skills will be provided in partnership with the H&M Foundation and the Asia Foundation. The government will also expand skills courses with international certification, which enable Bangladesh migrant workers to gain better employment opportunities overseas and increase remittance flows.

8. Output 4: Institutional capacity for skills monitoring and management enhanced.

This output will support the capacity development of core skill systems such as NSDA and NHRDF for the future sustainability of skills initiatives and partnership modalities. It will also support the functioning of a new Industry Advisory Board for output 1 activities. The output will continue enhancing monitoring mechanisms, such as the trainee management system (TMS) created under SEIP to monitor training and track its outcomes. Analytic studies, such as a tracer study and industry skills trends analysis, will be undertaken to assess the effectiveness of new skills

¹ A polytechnic in Narsingdi, where automobile production plant is being established, will become a specialized center of excellence for automotive technical skills. Another women's polytechnic is being planned for skills in electronics.

² Smart textile technology labs (STTL) provide hands-on learning environments with technology applications, from yarn manufacturing to fabric/garments production, using global standards in testing and production. It aims to strengthen capabilities of textile industry workforce and promote R&D, especially in manmade fabrics

³ International partnerships include Hanyang University and the Korea Institute of Textiles for NATIs; the Fashion Institute of Technology in New York for the Bangladesh University of Fashion and Technology; and the Korea University of Technology and Education for the Bangladesh Industrial Technical Assistance Center.

⁴ The current EDCs focus on the following four industries: garments, textiles, knitwear, leather goods and footwear.

programs and to build effective training partnership models. The output will ensure effective management and governance of skills development systems overall.

9. **ADB's value addition.** ADB has been a trusted partner for Nationwide skills programs with an innovative approach in public-private training partnerships. In the proposed RBL, ADB adds value in: (i) expanding training partnerships to advanced-level, technology-oriented skills, including customized training for emerging industries to support economic diversification; (ii) reorienting existing polytechnics and universities with strong industry linkages; (iii) facilitating international partnerships to develop stronger institutional capacity for skills in emerging IR4.0 and green technologies for climate resilient, green growth; (iv) strengthening gender and social inclusion dimensions with dedicated skills programs, including for those at risk of job loss due to low-carbon economy transition; (v) strengthening the broader government program with innovative results-oriented program designs; and (vi) bringing ADB's expertise with international good practices. The RBL program builds on the ongoing SEIP and complements ADB-financed TVET Teachers for the Future Program and other skills projects by the World Bank.

C. Project interventions

10. Under Output 1 the proposed RBL program aims to cultivate higher-level technical skills and enhance institutional capacity to produce skilled workers to adept with emerging technologies including green technologies. To achieve this aim, under current scope, the RBL program will construct/establish smart textile technology living labs (STTLs) in two textile engineering colleges (Bangabandhu Textile Engineering College in Tangail and Chittagong Textile Engineering College in Chattogram⁵), Narsingdi Auto-Tech Training Institute (NATI) at Narsingdi Polytechnic Institute (NPI) and construct one academic building (10 story) in the East West University. In addition, extension of classrooms and some renovation work will be carried out at the Institute of Business Administration (IBA), Dhaka University. Additionally Kumudini Nursing Institute (Academic Building) at the Kumudini Welfare Trust (KWT) has been proposed.

11. Additionally, civil work of Kumudini Nursing dormitory at Tangail, which commenced during the implementation of SEIP, will be taken over by SICIP. There are also a few scopes of civil works under SICIP under consideration but to be finalized. The scopes are following:

- (i) Automotive training at Narsingdi Auto-Tech Training Institute (NATI) at Narsingdi Polytechnic Institute, Narsingdi (i.e., a. new three storied building; b. one storied vertical extension of north block; c. vertical & horizontal extension of south block)
- (ii) Kumudini Nursing Institute (academic building) in Kumudini Welfare Trust (KWT) at Tangail
- (iii) At 1-2 universities or polytechnics, training centers may be established; the land yet to be identified.

12. 1-2 small upgrading works may be supported during implementation.

D. Implementation arrangement

13. The Finance Division in MOF will be the executing and implementing agency. The Skills Development Coordination and Management Unit (SDCMU)—established under SEIP—will continue to serve as the program management unit to facilitate, coordinate, and monitor all project activities. The key implementing partner agencies include the Technical and Madrasa Education

⁵ Bangladesh Government Gazette notification to change the name of five district is effective from 10. September. 2018. The names were changed to be consistent with their original Bangla spelling. However, despite of the name changes of the 5 districts, the associated polytechnic name was not changed.

Division in the Ministry of Education; Ministry of Expatriate Welfare and Overseas Employment; Ministry of Industries; and Ministry of Textiles and Jute (MoTJ). An inter-ministerial project steering committee, chaired by the Secretary of Finance Division, will provide overall policy advice and oversight, approval of annual operation plans, review of achievements against targets, and ensuring compliance with fiduciary oversight arrangements.



Figure I-1 Locations of the proposed structural investments under SICIP.

E. The Initial Environmental Examination (IEE)

14. This Initial Environmental Examination (IEE) has been prepared, in accordance with the environmental assessment requirements of the Asian Development Bank (ADB) and the Government of Bangladesh, as well as the guidance provided by the EARF developed for guiding the environmental safeguards principles adopted for SICIP, to help ensure that the infrastructure proposed under the Investment Project part of the Program meets a high standard for environmental and social responsibility. As proposed investments are dispersed across many locations within Bangladesh, it is considered appropriate for each location to be covered by a context-specific IEE. **This IEE report is applicable to “Construction of Kumudini Nursing institute (Academic building), Mirzapur, Tangail”.**

15. The findings presented in the IEE report are based on (i) desktop studies; (ii) discussions with Kumudini Welfare Trust Staff, (iii) detail architectural design, (iv) local knowledge of the consultants engaged in this project; (v) primary information collected from visits to Kumudini Welfare Trust and the surrounding area; and (vi) consultations with Kumudini Welfare Trust Staff in July 2025.

1. Objective, purpose and limitations of this report

16. This report describes the assessment results of environmental and social impacts caused by the subprojects as described in para. 11-12 which are likely to be categorized as Orange (building construction and repairs/retrofitting) according to the Environmental Conservation Rules (ECR) 2023 adopted by the Bangladesh Government and specifies measures to address such impacts. This IEE is guided by the Environmental Assessment and Review Framework (EARF) prepared during the ADB preparatory site visits in 2022/23 that focused on all subprojects. This IEE is developed based on the subproject site plans and information obtained during the field visits conducted by the environmental consultant; and secondary data, which characterize the environment and identify potential impacts. It contains the results of interviews and consultations with stakeholders in July 2025. The IEE includes an environmental management plan (EMP) outlining mitigation measures and monitoring requirements. Detailed Architectural Drawings are done for the proposed site which is reflected in the IEE.

2. Scope

17. The scope of the report covers the existing environmental condition in the project site, assessment of potential environmental impacts during design and/or pre-construction, construction, and operation stages; description of the environmental management plan (EMP) and environmental monitoring plan; stakeholders' consultation, grievance redress mechanism, and description of the legal and administrative framework. This IEE does not provide assessment for any other/future developments or activities at the location or anywhere else within the area concern reported in this IEE document. Should any further development be planned as a result of either this Project or other related works, additional planning and assessment following the requirements of the government shall be carried out separately.

18. In general, this IEE intends to:

- (i) Examine and describe the existing status of the various ecological, physical and human related components surrounding the project area;
- (ii) Predict the potential significant impacts of the project on the surrounding environment during the pre-construction, construction, operations and maintenance stages, and recommend appropriate mitigation and abatement measures; and,
- (iii) Identify residual impacts of the project and recommend appropriate short-term and long-term management plans.

3. Structure of this IEE report

19. The structure of this report follows the general guidelines of the Environmental Assessment and Review Framework (EARF) developed for SICIP. The structure of this report maintains the following sequence:

Executive Summary

Chapter 1 Introduction provides the background on the project, the project's impacts and expected outcomes, administrative structure of the project, purpose and limitation of this report.

Chapter 2 Legal and Policy Framework presents a review of relevant national laws and policies, international environmental obligations, ADB's environmental

	requirements, procedure of environmental clearance, environmental categorization.
Chapter 3	Description of the Proposed Infrastructures provides a brief description of the Project, the location, size and need, description of project components.
Chapter 4	Description of the Environment includes details on the baseline data of the environmental conditions in the project area (current features and conditions)
Chapter 5	Analysis of Alternatives presents the alternative considered during the feasibility study in order to arrive at the best option.
Chapter 6	Anticipated Environmental Impacts and Mitigation Measures identifies the potential environmental, economic and social impacts from pre-construction, construction, and operation phase.
Chapter 7	Public Consultation and Information Disclosure discusses the issues raised during the consultations, proposed actions to address them, and the information needed to be disclosed to the public.
Chapter 8	Grievance Redress Mechanism describes the process of addressing complaints.
Chapter 9	Environmental Monitoring Plan outlines the environmental monitoring program, institutional responsibilities including the cost of implementing the EMP.
Chapter 10	Conclusion and Recommendation
Appendices	

II. LEGAL AND POLICY FRAMEWORK

A. Introduction

20. This section of the IEE details the Administrative Framework for the Project, covering National requirements as well as applicable international treaties and conventions. The intent of this section is to lay out the regulatory and non-regulatory performance requirements for all stages of the Project. For the purposes of this report, only those regulatory elements directly relevant to the proposed Project will be discussed. The environmental assessment requirements of both the Government of Bangladesh and ADB are outlined as well.

B. Institutional framework

21. The lead environmental agency in Bangladesh is the Department of Environment (DOE), under the Ministry of Environment, Forests and Climate Change (MOEFCC). DOE is charged with furthering environmental conservation, improvement of environmental standards, and control and mitigation of environmental pollution. This mandate positions DOE as a key regulator of a broad range of developments in the infrastructure, industrial and commercial sectors, including both publicly and privately funded initiatives. DOE is responsible for administering the country's central environmental law, which provides the framework for environmental impact assessment.

22. Other agencies with important environmental mandates include the Bangladesh Forests Department (also under MOEFCC), the Ministry of Water Resources, the Ministry of Fisheries, and the Ministry of Land. The laws and regulations administered and enforced by these other agencies do not structure the environmental assessment process directly but may often come into play in the consideration of the suitability and permissibility of proposed infrastructure developments by DOE.

23. Occupational health and safety are key considerations of the environmental assessment of proposed infrastructure. The Ministry of Labour and Employment (MoLE), particularly its Department of Labour and Department of Factory and Establishment Inspection, is of direct relevance to the environmental assessment process, as it administers and enforces the country's legislation, rules and standards governing industrial workplaces, including construction sites and most industrial facilities where physical labour is undertaken.

C. National policies, laws and rules applicable to the project

1. Central policy instruments

a. National Environmental policy 2018

24. Bangladesh adopted the National Environmental Policy (NEP) in 1992 to chart a path towards the country's sustainable development. The NEP 2018 is a revision of the NEP 1992 in the context of the new reality of climate change. The NEP 2018 also outlines a more up to date understanding of the extent and magnitude of environmental degradation that has become a fact of life in the world in general, and in Bangladesh in particular. The NEP 2018 outlines the problems of population growth, poverty, illiteracy, lack of awareness and healthcare services, limitation of arable land, unplanned development and urbanization, and industrialization as the major impediments to the conservation of the environment. The NEP sets out the basic framework for environmental action together with a set of broad sectoral guidelines for action. Major elements of the policy are:

- (i) maintaining the ecological balance for ensuring sustainable development;
- (ii) protection against natural disasters;
- (iii) identifying and controlling activities which are polluting and/or destroying the environment;
- (iv) ensuring environment-friendly development in all sectors;
- (v) promoting sustainable and sound management of natural resources; and
- (vi) active collaboration with international initiatives related to the environment.

25. The NEP, amongst other aims, seeks to ensure that transport systems, including roads and inland water transport, do not pollute the environment or degrade resources. The policy states that environmental impact assessment should be conducted before projects are undertaken. The NEP 2018 includes additional elements addressing climate change mitigation and adaptation as key environmental issues facing the country and integrating a comprehensive 3R approach to the massive and growing problem of industrial and household waste that has swelled along with the country's urbanization.

26. Following are the key subject matters covered under the National Environment Policy, 2018:

- (i) Ensuring sustainable development through reducing human pressure on nature and natural resources;
- (ii) Considering environment protection as integral part of the development programs planned to meet the need of the present and future generation;
- (iii) Making natural resources extraction, use, environmental conservation etc. to be based on science;
- (iv) Considering environmental impacts and risks in extracting and using natural resources;
- (v) Evaluating economic contribution of ecosystem services simultaneously to that of natural resources;
- (vi) Giving priority to poor and under privileged group of people in order to ensure their participation, equity, justice, accessibility to the use of natural resources and getting ecosystem services on which, they are dependent;
- (vii) Taking initiatives to prevent misuse and ensure optimum of water, land, natural gas and other natural resources in the production process as well as day-to-day purposes;
- (viii) Encouraging sustainable use of new and renewable resources;
- (ix) Enhancing long term poverty alleviation and food security through conserving biological diversity;
- (x) Realizing compensation from persons and institutes those who are liable to environmental pollution through applying polluter pay principle;
- (xi) Including environmental conservation and preservation in all National policies and ensuring implementation of the environment policy at both government and non-government level;
- (xii) Giving priority to preventive measures over curative measures in environmental conservation;
- (xiii) Including adaptation and mitigation program in all development projects in order to address adverse impacts of climate change;
- (xiv) Ensure sustainable utilization of ecosystem goods and services;
- (xv) Implementation of 3R principle in utilization of resources;
- (xvi) Strengthening institutional and legal capacity of institution (Government, local, private and technical) relevant to the enforcing and implementation of rules and regulation relating to environment policy and environment conservation;
- (xvii) Ensuring considerations of climate change and challenges of calamities in all kinds of infrastructure projects;
- (xviii) Reducing of all SLCP (Short-Lived climate pollutants) which are harmful to health and environment;

- (xix) Taking development programs considering sustainable production and consumption as integral part of environmental conservation to meet the need of present and future generation;
- (xx) Allocating necessary funds to all areas of environmental conservation, preservation and control;
- (xxi) Taking up programs in favor of flourishing environment friendly economy; and
- (xxii) Including environmental and ecological conservation particularly to introduce the environment and ecological concept in the environmental academic curriculum and textbooks of schools and colleges.

27. This project triggers the National Environmental Policy 2018 in multiple fundamental ways: (i) **Land Use and Site Development:** With a total built-up area exceeding 25,800sq.m and comprising multiple floors, dormitories, and service facilities, the project alters significant land cover and may impact local ecology, drainage, and soil structure; (ii) **Resource Consumption:** The inclusion of extensive water and power infrastructure (generators, transformers, water reservoirs) triggers the policy's resource sustainability clauses; (iii) **Waste Management and Pollution:** The design introduces numerous functional spaces (canteens, laboratories, restrooms) which will generate solid and liquid waste, medical/lab waste, and potentially sewage—all areas of concern under the policy; (iv) **Community and Social Impact:** The academic and residential nature of the building increases population density and activity, influencing air quality, noise, and local traffic.

b. National Environmental Management Action Plan (NEMAP), 1995

28. The NEMAP built on the NEP to address specific issues and management requirements during the period 1995-2005 and remains a backbone of efforts to articulate National sustainability strategies. The plan includes a framework within which the recommendations of a National Conservation Strategy (NCS) are to be implemented. The NEMAP was developed with the following objectives:

- (i) Identify key environmental issues affecting Bangladesh;
- (ii) Identify actions to halt or reduce the rate of environmental degradation;
- (iii) Improve management of the natural environment;
- (iv) Conserve and protect habitats and biodiversity;
- (v) Promote sustainable development; and
- (vi) Improve the quality of life.

29. To this end, NEMAP grouped all the relevant necessary actions under four heads: institutional, sectoral, location-specific and long-term issues. The institutional aspects reflect the need for inter-sectoral cooperation to tackle environmental problems requiring new institutional mechanisms at National and local levels. The sectoral aspects reflect the way the ministries and agencies are organized and make it easier to identify the agency to carry out the recommended actions. The location-specific aspect focuses on particularly acute environmental problems at local levels. And the long-term issues include environmental degradation trends that threaten to emerge as serious threats to the country's environmental quality and well-being if not proactively addressed.

c. Other Environment-Related Plan and Policies

30. In addition to the central environmental policy instruments, a number of other National policy efforts have significant environmental content. Prominent policy documents include the

following National Plans, Policies Guidelines that confirm, compliment and support the National Environmental Policy:

- (i) National Bio-safety Strategy & Action Plan 1995
- (ii) National Biodiversity Strategy & Action Plan of Bangladesh 2016-2021
- (iii) A Roadmap for Clean Fuels and Vehicles in Bangladesh, 2011
- (iv) National Action Programme on Desertification, Land Degradation and Drought (DLDD) 2016-2024
- (v) Ecologically Critical Area Management Rules, 2016.
- (vi) Medical Waste (Management and Processing) Rules, 2008
- (vii) Hazardous Waste and Ship Breaking Waste Management Rules, 2011
- (viii) Bangladesh Biosafety Rules, 2012
- (ix) Bangladesh Biological Diversity Act 2017
- (x) Natural Water Reservoir Conservation Act, 2000
- (xi) National Forestry Policy 2016
- (xii) National Conservation Strategy 1998 and Draft Update 2013
- (xiii) National 3R (Reduce, Reuse & Recycle) Strategy 2010
- (xiv) Bangladesh Climate Change Strategy & Action Plan (BCCSAP) 2009
- (xv) Bangladesh Delta Plan 2100
- (xvi) National Disaster Management Plan 2010.
- (xvii) Nationally Determined Contributions (NDCs)
- (xviii) Five Year Plan
- (xix) Sustainable Development Goals (SDGs)
- (xx) National Adaptation Program (NAP) 2022
- (xxi) Other Sectoral Policies/Strategies like Industry, Agriculture, Energy, Water, Health, etc.
- (xxii) National Bio-safety Framework and Guidelines
- (xxiii) Guidelines on Environmental Management, Waste Treatment and Workers' Occupational Health and Safety for Ship Breaking Yard in Bangladesh
- (xxiv) Establishing National Landuse and Land Degradation Profile 2018 (proposed)
- (xxv) EIA Guidelines for Industry 2021
- (xxvi) Bangladesh Fire Prevention and Extinction Act, 2003
- (xxvii) Fire Prevention and Extinction Rules, 2014
- (xxviii) National Plan for Disaster Management, 2021-2025
- (xxix) National Industrial Policy, 2022
- (xxx) Hazardous Waste (E-Waste) Management Rules 2021
- (xxxi) Balumohal and Soil Management Act 2010

31. During environmental assessment of this project, Ecologically Critical Area Management Rules, 2016; Natural Water Reservoir Conservation Act, 2000; Bangladesh Climate Change Strategy & Action Plan (BCCSAP) 2009; Bangladesh Delta Plan 2100; National Disaster Management Plan 2010; National ly Determined Contributions (NDCs); Five Year Plan; Sustainable Development Goals (SDGs) and National Adaptation Program (NAP) 2022 have been considered.

2. Legislations

a. **Bangladesh Environment Conservation Act (BECA), 1995 (as amended in 2000, 2002 & 2010)**

32. The Bangladesh Environmental Conservation Act (BECA), 1995 is the main legislation for conservation of the environment, improvement of environmental standards, and control and

mitigation of environmental pollution. The enabling powers of the BECA are wide ranging. Wide-ranging powers (Section 4) are given to the Director General (DG) to take various actions or measures to enforce the BECA (Table). The Environment Conservation Act authorizes the DOE to undertake any activity to conserve and enhance the quality of the environment and to control, prevent and mitigate pollution. The DOE is designated as the regulatory body and enforcement agency for all environment-related activities. The Act enables the following critical components of DOE's remit:

- (i) declaration of Ecologically Critical Areas;
- (ii) administration of the procedure for obtaining Environmental Clearance Certificates for new industrial projects;
- (iii) regulation with respect to vehicles emitting smoke harmful to the environment;
- (iv) environmental regulations for development activities;
- (v) standards for quality of air, water, noise, and soils (including riverbed materials) for different areas and for different purposes;
- (vi) acceptable limits for discharging and emitting waste; and
- (vii) formulation of environmental guidelines to control and mitigate environmental pollution, conservation, and improvement of the environment.

33. Provision of BECA 1995 has been describes in Table II-1. Amendments to the ECA in 2000, 2002 and 2010 added significant substantive and procedural scope, defining the following new areas of authority:

- (i) ascertaining responsibility for compensation in cases of damage to ecosystems;
- (ii) increased provision of preventive measures, including fines and imprisonment, and the authority to take cognizance of offences;
- (iii) restrictions on polluting automobiles;
- (iv) restrictions on the production and sale of environmentally harmful items like polythene bags;
- (v) obtaining assistance from law enforcement agencies for environmental actions;
- (vi) definition and enforcement of punitive measures;
- (vii) authority to try environmental cases;
- (viii) prohibition on hill cutting except where established to be in the National interest;
- (ix) authority to regulate management of hazardous waste produced by ship breaking yards;
- (x) prohibition of filling or alteration of waterways except when judged to be in the National interest; and
- (xi) additional powers to compel compliance with emissions standards.

Table II-1 Provisions of the BECA, 1995

Section	Provision Under Section
Section 4	Powers of the DG to enforce various provisions of the Act including setting rules and regulations for environmental conservation and protection.
Section 4A	Powers given to the DG to seek the assistance of other enforcement authority (or authorities) in its enforcement. Done indirectly by way of disconnecting power, gas, or water supply to the user.
Section 7	Allows the DG to seek compensation in cases of damage to the ecosystem or injury to person(s), whether directly or indirectly caused by a person or persons. He may also require that corrective or remedial action be taken to mitigate or ameliorate the situation.
Section 8	Allows any person affected or likely to be affected as a result of pollution or degradation of the environment to apply to the DG for remedy of the damage or apprehended damage.

Section	Provision Under Section
Section 9	DG can require the person responsible and the person in charge of the place of occurrence of an accidental pollution take measures to control or mitigate the environmental pollution.
Section 12	Requires that an Environmental Clearance Certificate be obtained before an industrial unit or project can be established or undertaken.
Section 13	Formulate and publish environmental guidelines relating to the control and mitigation of environmental pollution, conservation and improvement of the environment.
Section 14	Allows appeal against grievances to the Appellate Authority. [Note: The Appellate Authority was constituted by MoEFCC by a notification dated 03/11/1997.
Section 15	Allows the imposition of penalties for various offences.
Section 20	Power to make rules for various purposes including the setting of EIA procedures.

Source: Compiled by TA consultant

34. The design and construction of the National Academic Building, like any large construction project in Bangladesh, directly triggers the requirements of the Bangladesh Environment Conservation Act (BECA), 1995 and its subsequent amendments. The Act's purpose is to conserve the environment, improve environmental standards, and mitigate pollution from all forms of development, especially new construction and land development. Section 12, requiring an Environmental Clearance Certificate, is effectively enforced by way of The Environmental Conservation Rules, 2023, which is made pursuant to the powers provided under Section 20 of the BECA. For academic/civic buildings over certain sizes or storeys (for example, more than 6 storeys outside Dhaka and 10 storeys within Dhaka), these projects typically fall under the Orange or Red Category, necessitating both an Initial Environmental Examination (IEE) and a full Environmental Impact Assessment (EIA) report before any construction or operation can legally begin.

b. Environment Conservation Rules, 2023

35. The Ministry of Environment, Forest and Climate Change of Bangladesh enacted the Environmental Conservation Rules (ECR) 2023 to implement the Environmental Conservation Act 1995. The rules have been effective from March 5, 2023, by repealing the Environmental Conservation Rules 1997. ECR 2023 is the most important set of regulations giving procedural substance and tools of enforcement to the aims articulated in the BECA 1995 and its amendments. The Rules specify the categorization of projects or industrial establishments by judging the severity of the project's (or industry's) impact on environment and human health.

36. ECR 2023 replaces all the old schedules stipulated in ECR 1997 and replaces the old four environmental categories i.e., 'green', 'orange A', 'orange B' and 'red' by new four categories i.e., 'green', 'yellow', 'orange' and 'red'. The new ECR also shades more lights on the determinants of environmental categorization of projects or industrial establishments, sets guideline for environmental impact assessment process and report preparation along with the qualification of environmental consultants and subject matter experts responsible for preparing environmental impact assessment reports. There are 14 schedules in the ECR 2023 which are described in Table II-2. The most highlighted changes in the ECR 2023 from 1997 edition is the inclusion of stakeholder engagement in the EIA process, adoption of impact of human health, setting qualification of environmental consultants for EIA study, setting standards for wastewater quality, inclusion of a comprehensive indicative list of categorized project/industries according to its impact on environment and human health, guidelines for location setting of a project or industry, guideline for ToR preparation for EIA study, indicative buffer distance between project/industry and sensitive area, indicative EIA reporting guideline and guidelines for inclusion of environmental consultants within EIA study team.

Table II-2 Environmental standards specified in the Environment Conservation Rules 2023

ECR Schedule	Standard name
Schedule 1	Indicative list of projects/industrial establishment under four categories of environmental impacts
Schedule 2	Standards for water quality a. ground water, coastal waters, b. drinking water
Schedule 3	Standards for wastewater
Schedule 4	Standards for industrial wastewater
Schedule 5	Standards for category based industrial wastewater
Schedule 6	Fees for application for location clearance or environmental clearance certificates
Schedule 7	Fees for location clearance or environmental clearance certificates and renewal
Schedule 8	Fees for information collection/sample analysis from Department of Environment (DoE)
Schedule 9	Guideline for location setting of industrial establishments
Schedule 10	Guideline for ToR preparation for environmental impact assessment
Schedule 11	Guideline for environmental impact assessment report preparation
Schedule 12	Guideline for establishment and operation of industrial effluent treatment
Schedule 13	Guideline for inclusion of environmental consultants or subject matter specialists
Schedule 14	Determinants environmental categorization of industries

37. The proposed six-storied academic building for Kumudini Nursing Institute at Mirzapur, Tangail is categorized as Orange under the Environment Conservation Rules, 2023. However, With a total floor area exceeding 25,000sq.m, significant green and ground areas, and support functions such as library, laboratories, canteen, and utilities, the building surpasses the typical thresholds for Green (lower risk) category projects. According to the Environment Conservation Rules, 2023: (i) Environmental Clearance Certificate (ECC): The project must secure an ECC from the Department of Environment (DoE) before any physical work begins; (ii) Initial Environmental Examination (IEE): Submission of an IEE report is mandatory, detailing the likely impacts of the project and proposed mitigation measures; (iii) Site & Layout Approval: The site plan, including green and paved areas, must be presented for approval, demonstrating that the design considers landscaping and sustainable drainage; (iv) Pollution Mitigation: Plans for managing construction and operational waste, emissions from standby generators, and dust/noise pollution during construction are required. According to the requirements, this project has Prepared this **IEE** with project description, baseline environment, identification of impacts (noise, air, water, soil, ecology, waste), and mitigation/monitoring plans. The project will also apply to DoE to secure **site and layout approval** including master plan, drainage, solid waste, and green coverage ratio documentation.

c. The Environment Court Act 2010

38. The Environment Court Act 2010 was passed with a view to ensuring the expedited disposal of environmental cases. The Act, consisting of 24 sections, amends and consolidates the existing law in establishing courts and related matters to expedite the trial of environmental crimes. It establishes administrative and legal proceedings of the above-mentioned Environment Court, as well requirements to be met by said court, which may direct the investigating officer or person for further investigation into a criminal case related to a case pending against him and may determine the deadline for reporting the report. The court may impose any power environment passed by this Act or the Environment Law. A lawyer appointed by the Director General shall conduct all the cases related to the trial in the Environment Court and the prosecuted lawyer shall be deemed to be a special public prosecutor in the case of a special public prosecutor and civil nature case, in case of prosecution: Provided that empowered by the Inspector or the Director General Any officer to assist the lawyer in managing the case. Subject to the provisions of this Act, in relation to the trial and settlement of compensation cases, the provisions of the Code of Civil Procedure shall apply, and, in that case, the Court of the

Environment shall be deemed to be a civil court and enforce all the powers of the Civil Court in the trial of any compensation suit under this Act.

d. Air Pollution (Control) Rules 2022

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

e. Noise Pollution (control) Rules, 2006

40. This rule has been promulgated under the provision of clause 20 of BECA, 1995. The rules provide for standard limits of noise level of vehicles and designated areas. According to the Rules, motor honking within a 100-meter radius of a hospital, school and office is prohibited. The rules also do not allow use of brick crushers and cement mixers within 500-meter radius of a residential area. Besides, prior permission is mandatory for using loudspeakers or megaphones. The rules stipulate safety and precautionary measures in workplaces, designated authorities for allowing noise generating appliances.

f. Solid Waste Management Rules 2021

41. 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 the treatment of solid waste such as composting and energy recovery.

g. Environmentally Critical Areas Management Rules, 2016

42. Under the Ecologically Critical Area Rule 2016, a National Committee is to be formed which will consider the prevailing naturalness and biodiversity status of the threatened area and identify causes of deterioration and potential threat. It shall recommend to the government about alternative livelihood for the dependent population of the ECAs. This committee is also directed to supervise or provide guidance and directives to the Nationally executed government development projects.

h. Other environment related rules and legislations

43. In addition to the ECA and ECR, numerous laws and supporting rules have been passed and developed to regulate the use of natural resources and protect the natural environment from deleterious activity. A summary of environment-related laws and rules, any of which may be relevant or applicable to proposed infrastructure development, is provided in Table II-3. Depending on the nature of project activities and infrastructure, No Objection Certificates (NOCs)

may need to be obtained from the agencies overseeing environment-related laws and regulations as part of the environmental clearance process directed by DOE, to ensure compliance with all relevant National laws.

Table II-3 Summary of Environmental Legislations Applicable to the Proposed Project

No.	Environmental Legislation / Act	Objective	Relevance to the Project	Responsible Institution
1	National Forestry Policy (2016) Draft	The National Forestry Policy (NFP) provides the framework for the protection of the remaining forests in the country and the restoration of about 20% of the country's land under the afforestation programs. The priority protection areas are the habitats which encompass representative flora and fauna in the core area of National parks, wildlife sanctuaries and game reserves. Multiple-use of forest, water and fish of the Sundarbans through sustained management will be ensured, keeping the bio-environment of the area intact.	Protected areas within the forest cannot be encroached by any project construction activities. No felling, cutting within protected or reserved forest is permitted. Not triggered by the project as the project area is outside designated forest areas declared by GoB	Department of Forests
2	The Forest Act (1927) and Forest (Amendment) Act (2000)	An act to control trespassing, illegal resource extraction and provide a framework for the forestry revenue collection system. To accommodate social forestry, the act was amended in 2000.	Requires clearances for any project within forest areas and clearances for any felling, extraction, and transport of forest produce. Not triggered by the project as the project area is outside designated forest areas declared by GoB	Department of Forests
7	The Bangladesh Wildlife (Conservation & Security) Act, 2012	To conserve and protect wildlife in Bangladesh including designation of protected areas. Protection of wildlife is provided with lists of species with four schedules: first, second, third and fourth schedule. The fourth schedule species have the highest level of protection.	Consultation and necessary permits required if the project would pass through the wildlife sanctuaries and other protected areas. Not triggered by this project. No wildlife or endangered species were found within the project boundaries.	Department of Forests
8	Bangladesh Protected Area Management Rules 2017	The rules portray the engagement process of the government authorities and local communities on how to be engaged in protected area management declared by the government. The rules cover protective activities such as regular inspections, security maintenance, annual planning of protection, actions against illegal activities, declaration of special reservation area etc.	No activity inside a declared PA is prohibited. Not triggered by the project. The project boundaries selected are outside the designated PAs, National parks and Sanctuaries.	Department of Forests
9	National Safe Drinking Water Supply and Sanitation Policy of 1998	Ensures access to safe water and sanitation services at an affordable cost	Pourashavas and water sanitation authorities will take actions to prevent wastage of water. They will take necessary steps to increase public awareness to prevent misuse of water.	Ministry of Local Government, Rural Development, and Cooperatives

No.	Environmental Legislation / Act	Objective	Relevance to the Project	Responsible Institution
			Pourashavas shall be responsible for solid waste collection, disposal and their management. Triggered by the project. The EMP section will layout the plan for supplying safe drinking water for the construction workers and communities.	
10	National Water Act 2013 Bangladesh Water Rules 2018	Ensures Bangladesh water sources are free from any type of pollution. Pollution from water in urban outfalls and reservoirs, e.g., lakes, canals, ponds and ditches may result in amenity losses, fisheries depletion, health problems and fish and aquatic species contamination.	Secure clearance certificate on water resource development subprojects. Triggered by the project. The water extraction for construction purposes and operation of the building will be sustainable and clearance will be taken from adjacent pourashavas or unions.	Ministry of Water Resources
11	Wetland Protection Act 2000	Advocates protection against degradation and resuscitation of natural waterbodies such as lakes, ponds, beels ⁶ , khals, tanks, etc. affected by man-made interventions or other causes. Prevents the filling of publicly owned water bodies and depressions in urban areas for preservation of the natural aquifers and environment. Prevents unplanned construction on riverbanks and indiscriminate clearance of vegetation on newly accreted land.	In case of diversion of water from any lake, a detailed assessment needs to be done. Not triggered. No wetlands are nearby, as per project prerequisite. The prosed site is within the Kumudini Welfare Trust (KWT) boundary.	Ministry of Water Resources
13	The Pourashava Act 2009 / Ordinance issued for the amendment of local government (municipality) ordinance, 2009 and 2010; The Pourashava Ordinance, 1977; Municipal Administration Ordinance, 1960	Provides guidance for subproject integrated community and workers health and hygiene at the construction and operation and maintenance stages of the project	Coordinate with pourashava committees on disaster management measures, water and sanitation and waste management. Triggered. During building design, construction and operation the acts were considered and applied.	Local Authorities
14	Bangladesh Climate Change Strategy and Action Plan of 2009	Enhances the capacity of government ministries, civil society and private sector to meet the challenges of climate change	Integrate adaptation measures for buildings in consideration of extreme climatic events. Triggered. BCCSAP 2009 has been considered in building	Ministry of Environment, Forests and Climate Change

⁶ A beel is a billabong or a lake-like wetland with static water (as opposed to moving water in rivers and canals - typically called khals), in the Ganges - Brahmaputra flood plains of the Eastern Indian states of West Bengal, and Assam and in the country of Bangladesh.

No.	Environmental Legislation / Act	Objective	Relevance to the Project	Responsible Institution
			design and project context.	
15	Building Construction (Amendment) Act and Building Construction Rules, Bangladesh National Building Code	Regulates technical details of building construction and to maintain standards of building construction	Follow specifications to ensure structural integrity of buildings. Triggered. BNBC has been considered during building design.	Ministry of Housing and Public Works
16	Electricity Act 2018	Requires compensation for any damage, detriment or inconvenience caused by the project; Requires precautionary measures in laying down electricity supply lines near or where any metallic substance or line crosses to avoid electrocution; directs in powerline laying construction related activities to avoid public nuisance.	Triggered. The following are ensured: Secure permission to supply energy and lay down or place electricity supply lines for the conveyance and transmission of electricity from respective authorities prior to any works. Give full compensation for any damage, detriment or inconvenience caused by him or by anyone employed by him/her. Take precautions in laying down electricity supply lines near or where any metallic substance or line crosses in order to avoid electrocution.	Ministry of Power, Energy and Mineral Resources
17	The National Energy Policy (1996 and Updated 2004)	Ensures environmentally sound sustainable energy development programs causing minimum damage to the environment, to encourage public and private sector participation in the development and management of the energy sector and to bring the entire country under electrification.	Public and private sector participation in the development and management of energy subprojects. Provides guidelines for renewable energy subprojects. Triggered. Renewable energy provisions are considered in the building design process.	Ministry of Power, Energy and Mineral Resources
18	Standing Order on Disaster, 1999 (Updated 2010)	Enhances capacity at all tiers of government administrative and social structures for coping with and recovering from disasters	Triggered. All building structures are designed to cope with local disasters accordingly.	Ministry of Disaster Management and Relief
19	National Disaster Management Act of 2012	Establishes a framework for managing disasters in a comprehensive way.	Setting-up emergency response procedures. Triggered. The project structure is to follow the setup of the Act.	Ministry of Disaster and Relief
20	East Bengal Protection and Conservation of Fish Act 1950 (1982)	Protection and conservation of fishes in inland water bodies of Bangladesh	No wetland or canal should be encroached or obstructed due to construction and operation of the projects. Not triggered. There is a fish pond nearby the project site. However, the project site will not	Department of Fisheries

No.	Environmental Legislation / Act	Objective	Relevance to the Project	Responsible Institution
			impact the pond in terms of land requirements .	
21	Public Procurement Rule (2008)	Applies to the procurement of goods, works or services by any government, semi-government or any statutory body established under any law; includes measures regarding the safety, security and protection of the environment in construction works; requires Contractors to take all reasonable steps to safeguard the health and safety of all workers on site, protect the environment on and off the site, and avoid damage or nuisance to persons or to property of the public or others	Triggered. The PPR (2008) will be followed during procurement process of the subprojects	Ministry of Public Works
22	Bangladesh Fire Prevention and Extinction Act, 2003 Fire Prevention and Extinction Rules, 2014	The Bangladesh Fire Prevention and Extinction Act, 2003 (Act No. 7 of 2003) and Rules 2014 are crucial legislation aimed at safeguarding lives, property, and valuable assets from fire hazards. The key considerations are: (i) fundamental requirements for fire safety. It covers aspects such as fire prevention, preparedness, and response; (ii) emphasizes the need for fire protection measures in buildings, public spaces, and other areas susceptible to fire incidents; (iii) adherence to safety protocols, regular inspections, and maintenance of fire extinguishers, alarms, and other firefighting tools	Triggered. During construction and operation, fire safety protocols that were stipulated in the Act 2003 and Ruled 2014 will be followed.	Department of Fire Service and civil Defense
23	National Plan for Disaster Management, 2021-2025	The National Plan for Disaster Management (NPDM) 2021-2025 outlines the strategic vision and mission of the Government of Bangladesh in collaboration with the Ministry of Disaster Management and Relief (MoDMR). This comprehensive plan aims to build a resilient Nation by addressing the challenges posed by natural and man-made disasters. The plan emphasizes: (i) Investments for building resilience against chronic disasters; (ii) Social protection; (iii) Resilient post-disaster response and recovery	Triggered. During construction and operation, the NPDM will be considered.	Ministry of Disaster Management and Relief (MoDMR)
24	Balumohal and Soil Management Act 2010	The Balumohal and Soil Management Act 2010 (Act No. 62 of 2010) deals with the provision of leasing Balumohal, extraction of sand and soil, soil management, and other related matters. This law specifies regulations regarding the leasing of Balumohal, exchange of money for sand or soil extraction, Balumohal management, and other relevant issues.	Triggered. During construction contractor will be carrying sand, silt from government approved balu mohal, as per the Act 2010	District Commissioner

i. Other environment related rules and legislations

44. During construction, the subproject will conform to the occupational and health related rules as outlined in the Table II-4 below.

Table II-4 Occupational and health safety related rules in Bangladesh

Title of Laws and Rules	Descriptions	Triggered (Yes/No)
Social Security under the Act, 1923 and an amendment in 1980	According to the Act social impact assessment includes the processes of analyzing, monitoring and managing the intended and unintended social consequences, both positive and negative of planned interventions (policies, programs, plans, projects) and any social change processes invoked by those interventions.	Yes
Bangladesh Labour (Amendment) Law, 2018	Compliance to the provisions on employment standards, occupational safety and health, welfare and social protection, labor relations and social dialogue, and enforcement Prohibition of employment of children and adolescent	Yes
Labour Rules 2015	The Labor Rules give substantial practical heft to the Labor Act, specifying standards for workplace dimensions and features, responsibilities of employers and facility owners, limits on working hours, special rules for young workers, and many other workplace safety and worker protection matters. The Rules provide the basis for inspections of construction sites and industrial facilities by the Department of Inspection for Factories and Establishments (DIFE) under Ministry of Labour and Employment (MoLE).	Yes
The Employer's Liability Act, 1938	The Act declares that the doctrine of common employment and of assumed risk shall not be raised as a defense in suits for damages in respect of employment injuries. Under the Maternity Benefit Act, 1939, the Maternity Benefit Act, 1950, the Mines Maternity Benefit Act, 1941, and finally the rules framed thereunder, female employees are entitled to various benefits for maternity, but in practice they enjoy leave of 6 weeks before and 6 weeks after delivery.	Yes
Public Health (Emergency Provisions) Ordinance, 1994	The ordinance calls for special provisions with regard to public health. Whereas an emergency has arisen, it is necessary to make special provision for preventing the spread of human disease, safeguarding public health and providing them adequate medical service and other services essential to the health of respective community and workers in particular during the construction related work.	Yes
The Employees State Insurance Act, 1948	It has to be noted that health, injury and sickness benefit should be paid to people, particularly respective workers at workplace under the Act.	Yes
Bangladesh Factory Act, 1979	The Act requires every workplace including small- or large-scale construction where women are employed to have an arrangement of childcare services. Based on this Act and Labor Laws - medical facilities, first aid and accident and emergency arrangements are to be provided by the authority to the workers at workplaces.	Yes
Water Supply and Sewerage Authority Act, 1996	The Act specify WASA's responsibility to develop and manage water supply and sewerage systems for the public health and environmental conservation.	Yes

D. International commitments

45. Bangladesh has signed many international treaties, conventions and protocols that pertain to environmental conservation, pollution control, and working conditions, and these need to be considered alongside National laws and regulations in the context of infrastructure planning. A list of the most relevant international treaties and conventions to which Bangladesh is a party is presented in Table II-5.

Table II-5 Treaties and conventions joined by Bangladesh and applicable to this project

Treaty or Convention	Brief description	Triggered?
International Plant Protection Convention (Rome, 1951) & Plant Protection Agreement for SE Asia and Pacific (1999 Revision)	Aims to ensure that construction work and construction materials do not introduce plant pests	The project allocates nearly 28,848sqft (2,681sqm) of green space, which likely includes planting of trees, shrubs, and other ornamental species. If non-Native species or nursery stock are used, there is a risk of introducing invasive pests.
Conservation of Wetlands of International Importance specially as waterfowl Habitat ("Ramsar Convention": Iran, 1971)	Conservation and proper use of wetlands and their resources; protection of significant wetlands and prevention of draining or filling during construction	The project does not appear to directly modify or destroy an existing Ramsar-listed wetland. However, by integrating green and water-sensitive urban design, the building aligns with the Ramsar ethos of wetland-friendly development.
Convention Concerning the Protection of the World Cultural and Natural Heritage (Paris, 1972)	Prevention of damage or destruction of culturally and/or historically significant sites, monuments, etc.	The National is located in Mirzapur, Tangail, Bangladesh—a region with a rich history and several heritage sites. Any major new construction in this context triggers consideration under Article 4 and Article 5 of the Convention, which require states to identify, protect, and conserve cultural heritage within their territory. However, the proposed site is not close to any cultural or natural heritage site.
CITES Convention (Convention on International Trade in Endangered Species)	Aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival	If the project involves the use of materials derived from CITES-listed species (such as hardwoods like mahogany, rosewood, or certain animal-derived products), this would directly trigger CITES compliance. The introduction of exotic plant or animal species for landscaping purposes that are themselves protected, or that could impact Native CITES species, may trigger compliance checks. The architectural documentation and tender should require contractors and suppliers to provide certification that timber and other biological materials do not come from CITES-protected species, or, if they do, that proper CITES permits and documentation accompany all shipments.
Occupational hazards due to air pollution, noise & vibration (Geneva)	Aims to protect workers against occupational hazards in the working environment	The project recognizes the potential for occupational hazards during construction and future operation, especially related to air pollution, noise, and vibration, in line with international standards such as those set in Geneva by WHO and the ILO.
Occupational safety and health in working environment (Geneva)	Prevent accidents and injury to health by minimizing hazards in the working environment	The construction of a 6-storied academic building involves numerous occupational risks (working at heights, heavy lifting, machinery use) necessitating strict OSH measures
Occupational health services (Geneva)	To promote a safe and healthy working environment	As a health-oriented institutional building, there is a legal and ethical trigger to comply with National building codes and international standards on occupational health and safety (OHS), including those set in the ILO Occupational Health Services Convention (No. 161), which stresses employer responsibilities to protect staff health.
Convention on Biological Diversity, (Rio de Janeiro, 1992)	Protection of biodiversity during construction and operation; underpins the value of natural	The construction of a large six-storied academic building and auxiliary structures involves significant changes to land use and can potentially lead to the loss of local flora and fauna habitats. Clearing ground for building, paved areas, roads,

Treaty or Convention	Brief description	Triggered?
	resources that provide food and livelihoods throughout the world	and plazas could disrupt existing ecosystems and reduce green open space.
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1992)	Aims to protect human health and the environment against the adverse effects of hazardous wastes	The generation of construction and demolition debris may include hazardous waste such as asbestos-containing materials, paints, solvents, batteries, mercury-containing devices, or chemical containers if such materials are present.
International (United Nations Framework) Convention on Climate Change (Kyoto Protocol, 1997)	International treaty on climate change and emission of greenhouse gases, reduce greenhouse gas concentrations in the atmosphere to a level that would prevent dangerous anthropogenic interference with the climate system	The Kyoto Protocol, under the UNFCCC, set binding obligations on industrialized countries to reduce greenhouse gas emissions and encouraged sustainable development practices. As Bangladesh is a signatory country, all major infrastructure projects are expected to address sustainability, reduce carbon emissions, and incorporate climate-adaptive measures.
Convention on Persistent Organic Pollutants, Stockholm, 2001	Restriction of use of pesticides and herbicides	Convention on Persistent Organic Pollutants, Stockholm, 2001
Minamata Convention on Mercury, 2017	Global treaty to protect human health and the environment from the adverse effects of mercury, by addressing interim storage and disposal, sites contaminated by mercury, and mercury-related health issues	Construction of modern academic and healthcare facilities often involves materials (e.g., lighting, switches, thermometers, blood-pressure devices) where mercury was traditionally present. The project must ensure these mercury-containing products are not used, in line with the phase-out dates specified by the Convention.

E. Environmental Assessment Process and Requirements

46. This project is subject to the environmental safeguards requirements of both the Government of Bangladesh and ADB. These requirements share some concepts and terminology and are non-contradictory. The two procedural frameworks for environmental impact assessment are described in turn below.

1. National Environmental Clearance Process

47. **Categorization schemes.** The Environment Conservation Rules 2023 stipulate a four-level color-coded typology of impact potential as the basis for determining the environmental clearance process for different types of proposed projects, and the extent of environmental assessment work that must be done in support of clearance applications submitted by proponents. The categorization framework is outlined in Table II-6.

Table II-6 Categorization scheme for determining environmental clearance requirements posed by DoE

Category	General Environmental Assessment Requirement
Green	No environmental assessment required to support application for environmental clearance

Yellow	No environmental assessment required, but detailed project information, including process flow diagrams and effluent treatment arrangement, must accompany application for environmental clearance
Orange	Initial Environmental Examination (IEE) required, and project can proceed to environmental clearance application once IEE is approved by DOE
Red	Brief IEE required to establish ToR for comprehensive Environmental Impact Assessment (EIA), and project can proceed to environmental clearance application after EIA and Environmental Management Plan (EMP) have been approved by DOE, often subject to conditions

48. The Environment Conservation Rules (Schedule I) provide indicative lists of types of projects, facilities and infrastructure that would normally fall into each of the four assessment categories. Although these lists are quite comprehensive, the listed types may in many cases not apply unambiguously to a given proposed infrastructure element or project activity. Further, the matters of scale and context, which determine so much of impact potential, are not strongly addressed by the indicative lists. Assigning an assessment category thus must be informed by expert judgement, based on the initial specifications of the planned project infrastructure and activities, and basic details of the project environment. DoE has noticed this. Hence the ECR 2023 includes the process of engaging experts in the environmental impact assessment process. DoE reviews preliminary infrastructure plans for proposed infrastructure investments and decides regarding the categorization on a case-by-case basis.

49. **Environmental clearance process.** According to the ECR 2023, all projects/industries must apply for a Location Clearance certificate (LCC) prior to the application for Environmental Clearance certificate (ECC) (Figure II-1). The DoE is responsible for awarding both certificates. Regardless of the assessment category assigned, all applications for environmental clearance must be accompanied by a NOC obtained from local authorities (Union Parishad Chairman or Upazila Nirbahi Officer in rural polytechnic locations, and from several entities in urban locations such as Chattogram), and by an application fee. NOCs may also be required from key agencies (e.g., Water Resources Planning Organization, Forests Department, Ministry of Fisheries) if the proposed project has any potential relevance for the natural resources under their remit. The proponent is responsible for obtaining the NOCs and paying the application fee. The proponent is also responsible for renewing the clearance certificate, once obtained, on a yearly/2 yearly/5 yearly basis, paying a fee for each renewal. Fines are levied when the proponent allows the clearance certificate to lapse.

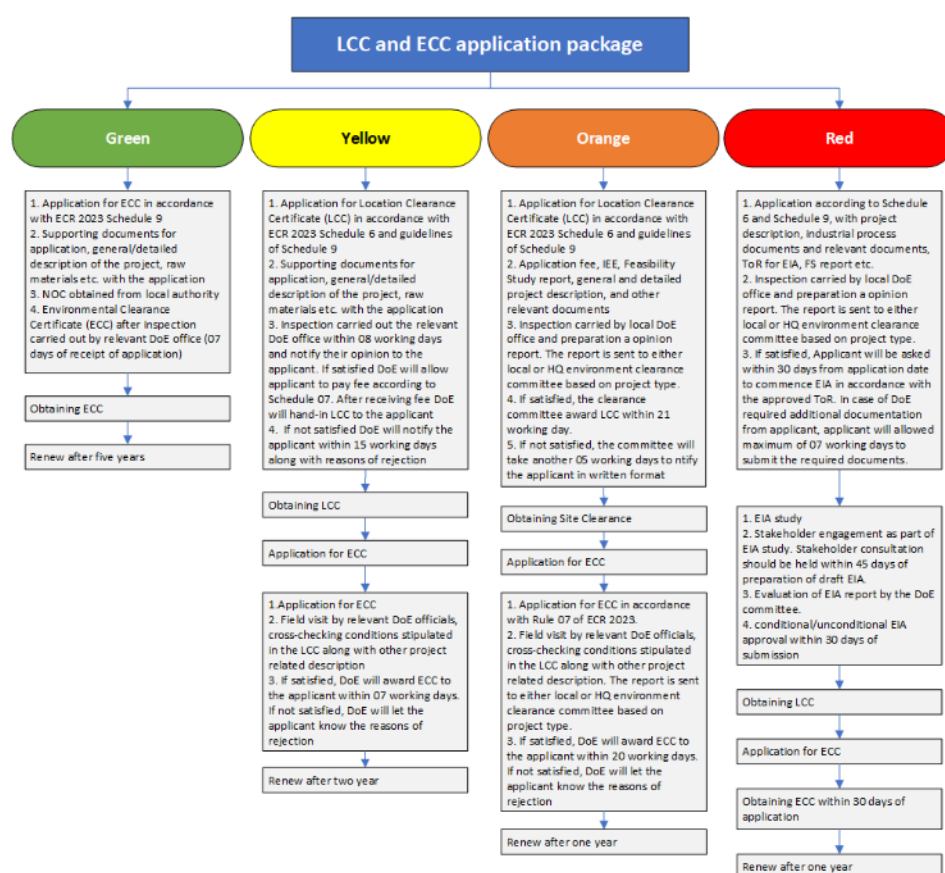


Figure II-1 Location Clearance Certificate (LCC) and Environmental Clearance certificate (ECC) application and awarding process from DoE

50. For investments that require an environmental assessment report (Orange and Red projects), DoE reviews and approves the report (either an IEE or more detailed EIA) before approving the clearance application. The approval may be subject to certain conditions, which the proponent is bound to meet to keep the clearance certificate current. Review time of clearance applications by DoE varies with project category. Environmental Review and clearance process of SICIP is shown below (Figure II-1).

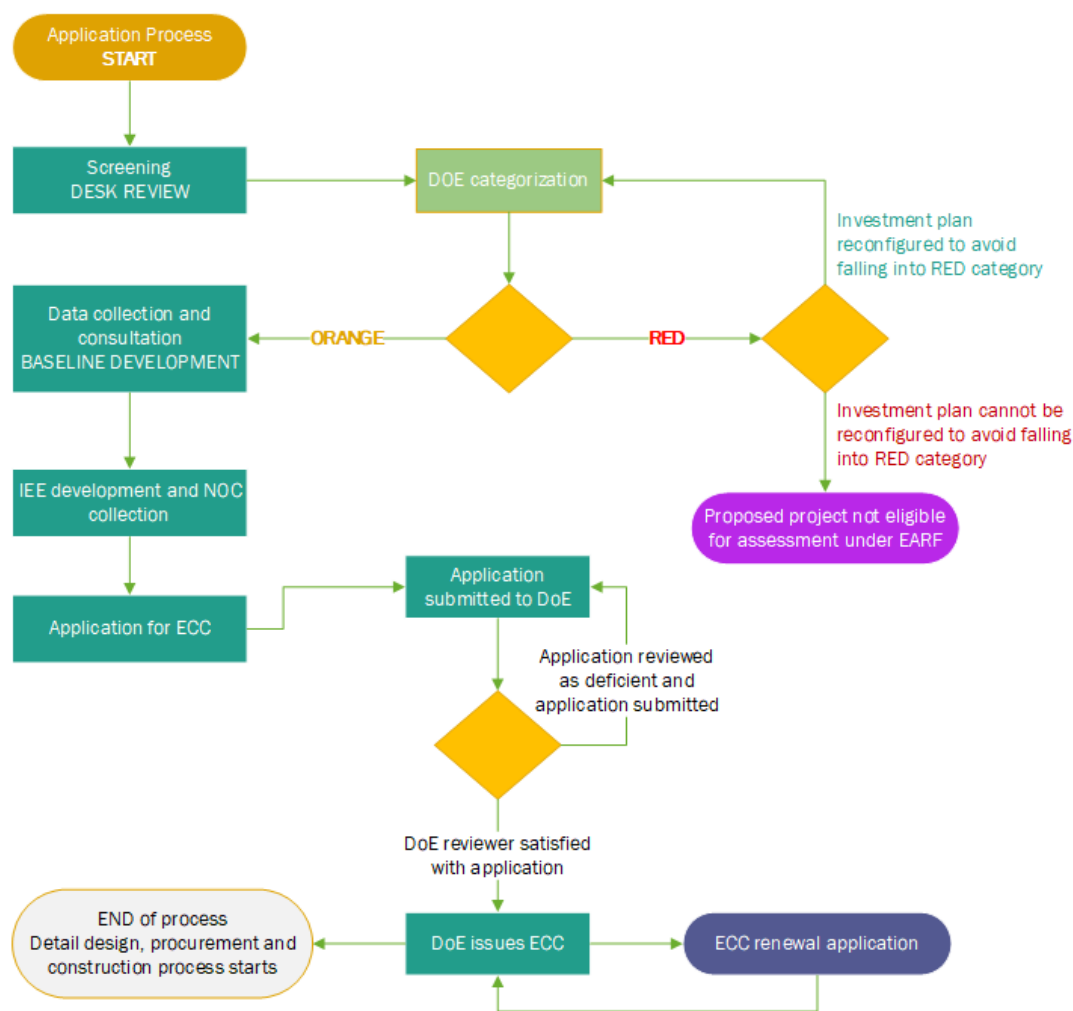


Figure II-2 Flowchart of National clearance process as applicable to SICIP

51. **Anticipated DoE assessment category.** The infrastructure development proposed for the Kumudini Nursing institute structures and associated polytechnic structures under the project will appropriately be considered to fall into the 'Orange' assessment category. The investments do not include any components that would trigger assignment to the 'Red' category, but do encompass components (multi-storied buildings, diagnostic laboratory) included in the 'Orange' list in Schedule 1 of the Environment Conservation Rules 2023. This IEE report will be reviewed by DoE, and the anticipated categorization will be confirmed at that time.

Table II-7 Anticipated project category according to the ECR 2023

Project description	Similar category (as per ECR 2023)	Likely category	Comments
Construction, repair and retrofitting of academic and administrative multistorey buildings and labs	Item no. 25: Residential and commercial buildings (5000 – 20000 sqm built-up area) Item no. 50: Hospital and Clinic (up to 50 beds) Item no. 85: Sewage Treatment Plant (STP) (<1000m ³ daily)	Orange	• Total built-up area exceeds 20000 sqm for the proposed building. However, there is no suggested category of project in ECR 2023 when built-up area exceeds 20000sqm. • The proposed nursing institute will not host any treatment bed. However, the health facility is similar to the ECR item no. 50. • STP capacity is still unknown, STP will be designed at later stage to connect the proposed Kumudini Nursing institute with other buildings.

Source: Information taken from ECR 2023 and interpreted by the consultant

2. ADB Environmental Assessment Requirements

52. Safeguard requirements for all projects funded by the ADB are defined in the ADB Safeguard Policy Statement, 2009 (ADB SPS). This document establishes an environmental review process to ensure that projects undertaken as part of programs funded through ADB loans are environmentally sound, are designed to operate in compliance with applicable regulatory requirements, and are not likely to cause significant environmental, health, or safety hazards. The SPS is one of the key Bank Policies collected in the ADB Operations Manual. The policy promotes good practice as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines.

53. SPS 2009 provides a framework of expectations for environmental analysis, engagement with stakeholders and communities potentially affected by projects, reporting, and follow-up implementation. Key prescriptions include the following:

- (i) At an early stage of project preparation, the borrower/client will identify potential direct, indirect, cumulative, and induced environmental impacts on and risks to physical, biological, socioeconomic, and cultural resources and determine their significance and scope, in consultation with stakeholders, including affected people and concerned NGOs. If potentially adverse environmental impacts and risks are identified, the borrower/client will undertake an environmental assessment as early as possible in the project cycle. For projects with potentially significant adverse impacts that are diverse, irreversible, or unprecedented, the borrower/client will examine alternatives to the project's location, design, technology, and components that would avoid, and, if avoidance is not possible, minimize adverse environmental impacts and risks.
- (ii) The assessment process will be based on current information, including an accurate project description, and appropriate environmental and social baseline data;
- (iii) Impacts and risks will be analyzed in the context of the project's area of influence.
- (iv) Environmental impacts and risks will be analyzed for all relevant stages of the project cycle, including preconstruction, construction, operations, decommissioning, and post-closure activities such as rehabilitation or restoration.
- (v) The assessment will identify potential trans-boundary effects as well as global impacts; and
- (vi) Depending on the significance of project impacts and risks, the assessment may comprise a full-scale environmental impact assessment (EIA) for Category A

projects, an initial environmental examination (IEE) or equivalent process for Category B projects, or a desk review.

54. Screening for potential social and environmental impacts is a critical early step in the preparation of a proposed ADB-funded project. Preliminary project conceptual designs and sites are evaluated using a standard checklist, and assigned to one of four categories, as follows:

- (i) **Category A.** A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An Environmental Impact Assessment is required.
- (ii) **Category B.** A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An Initial Environmental Examination is required.
- (iii) **Category C.** A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required, although environmental implications need to be reviewed.
- (iv) **Category FI.** A proposed project is classified as category FI if it involves investment of ADB funds to or through a financial intermediary.

55. Based on initial screening of components proposed, the project was assigned to **Category B**, pending further study. Accordingly, IEEs were deemed the appropriate mode of assessment for subprojects, unless early analysis based on conceptual design specifications and field reconnaissance were to reveal potential for impacts that require study and mitigation planning of a scale and complexity better addressed through the more detailed and exhaustive EIA. IEEs and EIAs are similar in terms of procedural steps and the structure of reports, but an EIA typically requires (i) more detailed investigation of impact linkages; (ii) collection of more and higher quality baseline data regarding key impact areas; (iii) often a longer and multi-phased study period; and (iv) deeper engagement and consultation with potentially affected people.

56. Important tools and output specified by the SPS 2009 for IEEs and EIAs include the following:

- (i) **Environmental Audit report on existing facilities:** Since proposed Kumudini Nursing institute will use the existing facilities of Kumudini Welfare Trust, as per ADB SPS 2009 an environmental audit report will be required.
- (ii) **Environmental Management Plan.** The borrower/client will prepare an environmental management plan (EMP) that addresses the potential impacts and risks identified by the environmental assessment and prescribes appropriate mitigation measures to address them effectively.
- (iii) **Consultation and Participation.** The borrower/client will carry out meaningful consultation with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation.
- (iv) **Information disclosure.** The borrower/client will submit to ADB the following documents for disclosure on ADB's website: (i) a draft full IEE (including the EMP); (ii) a new or updated IEE and corrective action plan prepared during project implementation, if any.
- (v) **Grievance Redress Mechanism.** The borrower/client will establish a mechanism to receive and facilitate resolution of affected people's concerns, complaints, and grievances about the project's environmental performance.
- (vi) **Monitoring reports.** Results from monitoring of the implementation of a project's EMP are reported semi-annually to the ADB, based on internal monitoring activity carried out more frequently (quarterly, monthly, weekly or daily) as appropriate to

- different project activities and impacts. Monitoring assesses compliance with the measures detailed in the EMP, as well as measurable effects of project activities on the environment.
- (vii) **Unanticipated impact.** If unanticipated involuntary resettlement impacts are found during project implementation, the borrower/client will conduct a social impact assessment and update the resettlement plan or formulate a new resettlement plan covering all applicable requirements specified in this document.
 - (viii) **Occupational Health and Safety.** The borrower/client will provide workers with a safe and healthy working environment, taking into account risks inherent to the particular sector and specific classes of hazards in the borrower's/client's work areas, including physical, chemical, biological, and radiological hazards.
 - (ix) **Community Health and Safety.** The borrower/client will inform affected communities of significant potential hazards in a culturally appropriate manner. The borrower/client will be prepared to respond to accidental and emergency situations. This preparation will include response planning document(s) that addresses the training, resources, responsibilities, communications, procedures, and other aspects required to respond effectively to emergencies associated with project hazards.
 - (x) **Physical Cultural Resources.** The borrower/client is responsible for siting and designing the project to avoid significant damage to physical cultural resources.¹³ Such resources likely to be affected by the project will be identified, and qualified and experienced experts will assess the project's potential impacts on these resources using field-based surveys as an integral part of the environmental assessment process.
 - (xi) **Harmonizing with Other MFIs' Safeguard Policies.** Harmonizing ADB's safeguard policy principles and requirements with those of other MFIs is also required to enhance development impacts, reduce transaction costs, and encourage collaborative behavior. ADB believes that it should harmonize its safeguard policies with those of other MFIs, especially in relation to key policy principles, whereas procedures across MFIs need to cater to a variety of clients and situations.
 - (xii) **Bidding and contract documents.** To ensure that contractors appropriately implement the agreed measures, the borrower/client will include the safeguard requirements in bidding documents and civil works contracts. Where National safeguard policies and regulations differ from ADB's safeguard policy statement including Safeguard Requirements, ADB and the borrower/client will formulate and agree on specific measures to ensure that ADB's safeguard policy principles and requirements are fully complied with.
57. Each of the key elements listed above is addressed in this IEE report.

III. PROJECT DESCRIPTION

A. Project Location

58. Proposed Kumudini Nursing Institute is located within Kumudini complex, beside the River Louhajong, with coordinates 24.0975°N, 90.0940°E. Administratively, the institute is under Mirzapur upazila of Tangail district in Dhaka division. The hospital is 51 kilometers from Hazrat Shahjalal International Airport, Dhaka the largest airport of Bangladesh and 53 kilometers from Bangabandhu Bridge over the river Jamuna. The district headquarters Tangail is 29 kilometers away from the hospital. Currently, north to the site, construction of dormitory for the Nursing and caregiving students of Kumudini Welfare Trust (KWT) is ongoing, funded by the ADB SEIP, the predecessor of ADB SICIP (Figure III-1).



Figure III-1 Location map of the proposed infrastructure at KWT, Mirzapur, Tangail. Red dotted rectangle indicates the KWT area while blue rectangle indicates the proposed site for Nursing Institute.

Image courtesy: Google maps. Prepared by: TA consultants.

59. The project is a six-storied academic building, constructed on a plot comprising various functional zones. The total project built-up area is 277,655 square feet (25,804.37 square meters), where the ground area covers 42,181 sqft (3920 sqm). Detailed of the project is described in later sections.

B. Existing Infrastructure

60. The proposed site is close to the current girl's dormitory (east to the proposed site) and the dormitory under construction (north to the proposed site) (Figure III-2). The ponds visible in the imagery (dated 16-02-2024) are currently sand filled and levelled areas (as of 23rd July 2025) due to the preparation of previous construction.

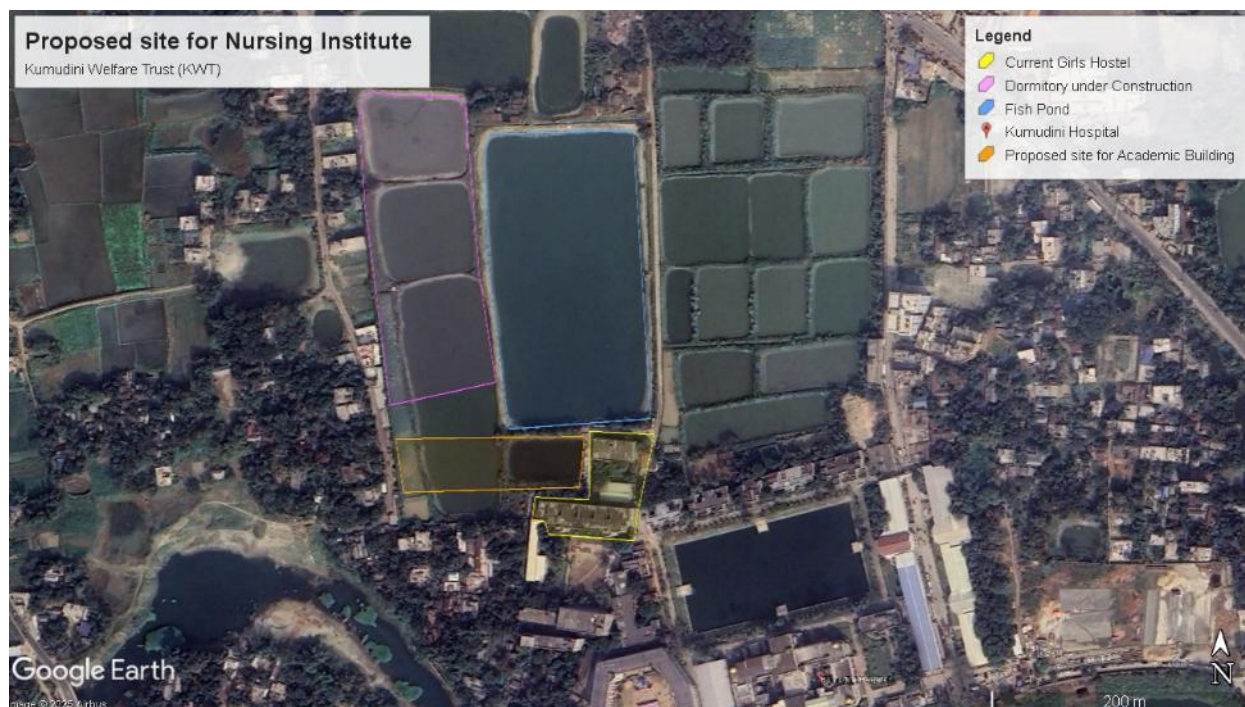


Figure III-2 Existing structures surrounding the proposed site of Nursing Institute at KWT

Image courtesy: Google maps. Prepared by: TA consultants.

61. The entire area within KWT is well connected with a stormwater drainage system that is connected to the Louhojong river (Figure III-3). The KWT campus is well above flood level. There is also a sewage drainage system underground of the entire campus that is connected with a currently operated Sewage Treatment Plant (STP). The STP is located at the Kumudini Hatchery area near 'professor para'. The STP discharges treated water to Louhojong river that is often inspected by the Tangail DoE inspectors. The STP is operational since 2014 and has a capacity of treating 800cum of sewage per day (Figure III-3).

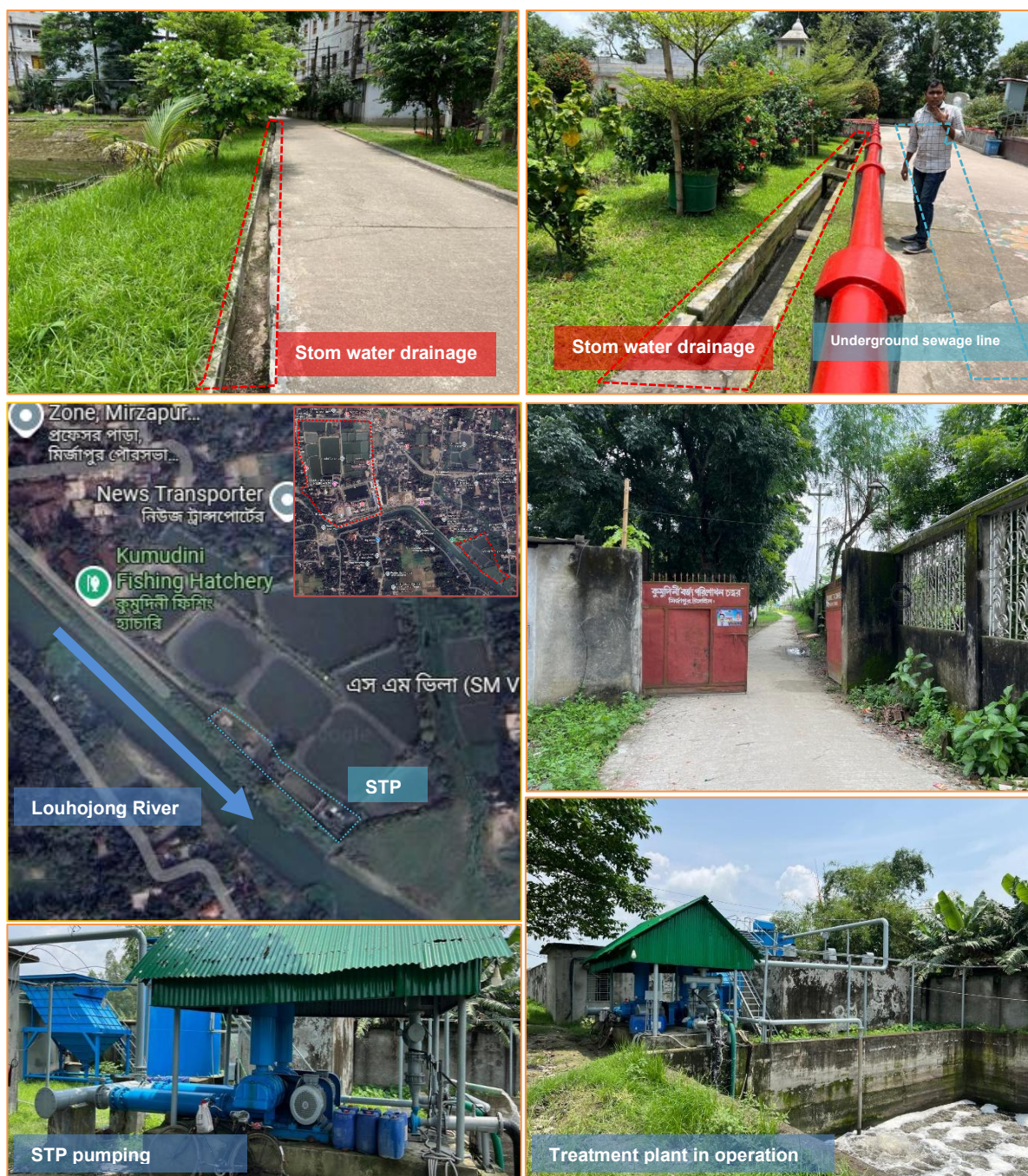


Figure III-3 Kumudini Welfare Trust (KWT) campus drainage and sewage system and STP

Source: TA consultant

64. **Structural & Architectural Details.** (i) Foundation: Designed for ten-storied load, ensuring durability and flexibility for vertical expansion; (ii) Columns and Grid: Rational grid system; detailed column schedule for phased construction and flexibility; (iii) Floor Planning: Large, modular floor plates to facilitate various academic, administrative, and communal functions; (iv) Circulation: Wide corridors (3800–5050 mm), multiple staircases and lifts for safe, continuous movement; (v) Access and Security: Defined entry/exit points, provision for future teachers' accommodation and expansion.

PROJECT AREA:	
ROAD	26,777 SFT / 2,488.57 SQM
PAVED	18,982 SFT / 1,764.13 SQM
PLAZA	10,667 SFT / 991.36 SQM
GREEN	28,848 SFT / 2,681.04 SQM
GROUND	42,181 SFT / 3,920.17 SQM
1ST	45,718 SFT / 4,248.88 SQM
2ND	48,277 SFT / 4,486.71 SQM
3RD	49,335 SFT / 4,585.04 SQM
4TH	44,642 SFT / 4,148.88 SQM
5TH	44,642 SFT / 4,148.88 SQM
ROOF	2,860 SFT / 265.80 SQM
TOTAL	2,77,655 SFT / 25,804.37 SQM

65. **Envelope and aesthetics.** Exposed local brick courses are combined with white render and perforated jali screens to moderate solar heat gain while preserving the texture and character of vernacular architecture. A series of continuous 2.1-meter horizontal lintels support precast shading devices, contributing to both functionality and visual interest. Additionally, the façades are articulated by stepping back 750 millimeters on every second floor, effectively breaking down the building's mass and enhancing its architectural rhythm.

66. **Building Typologies & Interior Features.**

Space type	Key provisions
Skill / science labs	1:1.2 natural light factor, epoxy floors, 100 mm cove skirting, centralized fume extract
Lecture halls	Raked tiers (1:9), acoustic paneling (NRC 0.75), rear AV control booths
Library zones	Column-free 27 m spans via PT beams; daylight sensors cut LED strips by 30%
Spiritual & wellbeing	Gender-segregated 40-person prayer rooms with ablution pods on 2F

67. **Environmental Safeguards.** The following environmental safeguards have been considered:

- Wastewater: Building ties to estate's central biological STP; 24 h retention, tertiary sand filtration before Nageswari River outfall.
- Stormwater: 90 m³ rooftop tanks delay discharge; overflow directed to ornamental pond re-charge.
- Mercury-free procurement: LED luminaires, digital sphygmomanometers and alcohol thermometers comply with Minamata Convention triggers.
- Materials: Low-VOC paints (<50 g/L) and fly-ash cement concrete reduce embodied toxins.
- Green Space: 28,848 sft / 2,681 sqm dedicated to landscaped areas, promoting biodiversity and reducing heat islands.
- Paved vs. Permeable Areas: Separation of paved (18,982 sft) and green, ensuring natural drainage and stormwater management.
- Natural Light & Ventilation: Full-height glazing and multiple windows designed for cross-ventilation and daylight penetration. Use of glass facades prioritizes indoor air quality and reduces dependence on artificial lighting.
- Water Management: Provision for the underground water reservoir. Overhead water tanks for uninterrupted potable and firefighting supply.
- Plantation & Shade: Shading devices on elevations reduce solar gain. Planter boxes incorporated into terrace and façade.

68. **Floorplan and utilities.** The proposed six-storied academic building for Nursing Institute features a robust and modern design, with careful attention to functional distribution, utility integration, and accessibility on every level. Below is an organized table summarizing major floor allocations and the integration of key utilities, as seen in the approved architectural plans:

Table III-1 Floor plan and utilities of the proposed Nursing institute

Floor	Major Spaces	Toilets	Staircases	Lifts	Emergency/Fire	Other Utilities
Ground	Security, reception, admin offices, conference room, library, nutrition lab, care-giving labs, canteen & kitchen, common & waiting areas	Multiple (M/F/Staff)	Six, evenly distributed	Four (16-pax each)	Fire hose cabinets on all wings, Janitor room	Service & storage, pantry, electrical and plumbing shafts, generator/substation, underground water reservoir
First	Principal & admin offices, faculty rooms, classrooms, exam hall, English/AV labs, anatomy/nursing skill/computer labs	Multiple (M/F/Staff)	Six	Four	Fire hose cabinets on all wings, Janitor room	Service & storage, electrical and plumbing shafts, terrace
Second	Prayer spaces (male/female), exam hall, OSPE, classrooms, lecturer/trainer rooms, microbiology/physiology labs	Multiple (M/F/Staff)	Six	Four	Fire hose cabinets on all wings, Janitor room	Service & storage, electrical and plumbing shafts, server room, meeting room, stores, ablution areas
Third	Tutorial rooms, lecture rooms, administrative rooms, meeting/tea rooms	Multiple (M/F)	Six	Four	Fire hose cabinets on all wings, Janitor room	Service & storage, electrical and plumbing shafts
Fourth	Faculty rooms (MSc/BSc/Diploma), classrooms for MSc/PhD, midwifery labs, lecture rooms, debriefing, lounge	Multiple (M/F/Staff)	Six	Four	Fire hose cabinets on all wings, Janitor room	Service & storage, electrical and plumbing shafts
Fifth	Library for post-graduate, MSc labs, exam halls, lecture rooms, stores	Multiple (M/F/Staff)	Six	Four	Fire hose cabinets on all wings, Janitor room	Service & storage, electrical and plumbing shafts, overhead water reservoir
Roof	Overhead water tanks, lift machine rooms	-	Six (access)	Four (machine rooms)	Fire Hose points at access	Service/drainage, access to all major shafts

Source: TA consultants

69. **Health and safety features.** (i) Fire Safety: Dedicated fire hose cabinets and firefighting shafts on each floor. Multiple protected stairwells enabling safe evacuation. Fire doors and compartmentalization for containment; (ii) Accessibility: Lifts (1200 kg/16 pax), wide ramps, and disabled toilets ensure universal access. Elevator lobbies sized for stretcher movement; (iii) Sanitary Provision: Decentralized toilets on each floor (male/female). Janitor and service rooms at all levels for hygiene upkeep; (iv) Security & Control: Security booths at entry points. Controlled access for staff, students, and visitors; (v) Emergency Exits: Clearly marked and accessible at all levels.

70. **Climate and climate change consideration.** The proposed Nursing Institute academic building in Mirzapur, Tangail demonstrates a comprehensive climate-responsive design approach that addresses the region's challenging tropical monsoon conditions. Located in Bangladesh's hot, humid climate zone with pronounced wet and dry seasons, the project integrates multiple passive design strategies to achieve thermal comfort, flood resilience, and energy efficiency.

- Solar Heat Management Strategies:** The project uses several layers of solar protection to manage high levels of sunlight in tropical environments. Shading devices extend 1.8 meters from the building façade, which helps shield the structure from sun exposure common in these regions. Studies indicate that such overhangs can decrease cooling loads by approximately 45% in tropical climates. **Jali brick screens** (perforated brick walls) act as the main solar filter, softening direct sunlight and preserving views outside. Research shows these screens work well in hot, humid climates by reducing glare and letting in useful daylight. The exposed brick with white and grey paint increases solar reflectance and keeps surface temperatures lower than darker regional materials. The building's thermal mass strategy utilizes exposed brick walls to moderate daily temperature swings. During hot days, the brick absorbs excess heat, releasing it during cooler evening hours—a passive cooling technique well-established in tropical architecture. This thermal flywheel effect is particularly valuable in regions with significant diurnal temperature variations.
- Natural Ventilation and Air Movement.** The building's design prioritizes effective natural ventilation and optimized air movement as integral aspects of its passive cooling strategy. Corridors measuring 5,000 mm in width are strategically oriented to align with prevailing wind directions, thereby facilitating efficient cross-ventilation throughout the structure. Studies demonstrate that effective cross-ventilation can maintain interior temperatures within 1.5°C of ambient outdoor conditions, thus substantially lowering reliance on mechanical cooling systems. Multiple stairwells are distributed across the building to promote stack-effect ventilation, wherein warm air ascends through vertical shafts, drawing cooler air from lower levels. This buoyancy-driven airflow provides continuous ventilation regardless of external wind activity. The building's ceiling heights, set at 3,600 mm, further enhance the stack effect while increasing indoor air volume, contributing to improved thermal comfort. Window openings are positioned on opposing facades in accordance with established tropical architectural principles, maximizing wind capture and crossflow regardless of seasonal shifts in prevailing winds. This approach is particularly advantageous in monsoon climates, where wind direction can change significantly throughout the year.
- Monsoon and Flood Protection.** The elevated plinth, set at +750mm above grade, fulfills several climate adaptation objectives beyond flood mitigation. This raised foundation minimizes ground-reflected heat, enhances site drainage, and establishes a protective barrier against surface moisture infiltration that can increase indoor humidity. Comparable plinth strategies have demonstrated significant success in safeguarding structures and communities throughout Bangladesh's flood-prone regions. Additionally, deep roof overhangs and covered walkways shield building exteriors from monsoon rains while supporting optimal natural ventilation. The sloped roof is engineered to efficiently divert heavy rainfall, thereby reducing risks associated with water accumulation, structural deterioration, and elevated humidity levels.



Integrated drainage infrastructure further channels runoff away from the foundation, diminishing hydrostatic pressure and mitigating moisture ingress.

- **Daylighting Optimization:** The central atrium on grid H-6 is designed to provide controlled natural illumination to interior spaces while regulating heat gain. Studies on tropical atrium design indicate that well-proportioned light wells can achieve daylight factors greater than 3%, which may lower artificial lighting needs and limit overheating. The atrium includes biophilic elements aimed at influencing occupant comfort and air quality. Jali brick screens are used to diffuse sunlight, reduce glare, and maintain sufficient illumination for educational purposes. This method is applied in nursing education settings where visual tasks benefit from consistent lighting. The screens' perforated patterns also support seasonal adjustments as sun angles shift throughout the year.

71. **Green Infrastructure.** The project's 28% green coverage helps lower surface temperatures by up to 23.8°C in tropical climates and improves local humidity through evapotranspiration, enhancing microclimatic comfort around the building. The landscape design likely incorporates indigenous vegetation adapted to local rainfall patterns, reducing irrigation requirements while providing natural cooling through shade and transpiration. Such integrated green infrastructure is increasingly recognized as essential for climate adaptation in tropical institutional buildings.

72. **Energy Performance Implications.** The combined climate response strategies significantly reduce the building's energy consumption. Natural ventilation and solar shading can eliminate air conditioning requirements for much of the year in tropical climates, while thermal mass and insulation strategies moderate peak cooling loads during extreme conditions. Studies indicate that well-designed tropical buildings can achieve 70% reduction in cooling energy compared to conventional construction. The LED lighting systems integrated with daylight sensors can reduce artificial lighting energy by 30% through responsive controls that adjust to natural light availability. This is particularly valuable in tropical regions with abundant but variable daylight throughout the year.

73. **Climate Resilience and Future Adaptation.** The building's design demonstrates forward-thinking adaptation to climate change impacts. Flood-resistant elevated construction addresses increasing precipitation intensity, while passive cooling strategies prepare for rising temperatures without relying on energy-intensive mechanical systems. The modular construction approach allows for future modifications as climate conditions continue to evolve. Community resilience benefits extend beyond the building itself, as the raised structure can serve as an emergency shelter during flood events, accommodating displaced families and their possessions. This dual-purpose design approach maximizes the building's value to the broader community while addressing climate vulnerability.

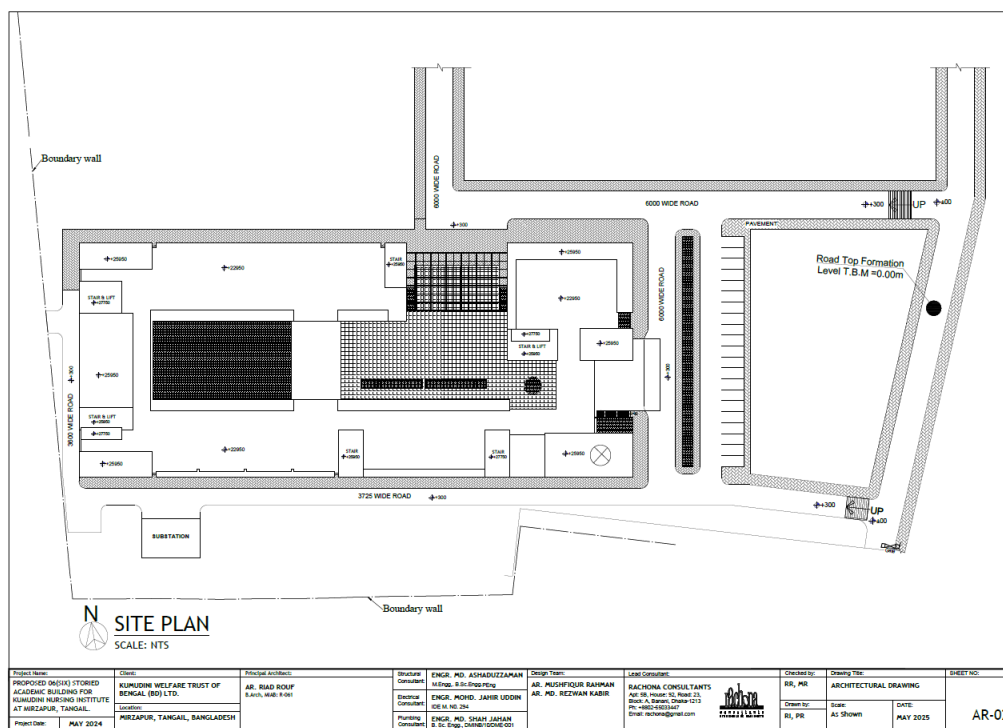


Figure III-7 Site plan of the proposed Nati (Academic Building)

Source: TA consultant

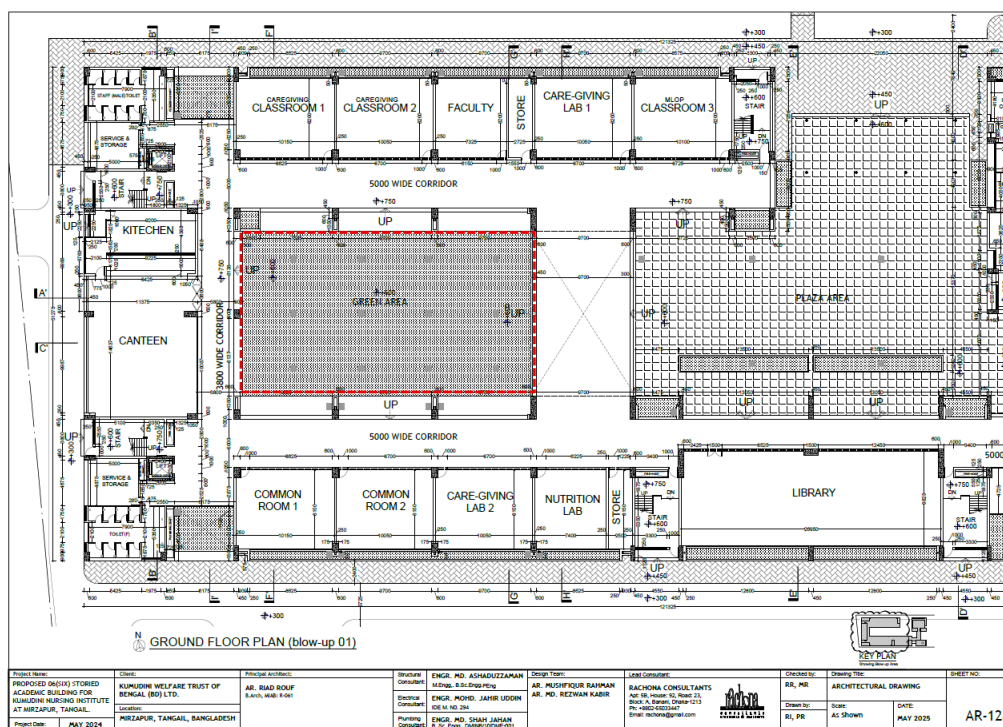


Figure III-6 Proposed Green Area on Ground floor

D. Construction schedule

74. Construction schedule depends on the methodology adopted for construction. In general, the time period will also depend on the resources put in place by the contractor. Designs were finalized in July 2025. The sub-project may take about 24 months for construction. The estimated Construction Schedule is shown in Figure III-10 including pre-construction and post construction activities. The post construction will also include a defect liability period of 12 months.

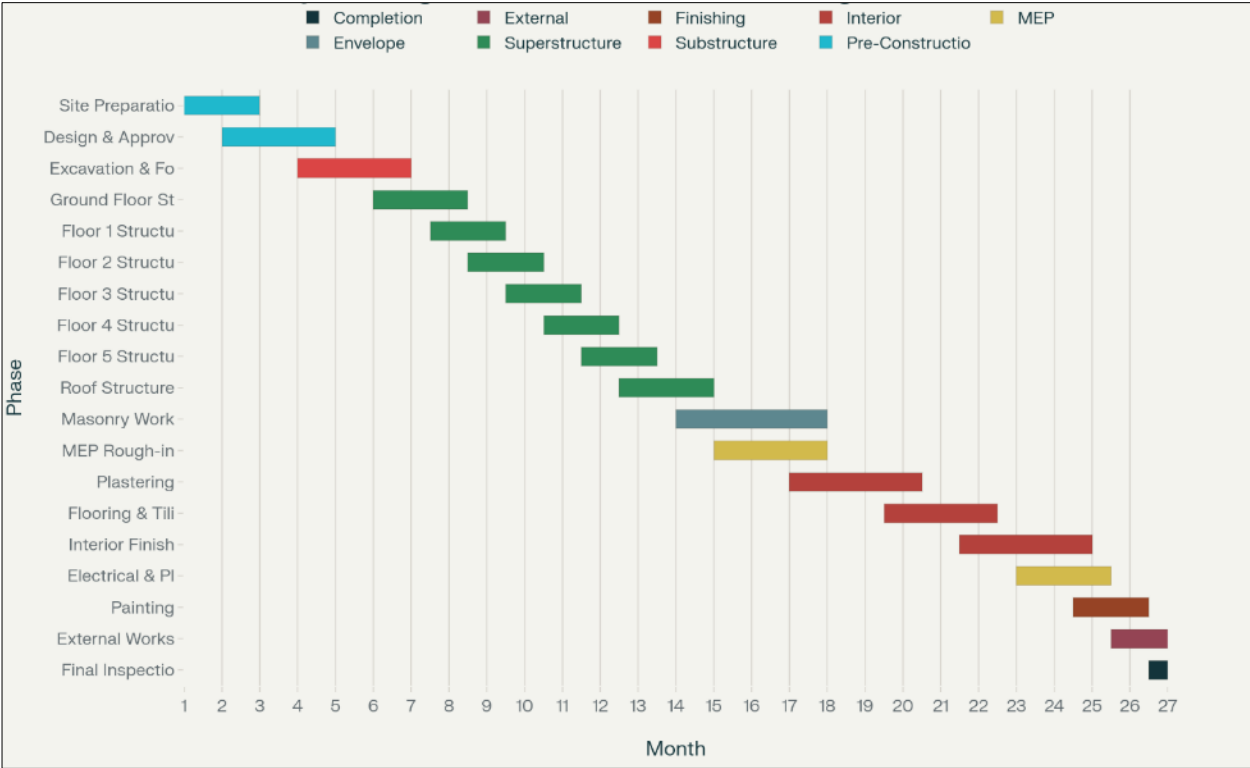


Figure III-10 Typical construction schedule of the proposed Nursing Institute at KWT

Source: TA consultants

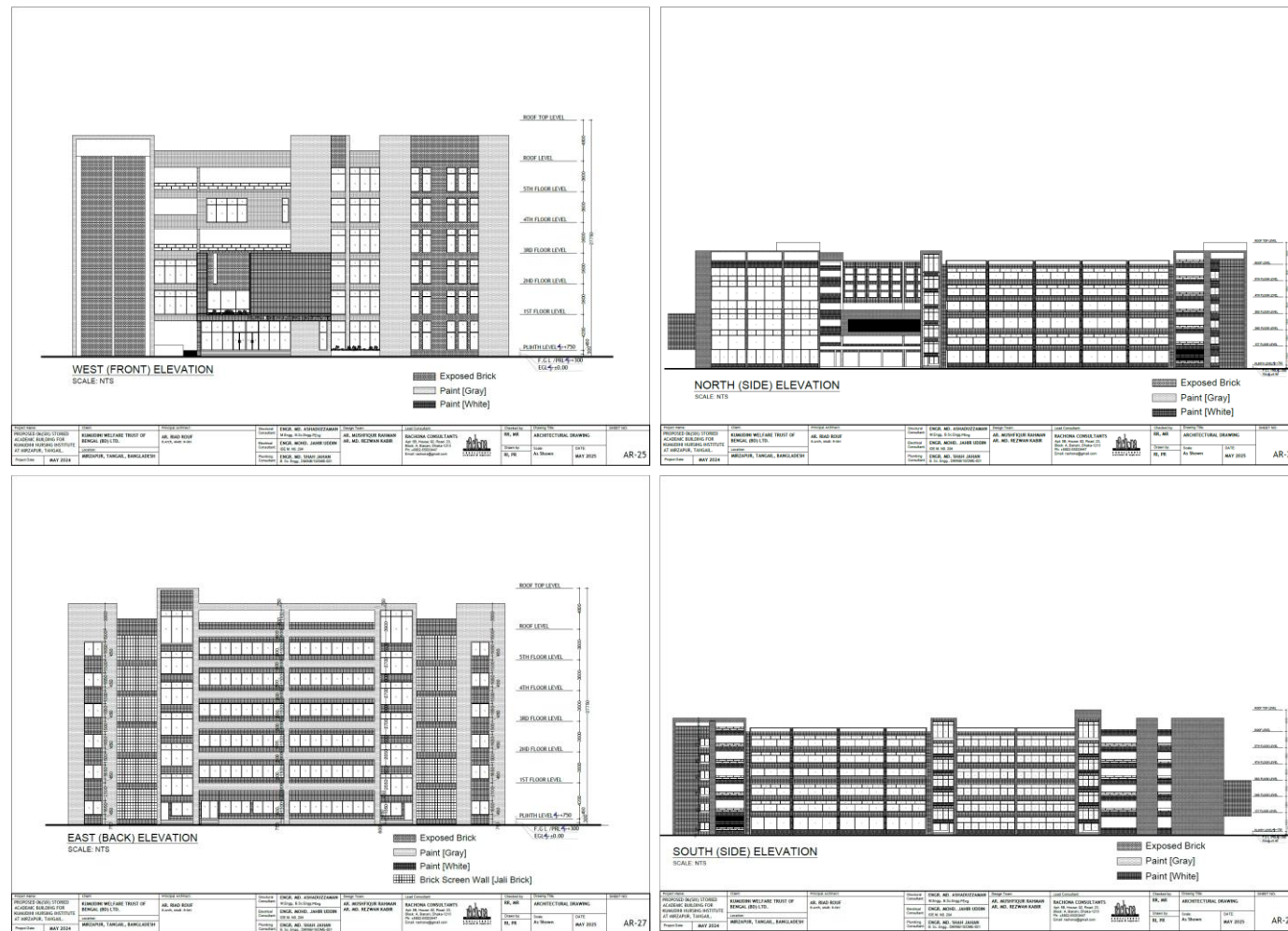


Figure III-11 Side view of the proposed KWT (Academic Building)

Source: TA consultants

A. Location setting

B. Location setting

Figure IV-1 Location of the proposed Kumudini Welfare Trust, Mirzapur, Tangail. Areal image taken from Google Maps. Map in-set collected from Banglapedia

76. **Connectivity.** Being connected. The hospital complex is roughly 25–27 kilometers from Tangail town and is in Mirzapur Upazila, which makes it easy to get to from both Tangail and Dhaka. The major way to get around in Mirzapur is by vehicle. There are pucca (paved), semi-pucca, and katcha (unpaved) routes that connect patients and personnel all year round. People from both cities and towns can go to Kumudini Hospital because there are regular vehicles on regional roads in the vicinity. But the quality of the roads varies, and while the main routes to the

hospital are kept up, some access points may be harder to get to during the monsoon or for people who live in more rural communities.

77. The Mirzapur community is very connected to Kumudini Hospital's campus. It is not only a place to get medical care, but also a place to work, learn, and give back. Its outreach efforts bring services, education, and health awareness to adjacent villages. The hospital's pristine, planted grounds are great for the area and make it a more respectable place to get care than smaller rural facilities. It is a central and valued institution in the area because it is both physically integrated, through the layout of the campus and the landscaping of the environment, and socially integrated, through long-term community involvement and village health outreach.

C. Physical Environment

1. Physiography

78. KWT campus occupies a narrow river valley cut into the eastern rim of the Madhupur Pleistocene terrace. This setting gives the site two contrasting physiographic influences: (i) a slightly elevated, red-brown upland spine (the ancient Madhupur Tract) that protects it from deep, long-duration flooding, and (ii) A bordering alluvial lowland carved by the Louhajang River that brings seasonal floodwater, fertile silts and occasional erosion. Therefore, the KWT campus region exhibits two major physiography: the **Madhupur Pleistocene Terrace** and **Louhajang–Bangshi Valley System**.

79. **The Madhupur Pleistocene Terrace.** The Madhupur Tract is a single block of Pleistocene uplift ($\approx 4\,244\text{ km}^2$) that rises 1-10 m above the surrounding floodplains and is dissected by narrow dendritic valleys⁷. Soils derive from highly weathered Madhupur Clay: acidic (pH 4.3 – 6.0), low in organic matter ($\approx 1.2\%$), and typically clay-loam to silty-clay-loam in texture⁸. Clay mineralogy is dominated by mica and kaolinite with interstratified kaolinite-smectite, giving a firm sub-soil that limits percolation and favours perched runoff⁹. The tract is crossed by the active Madhupur Fault; recent seismic evidence marks the zone as tectonically unstable¹⁰.

80. **Louhajang–Bangshi Valley System.** The Louhajang River branches from the Jamuna near Bhuapur, loops past Tangail town and joins the Bangshi at Jamurki in Mirzapur. Average depth is shallow (1–3 m), yet the river erodes actively during monsoon peaks, damaging banks and approach roads in Fatepur and nearby unions¹¹.

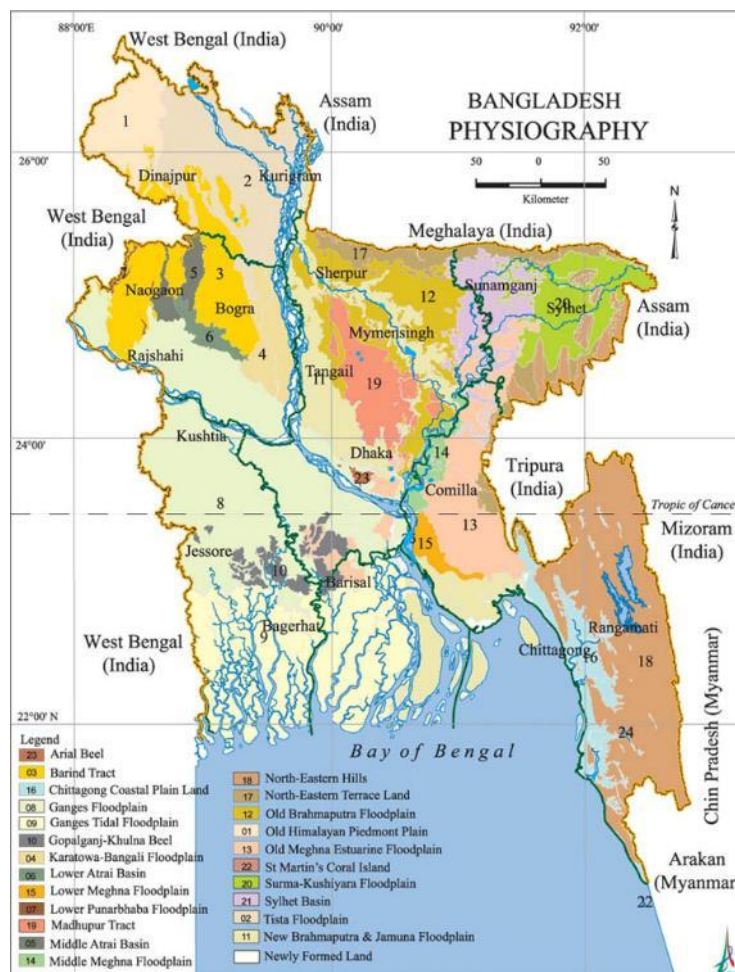


Figure IV-2 Physiographic units of Bangladesh. Project area is in Madhupur Tract. Source: Bangladesh

⁷ Madhupur Tract - Banglapedia. (n.d.). https://en.banglapedia.org/index.php/Madhupur_Tract

⁸ Rahman, M. M., J., M. A. Uddin, Rahman, K. M., & M. Shamsunnahar. (2008). Physico-chemical properties of some soils of Madhupur Upazila under Tangail District. In J. Agrofor. Environ. <https://jagroforenviron.com/wp-content/uploads/2018/09/19-Physico-chemical-properties-of-some-soils-of-Madhupur-upazila-under-Tangail-district-MM-Rahman.pdf>

⁹ Rahman, M. A., Moslehuddin, A. Z., Saha, D. K., Ahmed, I. U., & Egashira, K. (2005). Mineralogy Of Soils from Different Agroecological Regions Of Bangladesh: Region 28-Madhupur Tract. Clay Science 12, 333-339 (2005). https://www.jstage.jst.go.jp/article/jcssclayscience1960/12/6/12_6_333/_pdf

¹⁰ Maitra, M. Neotectonics in Madhupur Tract and its surrounding floodplains. Dhaka University Journal of Earth and Environmental Sciences, Vol. 1(2), 83-89 (January) 2011.

¹¹ <https://www.dhakatribune.com/bangladesh/Nation/285647/river-erosion-devastates-tangail%E2%80%99s-mirzapur>

Recurrent rises of 20-25 cm in a single day have been recorded at Mirzapur gauge points, worsening flash-flood risk¹².

81. **Micro-Setting of Kumudini Hospital.** Coordinates 24° 05' 53" N, 90° 05' 41" E place the hospital on a baid floor only a few hundred meters from the Louhajang's eastern bank. Historical accounts describe the campus as "nestled on the banks of a river in the impoverished region of Mirzapur", confirming its valley-bottom position¹³. The adjoining chala rises gently behind the campus; this subtle topographic step keeps hospital buildings above the highest recorded flood marks, while hospital access roads and staff housing on lower ground require periodic embankment repair.

82. **Implications of Physiographic Setting.** (i) Health-service continuity – The slight terrace elevation offers natural resilience, allowing Kumudini Hospital to function during district-wide floods when other Tangail facilities close; (ii) Water supply & sanitation – Acidic terrace soils and shallow water-tables enable cost-effective tubewells but require iron-manganese filtration to meet clinical standards; (iii) Expansion constraints – Clay-rich sub-soil and high seasonal water tables necessitate pile or raft foundations for new multi-storeyed buildings; seismic design must account for the nearby Madhupur Fault; (iv) Community outreach – The juxtaposition of upland villages and lowland char settlements within a 10-km radius makes the hospital an accessible hub for both terrace farmers and floodplain communities.

2. Topographic relief, land use and soils

83. **Topographic relief.** Mirzapur sits across the eastern Madhupur Pleistocene terrace and the adjoining flood-plain of the Louhajang–Bangshi system. Three discrete relief belts give the upazila its stepped landscape (Table IV-1):

Table IV-1 Distinct topographic relief featuring Mirzapur upazila¹⁴

Local relief unit	Typical altitude (m)	Surface form	Areal share	Dominant use	Key notes
Chala – terrace crests ¹⁵	15 – 25	Rolling interfluvies of red clay	≈ 40%	Orchards, dry-season upland crops, settlements	Part of the continuous Madhupur Tract; slopes break sharply to valleys ¹
Baid – incised valleys ¹⁶	5 – 12	Narrow, flat bottoms cut into the terrace	≈ 35%	Boro rice (winter), jute & aus (monsoon)	Streams are embanked to retain water for dry-season irrigation ¹
Young flood-plain ¹⁷	0 – 5	Broad, silty flats west of Gorai & Fatepur	≈ 25%	Triple-cropped paddy–jute rotations, chars	Deep, prolonged flooding; char migration common ²³

Source: *Madhupur Tract - Banglapedia*. (n.d.). https://en.banglapedia.org/index.php/Madhupur_Tract

84. Kumudini Hospital (24° 05' 53" N, 90° 05' 41" E) is located on a baid floor c. 10 m above mean sea level within a 400–600 m-wide Louhajang valley loop. The adjacent chala rim,

¹² <https://www.dhakatribune.com/bangladesh/Nation/351842/tangail-flood-situation-worsens-as-major-rivers>

¹³ Kumudini hospital. (n.d.). Kumudini Hospital. <https://kumudinihospital.org.bd/index.php?Page=KumudiniHospital>

¹⁴ Madhupur Tract - Banglapedia. (n.d.). https://en.banglapedia.org/index.php/Madhupur_Tract

¹⁵ 10 – 20 m above mean sea level, Broad, dome-shaped lateritic hillocks cut from the Madhupur Pleistocene terrace; soils are strongly weathered red-brown clay (Madhupur Clay) with iron–manganese nodules

¹⁶ 5 – 12 m, Narrow, flat-floored valleys incised between chala ridges; filled with silty-clay alluvium eroded from the terrace

¹⁷ 0 – 5 m Level, stratified sand-silt bars and over-bank deposits laid down each year along active Jamuna, Bangshi, Louhajang and other channels; soils calcareous to neutral, high in nutrients

only 6-8 m higher, shields the campus from long-duration floods, while approach roads on the lower tiers are intermittently submerged during peak monsoon crests (Figure IV-3).

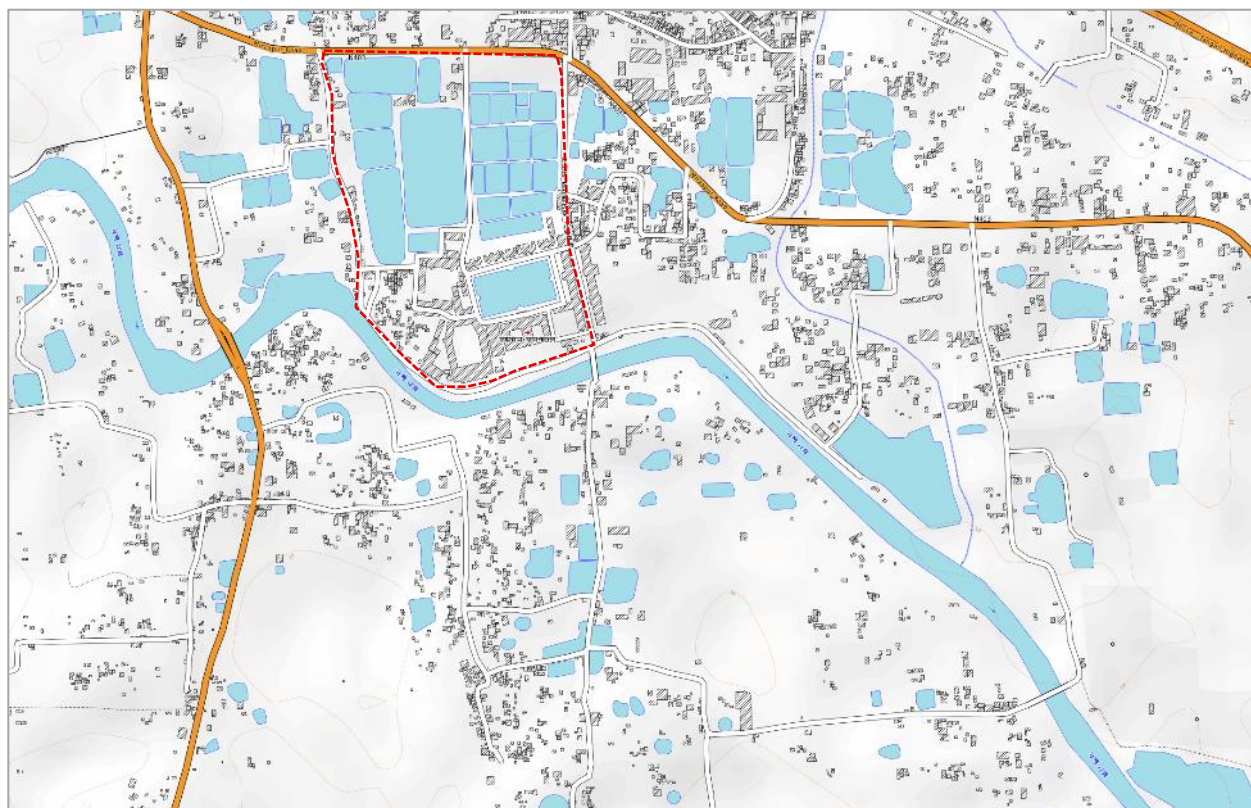


Figure IV-3 Topographic map of Mirzapur Upazila indicating the KWT campus.

Source: <https://opentopomap.org/#map=17/24.09621/90.09640>

85. **Soils.** The soils of Mirzapur display a clear sequence that mirrors the area's stepped relief. On the highest chala crests the landscape is mantled by the red-brown Madhupur Clay Series, a strongly weathered kaolinitic clay-loam that typically shows a pH of 4.5-5.8, very low cation-exchange capacity and poor base saturation¹⁸. The clay hard-sets when dry and sheds rainfall quickly, so it is best suited to deep-rooted perennials such as jackfruit, mango and the remnant sal (*Shorea robusta*) stands rather than to water-demanding field crops.

86. Descending into the narrow baid valley where Kumudini Hospital itself is located, the soil changes abruptly to a greyish-brown, mixed valley-fill alluvium (Figure IV-4). Here silty-clay to clay-loam topsoil overlies relict terrace clay at about 1–1.5 m depth, giving a medium acidity range (pH 5.6-6.5) and an organic-matter content of roughly 1.8-2.8%¹⁹. These attributes, combined with the valleys' perched water tables, make the baid valleys exceptionally productive for dry-season boro rice and monsoon jute, provided pumps keep the fields saturated from January to April. However, the heavy texture is prone to puddling, which can impede timely tillage after harvest.

¹⁸ Madhupur Tract - Banglapedia. (n.d.). https://en.banglapedia.org/index.php/Madhupur_Tract

¹⁹ Tusher, T. R., Piash, A. S., Latif, M. A., Kabir, M. H., & Rana, M. M. (2017). Soil Quality and Heavy Metal Concentrations in Agricultural Lands around Dyeing, Glass and Textile Industries in Tangail District of Bangladesh. In J. Environ. Sci. & Natural Resources.

87. Farther west, the active Louhajang-Bangshi flood-plain supports a younger suite of soils: calcareous, neutrally pH silt-loams with thin stratification of recent over-bank deposits. They are naturally fertile but experience deep, prolonged flooding and seasonal water-logging, factors that favour triple-cropped rice–jute–mustard rotations on the slightly raised ridges while limiting dry-season cultivation on the lower swales.

88. Across all three soil environments, several management problems are emerging. Long-term application of urea and other nitrogen fertilisers on terrace farms has accelerated acidification of the Madhupur Clay, further depressing nutrient availability²⁰. In the baid catchments downstream of dyeing and glass workshops near Gorai and Jamurki, SRDI tests have pinpointed local “hot-spots” of elevated lead, nickel and chromium—residues that pose chronic risks to rice and vegetable safety. Meanwhile, unregulated stripping of red-brown clay for brick-kilns has gouged pits two to three metres deep in chala land north-east of the hospital; the removal not only destroys topsoil but also steepens gully sides, hastening erosion and undermining adjacent rural roads. These trends underline the need for coordinated soil-conservation measures if Mirzapur’s diverse, but fragile land resource is to remain productive and safe for its growing population.

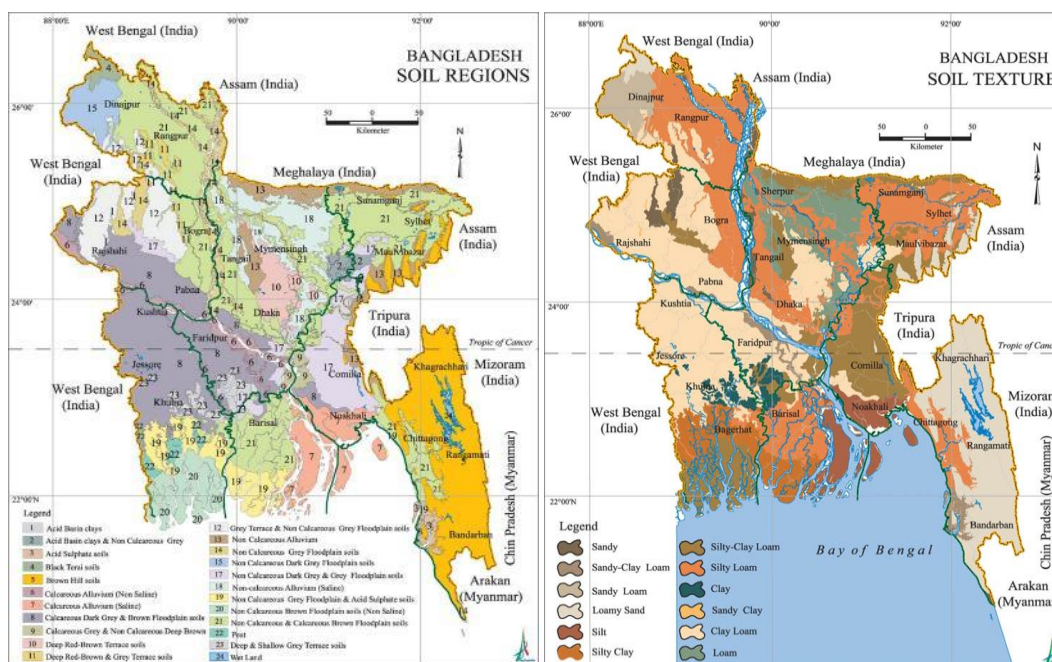


Figure IV-4 Bangladesh general soil regions and Soil textures. Mirzapur region features Deep Red Brown terrace soils (Madhupur Clay) mostly with silty-loam texture. Map source: banglapedia

3. Geology and geomorphology

89. Mirzapur Upazila occupies the southern flank of the Madhupur Pleistocene terrace, an elongate, north-south ridge of reddish-brown clay that was uplifted and deeply weathered during

²⁰ SRDI. (2023). Annual Report 2022-23. Soil Resource Development Institute, Ministry of Agriculture.

the Late Pleistocene (Morgan & McIntire, 1959²¹; Rashid et al., 2006²²). The terrace surface—locally known as the chala—stands 10–25 m above the surrounding flood-plains and is underlain by the stiff, kaolinitic “Madhupur Clay,” a highly oxidised, nutrient-poor deposit capped by iron–manganese nodules. Beneath this clay, bore-hole data show a transition to medium-dense, quartz-rich Dupitila sand and, at greater depth, to Miocene sandstone aquifers that feed local tubewells.

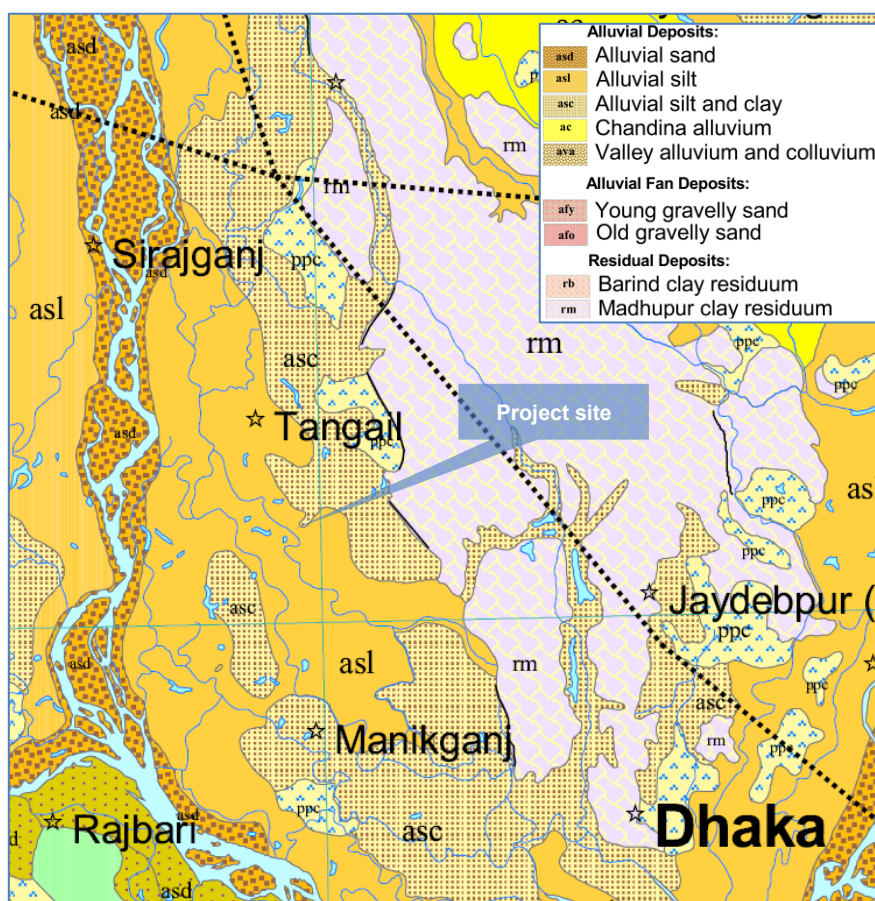


Figure IV-5 Geological map of Tangail region indicating the project area.

Source: GSB 1991

90. Tectonically, the terrace is segmented by a set of north-trending, en-echelon faults, the most prominent being the active Madhupur Fault that skirts Mirzapur and extends toward Dhaka²³. Paleoseismic evidence and modern micro-tremor records indicate that a magnitude-7 event on this structure could generate severe ground shaking across Tangail District and the capital, with scenario analyses predicting collapse of up to 60% of Dhaka’s buildings²⁴. The juxtaposition of

²¹ Morgan, J. P., & McIntire, W. G. (1959). Quaternary geology of the Bengal Basin. *Bulletin of the Geological Society of America*, 70(3), 319-342.

²² Rashid, T., Mosur, H. and Suzuki, S. (2006) A Review on the Quaternary Characteristics of Pleistocene Tracts of Bangladesh. OKAYAMA University, Earth Science Reports, Vol. 13, No. 1,1-13, (2006)

²³ Maitra, M. Neotectonic activities along Madhupur Tract and its adjoining areas. *Proceedings, 3rd InterNati Earthquake Symposium*, Bangladesh, Dhaka, March. 5-6, 2010

²⁴ TBS Report. (2024, June 1). 65% Dhaka buildings to collapse if 6.9 magnitude earthquake occurs on Madhupur fault: Rajuk. The Business Standard. <https://www.tbsnews.net/bangladesh/60-dhaka-buildings-collapse-if-69-magnitude-earthquake-occurs-madhupur-fault-rajuk-865781>

stiff terrace clay over weaker Holocene alluvium amplifies seismic waves at the chala–valley break-in-slope, an effect of particular relevance for large institutional structures such as Kumudini Hospital.

91. Erosional dissection has carved the terrace into a dendritic pattern of narrow, flat-floored baid valleys separated by convex chala ridges. These valleys are filled with 3–6 m of greyish, silty-clay alluvium eroded from the terrace flanks; the deposits display weak stratification, contain 1.8–2.8% organic matter and rest atop the relict Madhupur Clay at roughly 1–1.5 m depth²⁵. Seasonal water-logging turns the baid into natural reservoirs, promoting intensive boro rice cultivation but also favouring low shear-wave velocities that can lengthen seismic shaking. West of Mirzapur the landscape steps down once more to the young Louhajang–Bangshi flood-plain, a Holocene sheet of calcareous silt-loam barely 0–5 m above mean sea level. Annual over-bank deposition produces thin, alternating sand and silt couplets that are fertile yet highly erodible; bank migration along the Louhajang has already undercut several rural roads and threatens to widen the valley during future peak floods.

92. KWT campus sits on one of these baid floors, roughly 10 m above sea level and only 400 m east of the present Louhajang channel^{26,27}. Sub-surface investigations undertaken for recent ward extensions confirm a two-layer profile: 1.0–1.3 m of soft, grey silty-clay over very stiff, reddish terrace clay. This composite foundation affords dual advantages. First, the elevation and the impermeable sub-clay protect critical care blocks from prolonged inundation during the July–September floods that often submerge approach roads. Second, the stiff substratum limits differential settlement, an important consideration in a zone of moderate to high seismic hazard. Nonetheless, site-specific response modelling shows that resonance frequencies of the soft alluvial cap coincide with the 0.8–1.2 Hz band typical of four- to six-storey framed buildings, prompting engineers to adopt base-shear amplifications of 1.3–1.5 in structural design²⁸.

93. Geomorphically, the hospital compound marks the hinge between terrace and flood-plain processes. Upslope, fast surface run-off from chala orchards encourages gully incision and delivers iron-rich sediment to the valley floor. Downslope, slow lateral accretion by the Louhajang reworks this material into natural levees and scroll bars, occasionally forcing channel avulsion. The resulting mosaic of firm terrace clay, soft colluvium and young over-bank silt demands careful land-use zoning: permanent masonry belongs on the older, better-drained surfaces, while flexible or temporary uses are safer on the floodable silts.

4. Seismicity

94. The Bangladesh Geological Survey has published an Earthquake Zoning Map based on seismic intensity. They have divided the country into three zones depending on the seismic intensity namely Zone I, Zone II and Zone III. The North and eastern regions of Bangladesh belong to Zone I (seismically most active); the Lalmai, Barind, Madhupur Tracts, Dhaka, Comilla, Noakhali and western part of Chittagong Folded belt belongs to Zone II (moderately active) while Jessore, Khulna, Barisal, Faridpur, Patuakhali, and Noakhali belong to Zone III (seismically relatively quiet). According to the GSB, the study area is located within Zone II with seismic

²⁵ JICA (2013) Data Collection Survey on Water Resources Management In haor Area of Bangladesh, Final Report, The People's Republic Of Bangladesh, December 2013. Japan International Cooperation Agency, Nippon Koei Co., Ltd.

²⁶ Wikipedia contributors. (2025, March 16). Kumudini hospital. Wikipedia. https://en.wikipedia.org/wiki/Kumudini_Hospital

²⁷ Kumudini hospital. (n.d.). Kumudini Hospital. <https://kumudinihospital.org.bd/index.php?Page=KumudiniHospital>

²⁸ Hossain, M. S., Numada, M., Mitu, M., Timsina, K., Krisna, C., Rahman, M. Z., Kamal, A. S. M. M., & Meguro, K. (2023). Simplified engineering geomorphic unit-based seismic site characterization of the detailed area plan of Dhaka city, Bangladesh. Scientific Reports, 13(1). <https://doi.org/10.1038/s41598-023-37628-6>

coefficient of 0.05g (Figure IV-6). According to the BNBC (2010) zoning²⁹, the project site is located in Zone 3 with $Z = 0.28$ (moderate to high vulnerability zone). Hence, the proposed structure has a high vulnerability to earthquakes, and the design of civil structure needs to comply with relevant provisions on earthquake Bangladesh National Building Code 2020 (latest).

Historical record of major earthquakes for the last 450 years from the Department of Disaster Management (2012) show that from 1762 to 2016, earthquakes originating in Bangladesh had a Richter scale magnitude ranging from 4.2 to 8.8. A maximum of about 8.8 originated from Chittagong-Arakan in 1762.

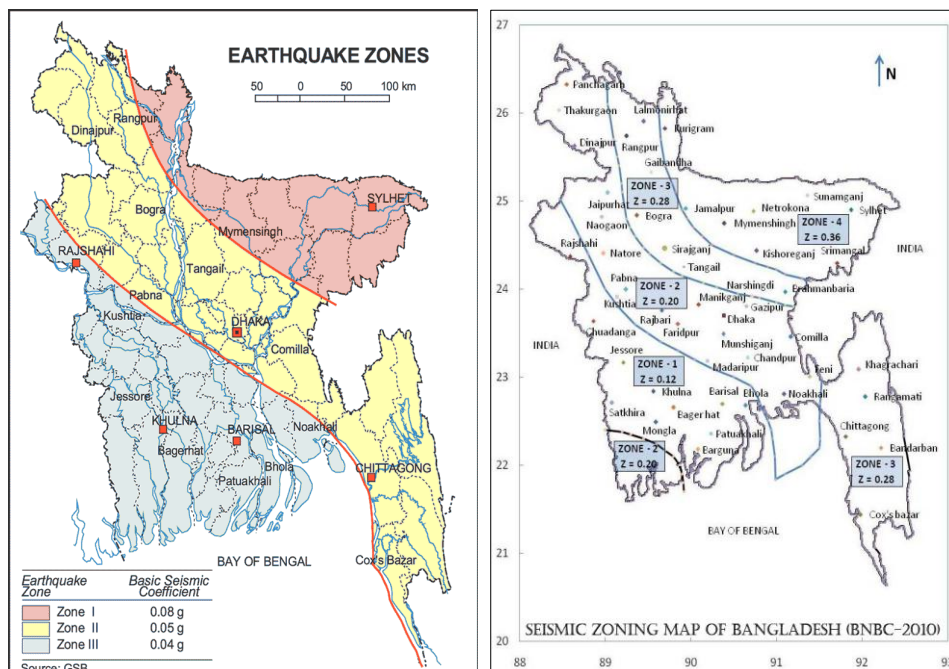


Figure IV-6 Seismic zoning map of Bangladesh (Source: GSB, URL: <http://www.gsb.gov.bd/>) and BNBC 2010

5. Hydrology and drainage system

95. **Rivers and channels.** Bangshi River serves as the primary waterway of the region, flowing along the northern boundary of Mirzapur upazila. This 238-kilometer river originates from the old Brahmaputra near Jamalpur and flows southward through Tangail and Gazipur districts³⁰. The Bangshi is part of the larger Jamuna river system and eventually joins the Turag near Aminbazar before connecting to the Buriganga.

96. **Louhajang** River forms another crucial waterway, originating from the Dhaleswari at Baisnabbari in Tangail Sadar upazila. This 76-kilometer river flows through Tangail town and eventually falls into the Bangshi at Jamurki in Mirzapur upazila³¹. The Louhajang historically supported navigation with launches and cargo boats until the 1980s. **Jhenai** River represents a significant tributary system that has become particularly notable for severe erosion issues in recent years³². The river flows through the eastern parts of Mirzapur, particularly affecting the Fatepur union area. **Turag** River originates from the Bangshi River and flows through parts of

²⁹ BNBC (2010) has been replaced by BNBC 2020. However, the seismic zone map remains the same.

³⁰ Wikipedia contributors. (2025, February 22). Bangshi River. Wikipedia. https://en.wikipedia.org/wiki/Bangshi_River

³¹ Shakil, M. (2022, January 24). Louhajang is dying. The Daily Star. <https://www.thedailystar.net/news/bangladesh/news/louhajang-dying-2945976>

³² <https://www.dhakatribune.com/bangladesh/Nation/349986/jhenai-river-devours-over-100-houses-in-tangail>

Mirzapur before continuing toward Dhaka³³. The Turag is connected to the Jamuna river system through the Louhajang River in Tangail.

97. **Drainage system and waterlogging.** The Mirzapur Township is positioned on higher ground above the annual flood level, but surrounding areas face chronic drainage issues³⁴. The region's topography includes basins that are moderately to deeply flooded and often remain wet during monsoons. This natural characteristic creates inherent challenges for effective drainage, particularly during the extended monsoon period from June through October. The upazila's location within the Young Brahmaputra and Jamuna Floodplain zone makes it susceptible to both riverine flooding and localized waterlogging³⁵. The flat terrain with minimal gradient creates conditions where surface water accumulates in low-lying areas, overwhelming natural drainage capacity during heavy rainfall events.

98. Tangail district experiences severe waterlogging even after moderate rainfall due to poor drainage systems³⁶. Research indicates³⁷ that over 50% of respondents in Tangail cite poor drainage as the primary cause of waterlogging. The municipal infrastructure has proven inadequate to handle increasing urban runoff, with knee-deep water accumulating on main roads after just one hour of torrential rain. The drainage crisis affects not just Mirzapur but the broader Tangail municipality, where 18 wards experience varying degrees of waterlogging, with 8 wards severely affected and up to 90% of residents impacted. Stagnant water can remain for up to 15 days in some areas due to drainage and land management issues.

99. **KWT** campus has experienced severe flooding that directly compromises its operations. During recent flood events, flood waters rose within the hospital complex, submerging all roads for approximately 15 days. The situation forced doctors, nurses, and staff members to travel to work by boat, demonstrating the severity of drainage system failures around the healthcare facility. Despite drainage system failures, the hospital has implemented emergency measures to maintain healthcare services. Heavy equipment on the ground floor was moved to the first floor to protect critical medical infrastructure. All essential services including Outpatient, In-patient, Emergency services, Operating Theatres, ICU's, Delivery Rooms, and Diagnostic Centre remained fully operational despite the flooding.

6. Ground water

100. Mirzapur upazila is positioned within the Young Brahmaputra and Jamuna Floodplain zone, characterized by thick layers of semi-consolidated to unconsolidated fluvio-deltaic sediments³⁸. The primary aquifer system consists of the Dupi Tila Sandstone Formation of Plio-Pleistocene age, which occurs at depths ranging from less than 5m in the northwest to more than 75m in the south (BWDB 2020). According to Bangladesh Agricultural Development Corporation

³³ <https://www.thedailystar.net/country/news/71-km-human-chain-formed-save-turag-192625>

³⁴ LGED (2015) Mirzapur Poursahava Masterplan: 2011-2031. Technical Assistance: Local Government Engineering Department (LGED). Government of the People's Republic of Bangladesh, Ministry of Local Government, Rural Development & Cooperatives Local Government Division.

³⁵ JICA, LGED, PCI (2005) Master Plan on SSWRD In Tangail District. JAPAN INTERNATIONAL COOPERATION AGENCY (JICA), MINISTRY OF LOCAL GOVERNMENT, RURAL DEVELOPMENT AND COOPERATIVES (MLGRD&C), LOCAL GOVERNMENT ENGINEERING DEPARTMENT (LGED), & PACIFIC CONSULTANTS INTERNATIONAL (PCI), JAPAN. https://openjicareport.jica.go.jp/pdf/11814605_14.pdf

³⁶ <https://www.dhakatribune.com/bangladesh/Nation/349946/one-hour-rainfall-accumulate-knee-deep-water-on>

³⁷ Latif, M.B., Arifuzzaman, M., Siddick, M.Z., Hosen, M. E. (2016) Effect of Waterlogging in Tangail Pourashava. Journal of Science and Technology, 6 (1&2): 11-20, December 2016. <https://www.scribd.com/document/526398563/v-6-i-2>

³⁸ BWDB (2020) Ground Water Table Hydrograph of 38 districts for the year 2008 to 2018. June 2020. Ground Water Processing Branch, Processing and Flood Forecasting Circle. Bangladesh Water Development Board (BWDB).

(BADC) data, groundwater levels in Mirzapur upazila show significant seasonal variations: the pre-monsoon depth is 10.30 meters, post-monsoon depth is 7.46 meters, and drought period depth reaches 5.28 meters³⁹. This indicates a groundwater table fluctuation of approximately 5.02 meters annually..

7. Flooding

101. **Regular Monsoon Flooding.** Mirzapur upazila regularly experiences monsoon flooding from June through October, with flood waters affecting 11 of its 15 unions⁴⁰. The 2020 monsoon floods alone affected over 600,000 people across Tangail district, with Mirzapur ranking among the worst-affected upazilas. Educational infrastructure suffered extensively, with 86 primary schools, 31 high schools, and 5 madrasas damaged in Mirzapur upazila alone⁴¹. The agricultural sector faces recurring devastation, with 18,126 hectares of standing crops including Aman paddy, vegetables, lemon, and sugarcane washed away during typical flood seasons⁴². Lemon growers in Mirzapur upazila face particular vulnerability, with 380 hectares of lemon orchards fully damaged during severe flood years, causing 50% plant mortality due to prolonged waterlogging⁴³.

102. **Primary Flood-Generating Rivers.** The **Jhenai River** represents the most destructive flood source for Mirzapur upazila^{44,45}. During 2024 flood events, the Jhenai River water level reached 97cm above danger level at Jokarchar point, causing over 100 houses to be devoured in five villages^{46,47}. The river's erosional capacity intensifies during flood periods, creating simultaneous flooding and land loss that displaces entire communities⁴⁸.

103. The Bangshi River contributes significantly to flood dynamics, with water levels rising above danger levels causing panic among riverside villages⁴⁹. The Ekabbar Hossain Bridge on Bangshi River remains in vulnerable state due to erosion, demonstrating how flood-related erosion threatens critical infrastructure⁴⁹. The Jamuna River system drives regional flood patterns, with water levels 35cm above danger mark triggering extensive flooding across multiple upazilas⁵⁰. When Jamuna water levels rise, its tributaries including Dhaleshwari and Jhenai experience corresponding increases, creating coordinated flooding across the entire river network⁵⁰.

104. Major River in the study area is Meghna River. According to the 'ThinkHazard!' Tool developed by GFDDR, flood risk at Tangail is "High". The Bangladesh Water Development Board maintains continuous monitoring stations throughout Mirzapur upazila⁵¹. Real-time water level data shows dramatic fluctuations, with stations recording rises of 68cm in 24-hour periods during extreme events⁵². The Mirzapur monitoring point on Bangshi River provides critical early warning data for downstream communities and healthcare facilities⁵³. Flood forecasting systems indicate

³⁹ <https://badc.gov.bd/site/page/d931c2f2-c016-4bc5-9483-67ca4bb4ea54/GroundWater-Level-Data>

⁴⁰ Kumudini hospital. (n.d.). Kumudini Hospital. <http://kumudinihospital.org.bd/index.php?Page=AllImages>

⁴¹ The Daily Star (2020, September 1). Floods damage 788 educational institutions in Tangail. The Daily Star. <https://www.thedailystar.net/country/news/floods-damage-788-edn-institutions-tangail-1954281>

⁴² <https://www.dhakatribune.com/bangladesh/Nation/218682/tangail-devastated-in-the-aftermath-of-floods>

⁴³ <https://thefinancialexpress.com.bd/home/tangail-lemon-growers-fear-losses-1605156378>

⁴⁴ <https://www.dhakatribune.com/bangladesh/Nation/285647/river-erosion-devastates-tangail%E2%80%99s-mirzapur>

⁴⁵ <https://www.dhakatribune.com/bangladesh/Nation/349986/jhenai-river-devours-over-100-houses-in-tangail>

⁴⁶ <https://www.dhakatribune.com/bangladesh/Nation/349986/jhenai-river-devours-over-100-houses-in-tangail>

⁴⁷ <https://www.dhakatribune.com/bangladesh/Nation/351387/thousands-still-trapped-by-floodwaters-in-tangail>

⁴⁸ <https://www.dhakatribune.com/bangladesh/Nation/285647/river-erosion-devastates-tangail%E2%80%99s-mirzapur>

⁴⁹ Shakil, M. (2021, June 27). Panic grips riverside villages. The Daily Star. <https://www.thedailystar.net/country/news/panic-grips-riverside-villages-2119569>

⁵⁰ <https://thefinancialexpress.com.bd/home/flood-situation-worsens-in-tangail-as-jamuna-swells-1594006930>

⁵¹ <http://old.ffwc.gov.bd/>

⁵² <https://www.voice7news.tv/district-news/news/10299>

⁵³ <http://old.ffwc.gov.bd/>

that water levels can remain above danger marks for extended periods, with some events lasting 15+ days⁵⁴. This prolonged inundation creates particularly severe challenges for healthcare facilities that must maintain operations throughout extended flood periods.

105. The Aqueduct is an effective tool developed by World Resources Institute (WRI) to predict flooding occurrences in a specific geographic area under various future climate scenarios. The tools map the present scenario of flooding in the Mirzapur Upazila (Figure IV-7) which reveals riverine flooding. The baseline scenario reveals that Mirzapur upazila currently experiences moderate flood inundation with several key characteristics: (i) **Flood Extent and Distribution:** The baseline map shows scattered flood zones primarily concentrated along river corridors and low-lying areas. Current flooding affects approximately 15-20% of the upazila area, with inundation depths typically ranging from shallow (under 0.5m) to moderate (0.5-2m); (ii) **Geographic Pattern:** Flood inundation follows predictable patterns along the Bangshi, Louhajang, and Jhenai river systems, with limited penetration into upland areas. The Mirzapur township area shows minimal flooding under current conditions, consistent with its position on higher ground above annual flood levels; (iii) **Infrastructure Vulnerability:** Under baseline conditions, critical infrastructure including healthcare facilities face manageable flood risks, though periodic waterlogging affects accessibility and operations.

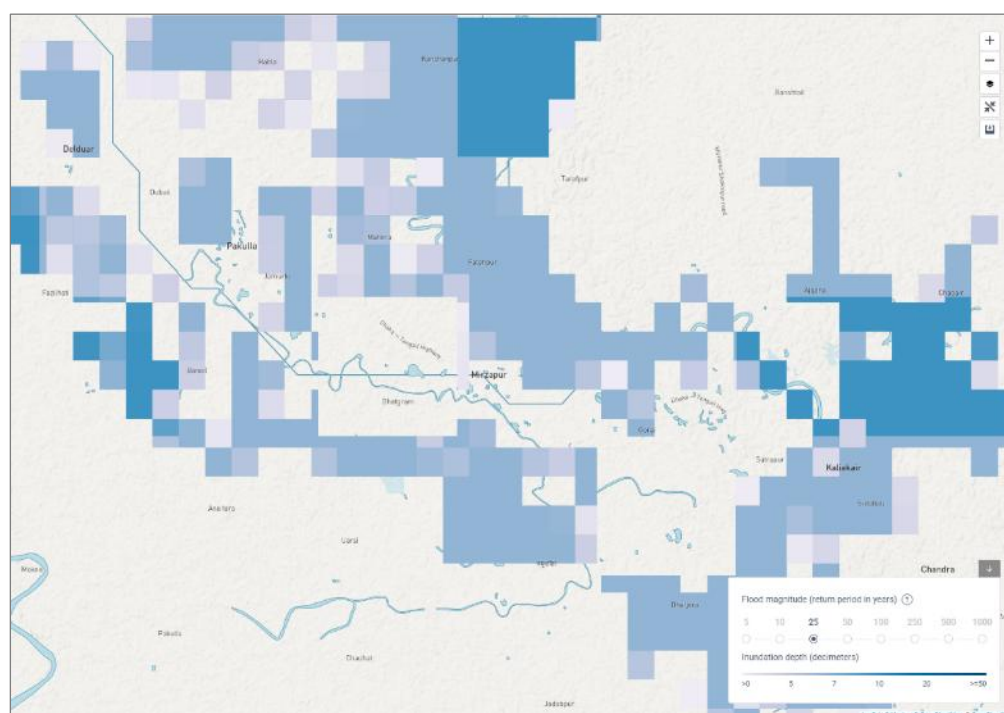


Figure IV-7 Baseline scenario of flooding in the Mirzapur Upazila region mapped by Aqueduct tool.

Source: www.wri.org/applications/aqueduct/floods/

106. Flood occurrences have been projected using the Aqueduct tool for Mirzapur upazila under RCP 8.5, SSP3 scenario for 2050 with a 50-year return period setting using GFDL-ESM2M model. The results are given in Figure IV-8. According to the forecast, there is a considerable

⁵⁴ <http://kumudinihospital.org.bd/index.php?Page=AllImages>

chance that the project site will flood in the future. A drastically different flood landscape is depicted in the RCP 8.5 SSP 3 scenario for 2050 with a 25-year return period: (i) Significant Increase in Flood Zones: According to the future scenario, between 35 and 40 percent of the upazila area will be flooded, which is twice as much as the area that is currently flooded. large areas of prolonged submersion due to the growth of deep inundation zones (above 2 meters); (ii) Increased Flood Intensity: Vulnerable areas experience flood depths exceeding 7 to 10 meters, with flood depths rising dramatically. Flood waters reach far inland from river corridors, causing flooding to occur constantly over large areas of the upazila; (iii) Geographic Transformation: The highest possible flooding levels are higher than ever before, transforming once-safe areas into high-risk flood zones. The dispersed pattern of baseline conditions is replaced by interconnected flood zones, which makes emergency response and evacuation considerably more difficult.

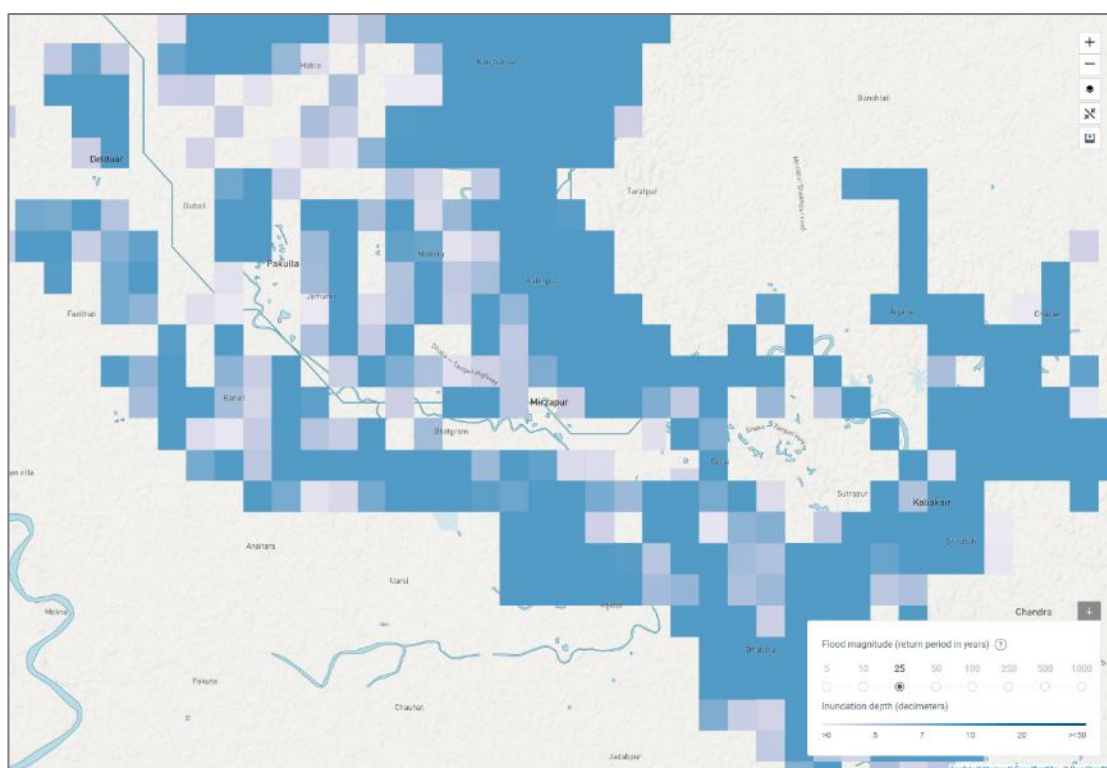


Figure IV-8 2050 flood inundation scenario of Mirzapur Upazila using Aqeduct tool with 25-year return period, under RCP 8.5, SSP 3 scenario.

Source: www.wri.org/applications/aqueduct/floods/

8. Climate

107. Although less than half of Bangladesh lies within the tropics, the presence of the Himalaya Mountain range has created a tropical macroclimate across most of the east Bengal land mass. Bangladesh can be divided into seven climatic zones (Rashid 1991). According to the classification, Tangail is located in the South-central Zone climatic zone (Zone G, Figure IV-9). This is a transitory zone between the southeastern, northwestern, and southwestern zones. This zone is characterized with high rainfall as well as high temperature. Throughout the year, Narshingdi experiences consistently high temperatures with an average annual temperature around 25°C (77°F). The hottest months are typically from March to May, with average highs exceeding 30°C (86°F). In this zone rainfall is abundant, being above 1,900 mm. this zone also experience severe hailstorms, nor'westers, and tornadoes.

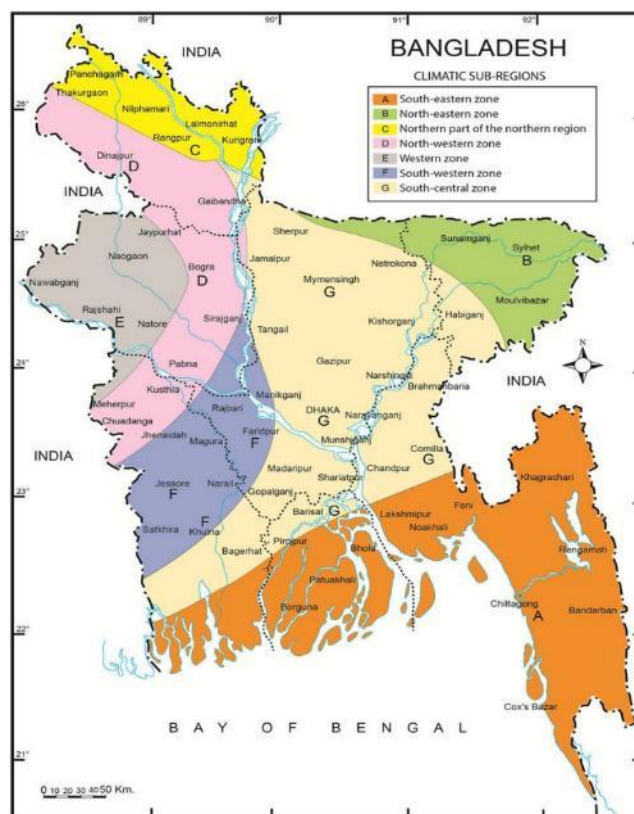


Figure IV-9 Climatic zones of Bangladesh. Project site belongs to Zone G.

108. In the Köppen climate classification, Tangail has a Tropical savanna climate (symbol: Aw). Tangail (Tropical savanna) experiences consistently high temperatures throughout the year. The mean annual temperature is around 25.1°C (77.2°F), with all months having an average temperature well above the 18°C (64.4°F) threshold that defines tropical climates. The most defining characteristic of the Aw climate in Tangail is the clear division between a heavy wet season and a pronounced dry season. The wet season, heavily influenced by the South Asian monsoon, runs from approximately June to September. During this period, Tangail receives the vast majority of its annual rainfall. Rainfall can be intense and frequent, and the climate is hot and very humid. The average annual rainfall for the district is substantial, ranging from 1,467 mm to over 2,000 mm. The dry season occurs during the winter months, typically from December to February. During this time, precipitation is significantly reduced, with some months receiving less than 10 mm of rain. The weather is cooler and less humid, which is why the "w" (winter dry) is used in the classification.

109. **Temperature and rainfall.** The district experiences hot and humid summers with mild winters, with the monsoon season now extending from February to October instead of the traditional June-September period. This extended monsoon creates prolonged periods of high humidity and increased disease transmission risks (Figure IV-10). The pre-monsoon period represents the most challenging time for healthcare facilities in Mirzapur. Temperatures soar to 30-38°C (86-100°F), with extreme temperatures reaching up to 44°C (111°F) during heat waves. April typically records the highest temperatures, with averages of 36°C (97°F). Humidity levels range from 70-85%, creating oppressive conditions. The monsoon season brings the heaviest rainfall, with July and August receiving 300-400mm monthly. This period is characterized by temperatures of 28-33°C (82-91°F) and humidity levels of 85-95%. The southwest monsoon carries warm, moist air from the Bay of Bengal, creating ideal conditions for vector breeding. The winter dry season provides relative relief with temperatures of 15-25°C (59-77°F) and lowest

humidity of 65-75%. January records the coldest temperatures, averaging 21°C (70°F) with minimal rainfall of 10-25mm monthly.

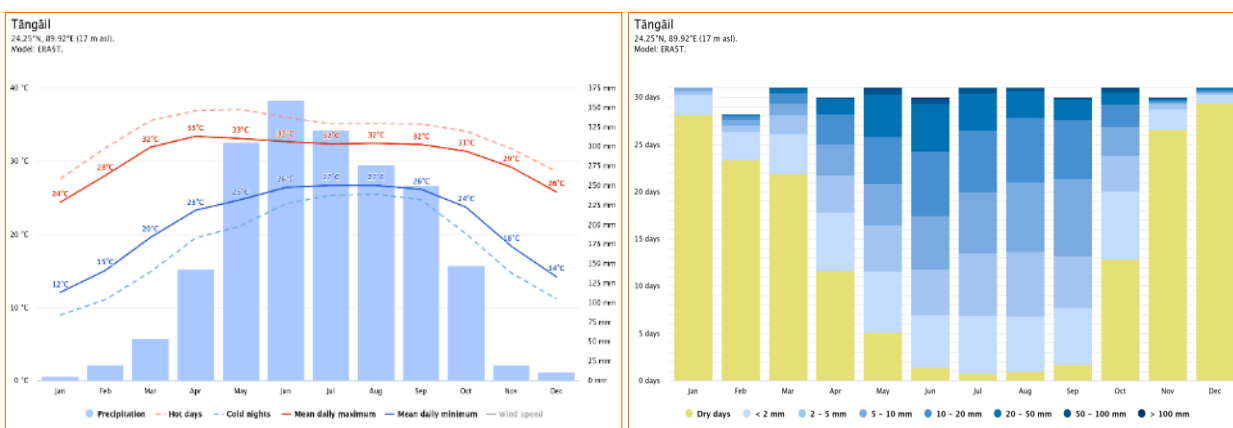


Figure IV-10 (left) Avg. temperature and precipitation; (right) precipitation amount year-round in Tanagail region.

Source: www.meteoblue.com

110. **Hospital Challenges:** Kumudini Hospital faces increased patient loads from heat-related admissions while dealing with equipment stress from high temperatures. The hospital's infrastructure must cope with elevated cooling demands and potential power disruptions.

9. Cyclones and other disasters

111. **Cyclones.** Cyclones are not common in Tangail district. As per the cyclone risk zone map prepared by PC and ADB (2021)⁵⁵ (Figure IV-12) project site is in the moderate-risk area of Bangladesh. Cyclone risk zone map and track map of Bangladesh is given in Figure IV-11 below. Only 01 cyclones are recorded in last 56 years that had hit the Tagail District of Bangladesh. Mirzapur's elevation of 15.8 meters above sea level places it in a transitional zone where cyclones typically weaken after making coastal landfall but still retain significant destructive potential. The upazila's location within the Jamuna-Brahmaputra river basin increases vulnerability to cyclone-induced flooding and storm surge effects that can penetrate far inland through river systems.

⁵⁵ Planning Commission, Ministry of Planning and Asian Development Bank. 2021. Bangladesh Climate and Disaster Risk Atlas: Hazards—Volume I. Dhaka, Bangladesh and Manila, Philippines.

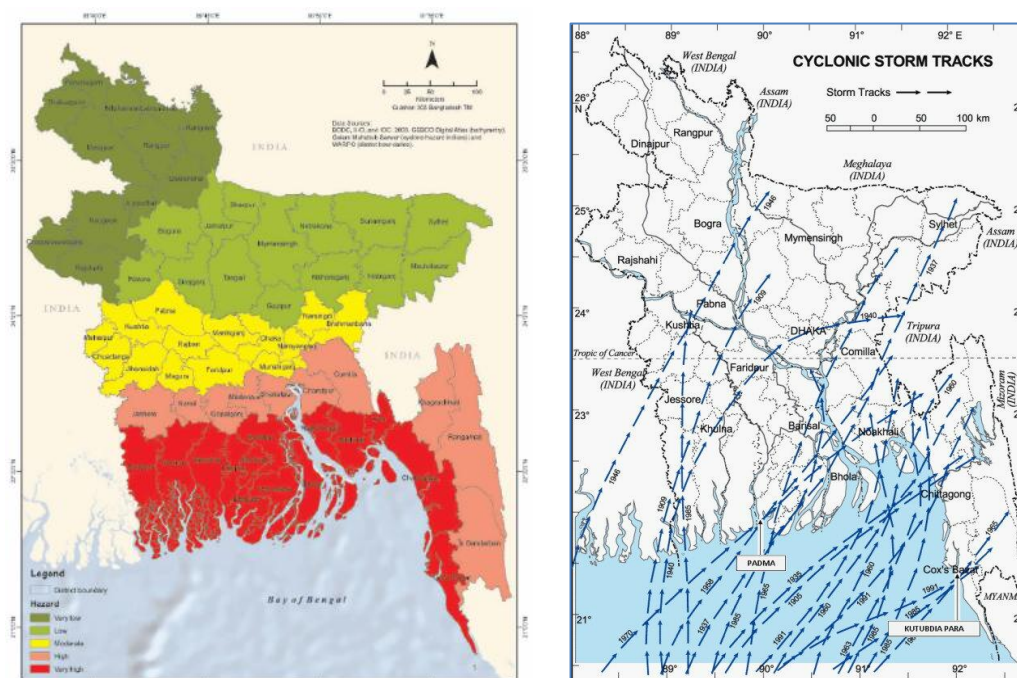


Figure IV-11 (Left) Cyclone risk Zone map of Bangladesh (PC and ADB 2021); (Right) Cyclonic Storm Track map of Bangladesh (Islam et al. 2014).

10. Environmental quality

112. Environmental quality around the KWT region is available for 2022 from secondary sources which can serve as baseline information. Environmental parameters extracted from secondary sources are discussed in the next paragraphs.

113. **Surface Water.** In order to verify the general surface water condition of the project area, two nearest location data were collected from a secondary source. The results of the secondary sources show that the surface water parameters are within the National standard (Table IV-2).

Table IV-2 Results of surface water quality test around KWT campus

Monitoring Parameter	Unit	Location	GPS Coordinate	Monitoring Result	National Standard	Remarks
SW_01						
Temp	°C	Sample is collected from Kodda bridge Location at Turag River	23°59'47.49"N 90°20'51.46"E	22.3		Not yet standardized
BOD	mg/l			0.6	6 or less	Result is within the standard
DO	mg/l			6.8	5 or above	
EC	μS/cm			550	-	Not yet standardized
pH	-			7.56	6.5-8.5	Result is within the standard
TDS	mg/l			280	1000	

Monitoring Parameter	Unit	Location	GPS Coordinate	Monitoring Result	National Standard	Remarks
SW_02						
Temp	°C	Sample is collected from Kodda bridge Location at Turag River	23°59'46.19"N 90°20'51.15"E	22.3		Not yet Standardized
BOD	mg/l			0.5	6 or less	Result is within the National Standards
DO	mg/l			6.5	5 or above	
EC	µS/cm			560	-	
pH	-			7.57	6.5-8.5	
TDS	mg/l			260	1000	Not yet standardized

Source: SASEC ROAD CONNECTIVITY PROJECT, ADB, February 2022

114. **Ground Water.** The ground water data were collected from secondary source in order to verify the groundwater condition of the project area. The samples were analyzed for parameters covering bacteriological and physico-chemical characteristics which include certain heavy metals and trace elements. Table IV-3 shows the data from secondary source. The results are within the National standard.

Table IV-3 Results of ground water quality test around KWT campus

Monitoring Parameter	Unit	Monitoring Result			National Standard	Remarks
		Ground Water 1	Ground Water 2	Ground Water 3		
		Vogra bazar area	Near to Kodda bridge Location at Turag River	Chandra More Area		
		23°59'47.49"N 90°20'51.46"E	23°59'44.76"N 90°20'52.39"E	24° 2'49.22"N 90°14'21.70"E		
Fluoride(F)	mg/l	0.13	0.11	0.15	1	Result is within the National Standards
Arsenic (As)	mg/l	0.0	0.0	0.0	0.05	
Chloride (Cl)	mg/l	4.6	4.1	5.2	150-600	
Electrical Conductivity (EC)	µS/cm	440	410	400	-	Not yet standardized
pH	-	7.35	7.31	7.20	6.5-8.5	Result is within the National standard
Fecal Coli form (FC)	N/100 ml	0.0	0.0	0.0	-	
Total Coli form (TC)	N/100 ml	0.0	0.0	0.0	-	

Source: SASEC ROAD CONNECTIVITY PROJECT, ADB, February 2022

115. **Ambient air quality.** Ambient air quality data was collected from a secondary source-SASEC ROAD CONNECTIVITY PROJECT for the month of February 2022 (Table IV-4). The aim

was to identify areas that already have high pollution levels or are expected to experience so, on account of the building project, and to design adequate mitigation measures, as applicable.

116. Motor vehicles and traditional brick kilns are primary contributors to local air pollution, with recent industrial activity adding to the problem. Key pollutants in Tangail include nitrogen oxides (NO_x), sulphur dioxide (SO₂), suspended particulate matter (SPM) and PM₁₀, and carbon monoxide (CO). Diesel vehicles account for over 80% of PM emissions, while numerous brick kilns operate during the dry season, increasing particulate levels. Pollutant dispersal is influenced by wind, weather, atmospheric stability, and source height. According to secondary data, all measured air quality parameters remain within standard limits.

Table IV-4 Results of ambient air quality test around KWT campus

Air quality Parameters	Unit	Locations and results			Bangladesh Standard	IFC EHS Guideline, 2007	Duration	Remarks
		Air quality-1	Air quality-2	Air quality-3				
		Fazlul alam Madrasa	Construction Camp	Chondra Circle				
PM _{2.5}	µg/m ³	16.3	20.1	28.6	65	75	24	All results are within the National standards
PM ₁₀	µg/m ³	28.8	26.4	39.8	150	150	24	
SPM	µg/m ³	52.1	45.9	68.5	200	NYS*	8	
SO _x	µg/m ³	12.5	16.4	32.1	365	125	24	
NO _x	µg/m ³	23.2	28.2	42.7	100	40	24	
CO	PPM	<1	<1	<2	9	NYS*	8	

Source: SASEC ROAD CONNECTIVITY PROJECT, ADB, February 2022

117. **Noise environment.** Excessive noise is a potential issue for both human and biological receivers and can result in a range of negative issues, from mild annoyance and moderately elevated levels of aggression to significant disturbance of behavioral patterns and – in severe cases – hearing loss. In order to get the actual noise level data in the project location, a primary data collection is considered in the area. A sound level meter (SL-1352) is used under the supervision of the environmental specialist of the project during site visit on 15 April 2022 for primary noise data collection. The data is recorded for 1-hour duration with slow response (dB(A)) and statical analysis setting. The result of the data is provided in Table IV-5.

Table IV-5 Results of ambient noise quality test around KWT campus

Sample ID	Sample Location	GPS Location	Land Use Category	Date	Time		Noise Level (dBA) (LAeq)	Bangladesh Standard (DoE)	IFC EHS Guideline, 2007
					Day				
					Start	End			
NM_01	Beside the Proposed Building location, inside Kumudini Premises, Tangail	24.100240° N 90.091479° E	Residential	15.04.22	10:10 AM	11:10 AM	52.25	55	55

Source: SASEC ROAD CONNECTIVITY PROJECT, ADB, February 2022

D. Biological environment

118. Agroecological zone. According to the 30 agroecological zones of Bangladesh classified by FAO and UNDP⁵⁶ the project site belongs Four Agroecological Zones (Figure IV-12). AEZ 7: Active Brahmaputra-Jamuna Floodplain - this zone covers approximately 850 km² (23.0%) of Tangail district, primarily along the western border adjacent to the Jamuna River. The zone represents the most dynamic and geomorphologically active area in the district. The Active Brahmaputra-Jamuna Floodplain consists of recent alluvial deposits formed by ongoing river processes. The landscape is characterized by medium high land (42%) and high land (28%), with frequent char (sandbar) formation and riverbank erosion.

AEZ 8: Young Brahmaputra and Jamuna Floodplain - the largest AEZ in Tangail, covering 1,250 km² (33.8%) of the district. This zone extends across western parts of Sherpur, Jamalpur, and Tangail districts, including areas adjacent to the old Brahmaputra channel. Formed by young alluvial deposits from the Brahmaputra-Jamuna river system, this zone features medium high land (42%) and high land (18%). The topography is relatively flat with gentle undulations and seasonal flooding patterns. AEZ 9: Old Brahmaputra Floodplain - covering 920 km² (24.9%) of Tangail district, this zone includes large areas in Sherpur, Jamalpur, Tangail, Mymensingh, Netrokona, Kishoreganj, Narsingdi, and Narayanganj districts. Physiographic Characteristics: Formed by older alluvial deposits from the Brahmaputra river system, featuring medium high land (35%) and high land (28%). The landscape shows well-developed ridge and basin topography with mature soil profiles. AEZ 28: Madhupur Tract - the Madhupur Tract covers 680 km² (18.4%) of Tangail district, representing the northwestern part of this large upland area. The total Madhupur Tract spans 4,244 km² across Dhaka, Gazipur, Narsingdi, Narayanganj, Tangail, Mymensingh, and Kishoreganj districts. Physiographic Characteristics: The Madhupur Tract is a Pleistocene terrace elevated 1-10 meters above adjacent floodplains. It features high land (56%) and medium high land (18%) with well-developed drainage networks and dissected topography. The area is characterized by chala (uplands) and baid (valleys) landscape features.

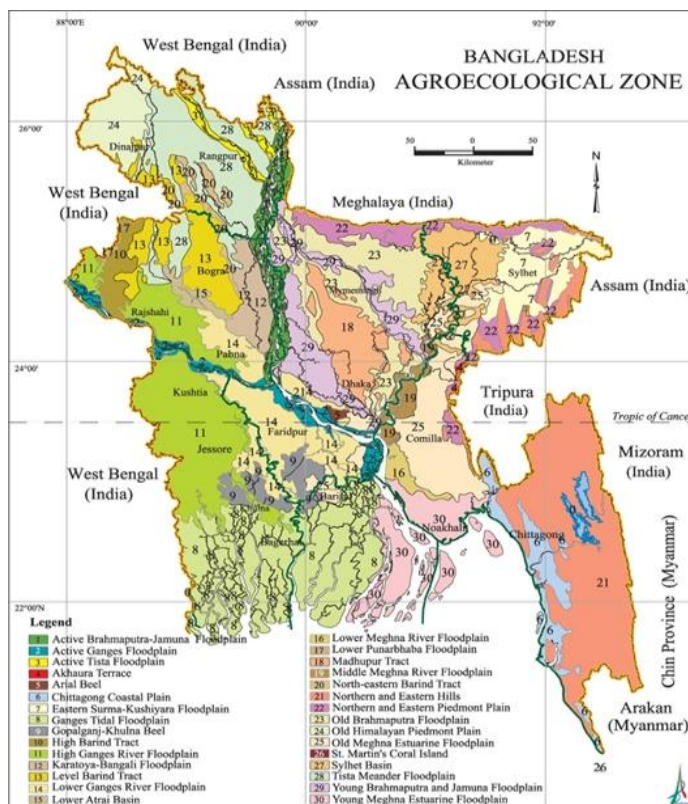


Figure IV-12 Agroecological zones of Bangladesh. Project site belongs to old Brahmaputra floodplain (item no. 23 in map). Source: Banglapedia.

⁵⁶ FAO/UNDP, Land Resources Appraisal of Bangladesh for Agricultural Development Report 2: Agroecological Regions of Bangladesh, FAO/UNDP, 1988

119. **Protected areas and reserve forests.** There is no protected area (PA) or reserved forest within 20 km of the project boundary. The nearest PA from the proposed subproject area is Bhawal Protected Forest, which is located roughly 25km from the project boundary (Figure IV-13).

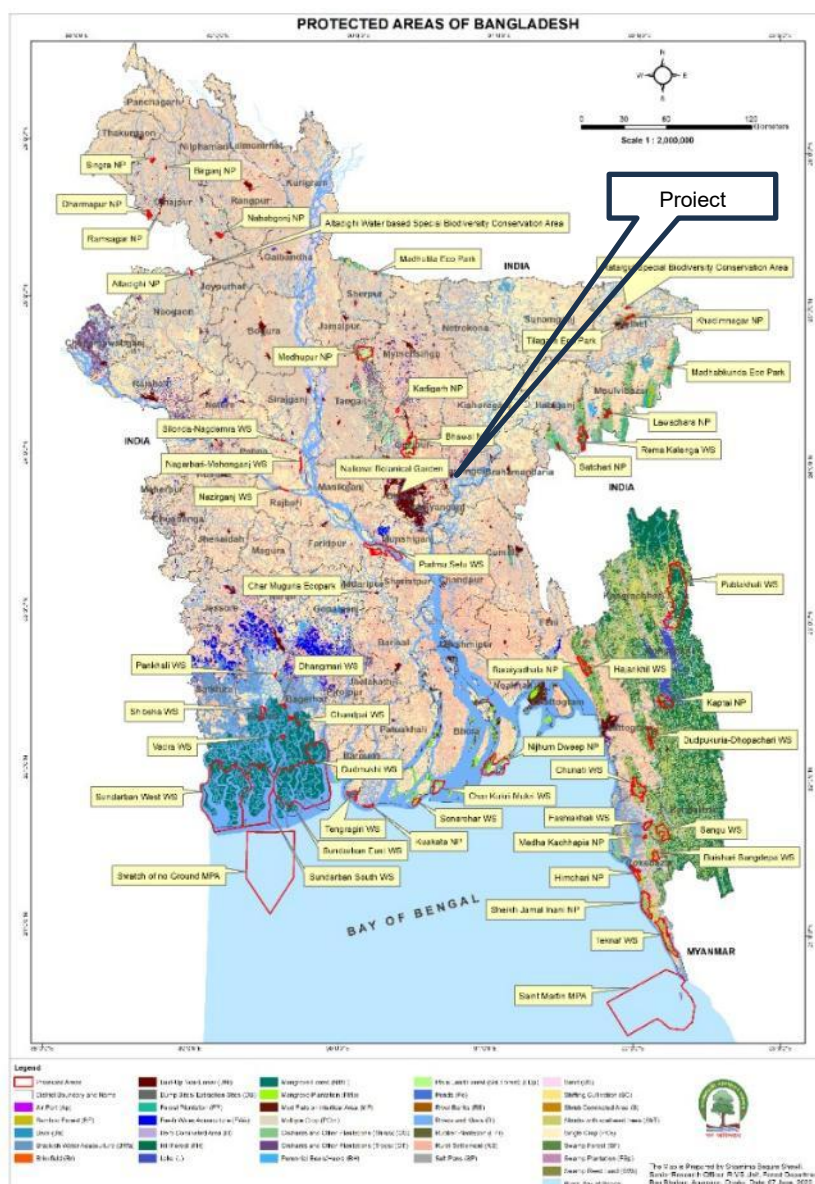


Figure IV-13 Protected areas of Bangladesh and location of the proposed project. The nearest PA is Bhawal National Park, located about 25km from the proposed site.

Source: MAP collected from Forest Department website

120. **Flora and fauna.** The proposed project site is located within the historic Kumudini Welfare Trust (KWT) campus in Mirzapur, Tangail, a long-established institutional complex situated near the Louhajang River that has been developed since the 1930s and is generally characterized by mature tree cover and ornamental flowering plants across its older sections. However, the specific

footprint proposed for the new academic building is a discrete, already-disturbed parcel within this larger green campus: the site has been sand-filled as part of construction activity at the adjacent plot and is currently barren, lacking any standing vegetation, tree cover, or ground flora (Figure IV-14).

121. Because the immediate project footprint is devoid of vegetation, it does not provide habitat for wild fauna, and no wild animals were observed or are expected to be present on the site itself. The broader KWT campus, by contrast, retains scattered shade and flowering trees typical of institutional grounds in this part of Tangail, which may support common synanthropic bird species (e.g., house crow, common myna, bulbul) foraging or roosting nearby, though these individuals are not resident on the barren construction footprint itself. As the proposed site contains no existing trees, no tree removal or felling will be required for construction, and the project will not result in any direct loss of vegetation or wildlife habitat (Figure IV-14).



Figure IV-14 No Vegetation was found at the proposed site.

E. Socio-Economic Environment

122. **Demography.** Mirzapur spans an area of about 373.88sqkm, resulting in a population density of 1,132.9 people per sqkm. The upazila predominantly comprises rural communities, though the central municipality is home to around 28,602 residents⁵⁷.

123. Religiously, the population is overwhelmingly Muslim (86.6%), with Hindus making up 13.4% and small minorities of other faiths. The literacy rate is relatively high for the region, at approximately 55.5%, surpassing several neighboring localities. Notably, about 20% of the population is under ten years of age, signaling a young demographic structure. Mirzapur is divided into one municipality and 14 union parishads, with a total of 202 mouzas and 219 villages, highlighting its rural and administrative diversity. The area is also well-known for its educational institutions and healthcare infrastructure, including the notable Kumudini Hospital, making it a significant hub for both social and economic activities within Tangail district⁵⁸.

124. **Land Use.** Mirzapur upazila exhibits a landscape shaped predominantly by agricultural use, settlement expansion, and rich vegetation, with water bodies scattering its terrain. The upazila covers approximately 374sqkm, much of which is used for intensive agriculture due to the

⁵⁷ <https://mirzapur.tangail.gov.bd/bn/site/page>

⁵⁸ https://en.banglapedia.org/index.php/Mirzapur_Upazila

region's fertile floodplain soils. Historically, agricultural land constituted the largest share of land use, but over the years there has been a marked transformation: urban and settlement areas have expanded rapidly, reducing the proportion of land allocated to farming and natural habitats.

125. Between 2001 and 2017, data from regional surveys reveal distinct shifts in Mirzapur's land use patterns. In 2001, agricultural land accounted for the largest portion (1,564 hectares), followed by vegetation (873ha), settlements (735ha), and water bodies (193ha). By 2011, there was a dramatic decrease in agricultural land (622ha), partially offset by increased vegetation (1,258ha) and a significant rise in settlement area (1,235ha) as population growth drove urbanization. Water bodies also saw a slight increase, reflecting efforts to preserve or expand

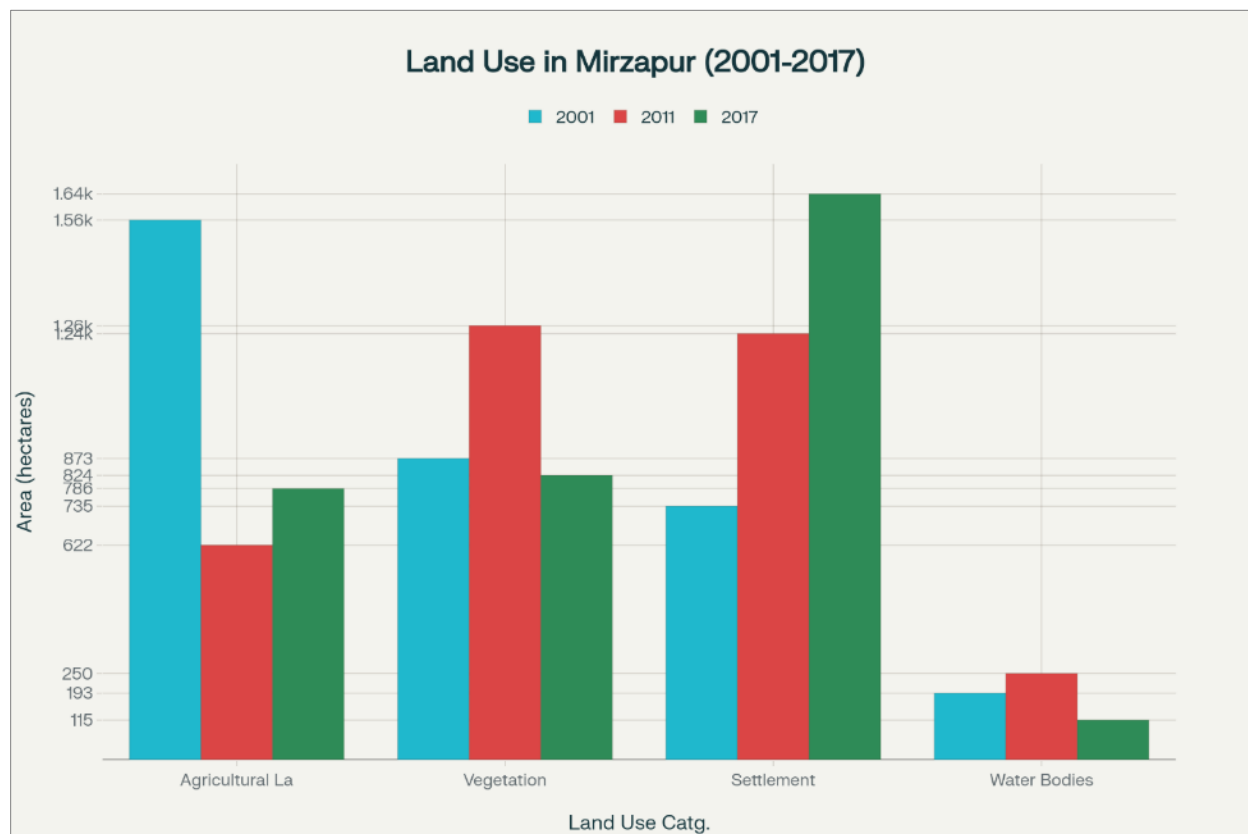


Figure IV-15 Land use change in Mirzapur upazila of Tangail district over the period of 2001-2017.

Data Source: Upazila land Office

aquatic resources. In 2017, the trend continued with settlements dominating (1,640ha), agricultural land slightly rebounding (786ha), vegetation declining (824ha), and water bodies decreasing to 115ha⁵⁹, largely due to the encroachment of built-up areas for residences, infrastructure, and educational institutions.

126. **Industry and Agriculture.** Mirzapur upazila presents a compelling blend of agricultural tradition and emerging industrial activity. Agriculture forms the backbone of the local economy, with over half the population engaged in farming. The fertile fields yield key crops such as paddy, jute, potato, mustard, wheat, pulse, sugarcane, and a wide variety of vegetables. Fruit cultivation is also vibrant, especially mangoes, jackfruits, bananas, litchis, and papayas. Over time, some

⁵⁹ <http://www.acl.mirzapur.tangail.gov.bd/en>

traditional crops like sweet potato, sesame, black gram, and khesari have become nearly extinct. Livestock and fisheries further diversify rural livelihoods, with numerous fishery, dairy, and poultry establishments supporting household incomes⁶⁰.

127. Industry in Mirzapur, while smaller in scale compared to agriculture, is steadily expanding. Industrial pursuits include a cotton mill, spinning mill, jute mill, biscuit factory, battery factory, and welding factory, among others. There are also around 360 small-scale industries and several cottage industries specializing in goldsmithing, blacksmithing, brass works, pottery, weaving, and woodworking. Local exports are notable for potatoes, jute, and sugarcane molasses. The Gorai Hatobhanga area has been developed as the main industrial zone, reflecting the upazila's growth in business-friendliness. Rural electrification extends to all wards and unions, enabling greater participation in both agricultural processing and light industry⁶¹.

128. **Infrastructure, Transport and Communications.** Mirzapur upazila features a robust and improving infrastructure, serving as a major hub for the region's connectivity and development. The upazila is well-endowed with essential services such as electricity, with all wards and unions falling under the rural electrification network, although about 63.6% of households have direct access to electricity. Sanitation coverage is also notable, with 65% of households using sanitary latrines and widespread access to safe drinking water, primarily from tube-wells. The area boasts multiple health centers, including the prominent Kumudini Hospital, government and private educational institutions, and a range of cottage and industrial enterprises—such as cotton mills, spinning mills, biscuit and battery factories—located mainly in the Gorai union, which bolster local employment and commerce⁶².

129. Transport and communication across Mirzapur have seen significant advancements in recent years. Externally, Mirzapur is directly connected to Dhaka and Tangail by the Dhaka-Tangail highway, providing easy access to the Bangabandhu Bridge and onward to Rajshahi and Khulna via a dual-gauge rail line. Regular bus services operate from major Dhaka bus terminals such as Mohakhali and Gabtoli, while Bangladesh Railway runs daily trains between Dhaka and Mirzapur, making travel convenient and affordable. The journey from Dhaka to Mirzapur takes about one to two hours by road or rail. Internally, the development of metalled and concrete roads ensures that even rural residents are within a short distance of all-weather transportation routes. However, some roads and bridges still face periodic connectivity issues, particularly during the rainy season when certain low-lying areas become temporarily boat-dependent for local travel⁶³.

130. Communication infrastructure includes both physical and digital networks. The upazila is well served by postal services, with facilities at the Upazila Engineer's Office and other union offices, while modern advancements have brought widespread mobile network coverage and access to online communication services for residents and local government offices⁶⁴. Economic and social interaction with wider Bangladesh is also supported by regular courier and parcel services originating from Mirzapur, providing reliable logistics for trade, business, and personal needs⁶⁵.

131. **Source of Drinking Water.** The primary source of drinking water in Mirzapur upazila, Tangail, is groundwater extracted through tube wells. An overwhelming majority—about 91.7% of households—rely on tube wells for their daily drinking water needs. These include both hand-

⁶⁰ https://en.banglapedia.org/index.php/Mirzapur_Upazila

⁶¹ <https://mirzapur.tangail.gov.bd/en/site/page/>

⁶² https://en.banglapedia.org/index.php/Mirzapur_Upazila

⁶³ <http://lged.mirzapur.tangail.gov.bd/en/site/page>

⁶⁴ <https://lged.mirzapur.tangail.gov.bd/en/site/page/>

⁶⁵ <https://www.parcelabc.com/shipment-fcc1/send-a-parcel-from-mirzapur-to-tangail/19/758/101/1010>

operated tube wells and ones fitted with submersible or electric pumps, with installations typically reaching depths between 30 and 55 meters to access safe aquifers. There is no piped or municipal water supply system in the main urban center or most rural areas; only a minor proportion (3.5%) access tap water, and the remaining households use other sources such as wells or surface water, though these are far less common^{66,67}.

132. The widespread use of tube wells is informed by the generally favorable groundwater quality in Mirzapur, as the confined aquifers provide water with low risk of surface contamination. Nevertheless, environmental oversight remains important, given the risks of pollution from sanitation practices and industrial activities in the region. Fortunately, surveys indicate that most sanitation facilities are appropriately distanced from water sources, reducing the likelihood of contamination. Regular monitoring is crucial, especially since Tangail district has faced sporadic groundwater quality concerns in the past⁶⁸.

133. **Toilet Facilities.** Toilet facilities in Mirzapur upazila, Tangail, reflect the broader trends of rural and semi-urban sanitation in central Bangladesh. According to recent surveys, approximately 65% of households in Mirzapur upazila use sanitary latrines, while about 29% rely on non-sanitary latrines, and a small minority (around 6%) have access to neither, highlighting persistent disparities between urban centers and outlying villages⁶⁹. Within the Mirzapur municipality—a more urbanized part of the upazila—every household reportedly uses at least some form of toilet, making the area officially open defecation free. Households access mainly on-site sanitation systems, including single-pit and double-pit latrines or septic tanks. However, less than a quarter of these facilities are optimally located with respect to groundwater safety standards.

134. Public toilet facilities are limited, with only a few serving market areas and bus stations. Maintenance and modern waste management remain challenges, with most faecal sludge disposed of in open drains or water bodies due to the absence of a centralized treatment facility. Emptying and desludging are primarily performed by private sweepers using manual and mechanical methods, sometimes posing health risks to the workers. While the upazila has made significant progress in reducing open defecation and expanding access to basic toilets, ongoing issues include improving infrastructure in rural areas, ensuring safe sludge disposal, and increasing the proportion of sanitary latrines across all communities⁷⁰.

135. **Solidwaste management.** Waste management within the existing KWT campus currently relies on conventional, informal practices typical of institutional campuses in Bangladesh, comprising manual collection of solid waste (mostly domestic-type refuse from academic, residential, and administrative areas) into common bins placed at scattered points, with periodic collection and disposal to designated dumping areas within or near the campus boundary; there is no evidence of a formal waste segregation system distinguishing biodegradable, recyclable, and hazardous waste streams. Wastewater from existing buildings appears to be managed through conventional septic tank/soak-pit systems rather than a centralized treatment facility, and no dedicated composting, recycling, or biomedical waste treatment infrastructure was observed within the immediate project area. This baseline indicates limited formal waste management capacity, underscoring the need for the proposed project to introduce improved solid waste

⁶⁶ <https://www.susana.org/resources/documents/default/3-4831-7-1643044503.pdf>

⁶⁷ https://en.banglapedia.org/index.php/Mirzapur_Upazila

⁶⁸ <https://www.susana.org/resources/documents/default/3-4831-7-1643044503.pdf>

⁶⁹ https://en.banglapedia.org/index.php/Mirzapur_Upazila

⁷⁰ <https://www.susana.org/resources/documents/default/3-4831-7-1643044503.pdf>

segregation, storage, and disposal practices, together with adequately designed wastewater management facilities, as part of its environmental management plan.

V. ANALYSIS OF ALTERNATIVES

A. Need of analysis of alternatives

136. The primary objective of the “analysis of alternatives” is to identify the location/technology for a particular sub-project that would generate the least adverse impact and maximize the positive impacts. The preliminary assessment of the project included an analysis of alternatives, addressing the optimal match between required technical specifications and site conditions, as well as addressing any concerns for environmental, social, and economic features in each location.

B. Current proposal

137. Currently there is just adjacent to the proposed site construction for dormitory of the Nursing Institute for teachers and students is going on. The proposed Nursing Institute Academic building will complement the ongoing construction. Proposal for space for the proposed academic building at KWT campus has been already discussed in the earlier chapters. The proposed location is barren and sand filled (i.e., prepared for construction). A summary of the impacts of the current proposal is given in Table V-1.

Table V-1 Summary of potential negative impacts of the current proposal

Sector	Negative Impact
Presence of important features within or around the land	None
Land (Government-owned land are to be given priority)	NO. The land is owned by KWT
Presence Agricultural/cropped land	None.
Village affected	None.
Families affected	None.
Loss of structures	None.
Impact on Common properties	None.
Trees to be chopped down	None.
Presence of sensitive ecosystem	None.
Presence of waterbody	None.
Tribal population affected	None.

Source: TA consultants

C. The preferred alternative

138. Adopting “Without option” (option in which the actions considered in the Project are not implemented (business-as-usual option) and “Zero option” (option in which the project purpose is met by methods/businesses that are not subject to environmental impact assessment) will keep hampering the training process of teachers. Since the proposed subproject will have the minimum environmental and social impact but enhance the teaching condition and reduce waterlogging, better management of solid waste during construction through enforcing of Environmental Management Plan (EMP) implementation, and during operation stage by serving better transportation services, the subprojects are preferred for implementation.

VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION

A. Approach and methodology

139. The IEE commenced with the review of legal requirements for the project followed by collection of technical details, and discussions with SDCMU and DTE to reconfirm the data and information.

140. Scoping of issues to be addressed in the IEE was conducted early in the assessment process (i.e., field visit) to collect the appropriate baseline information. Additional tools and methods used are described in the following:

1. Approach

141. The IEE study has been conducted following the ADB SPS (2009), World Bank's Environmental and Social Framework (ESF) 2018, EIA Guidelines for Industries, prepared by the DoE in 2021⁷¹ in accordance with the requirement of the Environment Conservation Rules (ECR 2023). The IEE process adopted in this study involves identification of the key impacts on natural and social environment and evaluation of the significant impacts along with recommendation of initiative measures as well as listing of unresolved environmental issues. The IEE includes collection of baseline information, setting of boundaries, impact assessment, suggestion of mitigation measures and alternative sites providing an environmental management plan.

142. This IEE study adopted a scoping of environmental assessment comprising of seven dimensions that explain the direction, magnitude, spatial extent, duration of impact, timing of impact, nature of impact and cumulativeness of the possible impacts, if they are not mitigated. This was done to capture the complex environmental impact pathway of construction projects. The steps of impact analysis and their methods are described in the later sections (VI-A- 2 to VI-A-3). Results of Impact assessment and possible remedies are described in Section VI-B and onwards. Finally, the summary results of the final assessment ratings have been presented in the form of matrix in later sections.

2. Methods of physical environmental assessment

143. The issues of physical environment have been investigated through professional observation of the study team members backed up by feedback from the local people during field visits. The base of the physical environmental assessment was data from secondary sources and field observation in combination with google earth images. In general, the physical environmental data collection and survey was carried out by a composite method of investigation including observation, satellite image analysis and public consultation. Every analysis was done with world standardized tools and the result presented with the Geographical Information System (GIS) interface. The geological and seismic issues have been taken care of through secondary information and field observations. The general geological features and the seismicity of the project and its surrounding areas were collected from available secondary literature and Geological Survey of Bangladesh.

144. Meteorological data such as rainfall, evapotranspiration, temperature, sunshine hours, humidity, wind speed and wind direction have been collected and analyzed for assessing local

⁷¹ DoE (2021) EIA Guidelines for Industries, Department of Environment (DoE), Ministry of Environment, Forest and Climate Change, Government of the People's Republic of Bangladesh. Dhaka, February 2021.

climate that are directly related to water resources of the study area and the project area. Meteorological data for selected stations have been collected from the Bangladesh Meteorological Department (BMD). The methods of physical assessment that has been implemented in this study is presented in later sections.

a. Primary data collection

145. Primary data sources include site visit impressions and interviews of relevant stakeholders such as local communities and polytechnic teachers. The information collected includes local topography, environmental condition, flooding condition, traffic situation, local hydrological information etc.

b. Secondary data collection

146. The secondary Information sources include published literatures, statistics, maps and reports collected from various government and non-government organizations, such as the Bangladesh Meteorological Department (BMD), Bangladesh Water Development Board (BWDB), Soil Resource Development Institute (SRDI), Geological Survey of Bangladesh (GSB) and the International Union for Conservation and Nature (IUCN), Bangladesh Bureau of Statistics (BBS) Population and Housing Census 2011, Community Reports of BBS. The information collected in such ways were categorized and added to the database of the baseline condition.

c. Socio-economic Survey

147. The social and economic data collection and review involved fact-finding from field, collection of data, tabulation of data, database entry, data compilation and review and the presentation of data. Secondary information including data, maps and reports have been collected from various sources. The data analyzed as part of this process has been collected from a number of secondary sources.

- **Primary data collection:** The socio-economic data especially for the social features of the Project affected area were collected through visual observation, focus group discussion and public consultations.
- **Secondary data collection:** Key secondary sources include Information on socio-economic profiles of the Project affected educational institutes which covers demographic profiles, education, coverage of health and sanitation facilities, use of power, agricultural land etc.
- **Public Consultations:** Focused Group discussions (FGDs) and Key Informant Interviews (KIIs) were arranged at subproject site for public consultation. The stakeholders for the project were the officers of KWT and nursing students, since all the interventions will be implemented within the boundary of the KWT. In the consultations stakeholders were made aware of the project activities and consultants as well as consultants answered their queries, questions and took note of their suggestions. In addition, several informal group discussions as well one-on-one discussions were held with local people, project affected people and community representatives at the different locations of the Project sites. The team recorded their perception of the proposed work and sought their suggestions on implementation of EMP with mitigation measures on how to reduce any potential impacts on natural and social environments and mainly centered on drainages congestion, flood, local landscape, removal of tress, loss of agricultural lands, and community cohesion problems.

d. GIS and Remote sensing

148. The Geographical Information Systems (GIS) and Remote Sensing (RS) played crucial role in development and modelling of the spatial extension of environmental problems in the target city corporations such as extension of flooding, waterlogging, topography, population etc. Further, the GIS and RS technologies were used for investigations and detailed on-ground validation of spatial information on land use by using a hand-held, non-differential GPS in this IEE study. The Project alignment maps as Keyhole Markup Language zipped, Compressed Version of KML (KMZ) and Keyhole Markup Language zipped Google Earth (KML) produced during spatial modelling analysis were studied prior to field investigations, spatial analysis of satellite imagery was also used to identify land use boundaries. Based on spatial data acquisition and validated land use, the sensitive areas for sampling locations identified for biophysical survey of the Project. In addition, the GIS based maps of existing environment are produced for this IEE report from the collected information from field and acquisition of spatial data.

3. Impact assessment methodology

a. Impact categorization

149. **Significance of Impacts:** Generation of environmental and social impacts from infrastructure development is a function of the activities that take place during construction and operation of the infrastructure, on the one hand, and the particular environmental and social attributes of the local setting on the other. The people, communities and ecosystems that may be affected by a project (receptors) are variable in terms of their proximity to the infrastructure; their sensitivity to influences such as noise, disturbance and emissions; and their ability to adapt to change. The activities involved in construction and operation of infrastructure also vary based on the nature of the project, the noisiness and dirtiness of the construction works required, and how long different activities are carried out in one place. The significance of impacts depends on the particular juxtaposition of activities and receptors in specific locations.

150. **Typology of impacts:** The impacts that arise from particular configurations of infrastructure development activities and landscape features may emerge in different forms and through various pathways. It is useful to consider the types of impacts that may come into play - some of which may be more immediately obvious than others - when assessing the potential effects of a project on people and nature in the surrounding environment.

151. Table VI-1 below explains the Impact categorization and typology adopted for this study. Figure VI-1 explains the impact assessment process that has been adopted in this study.

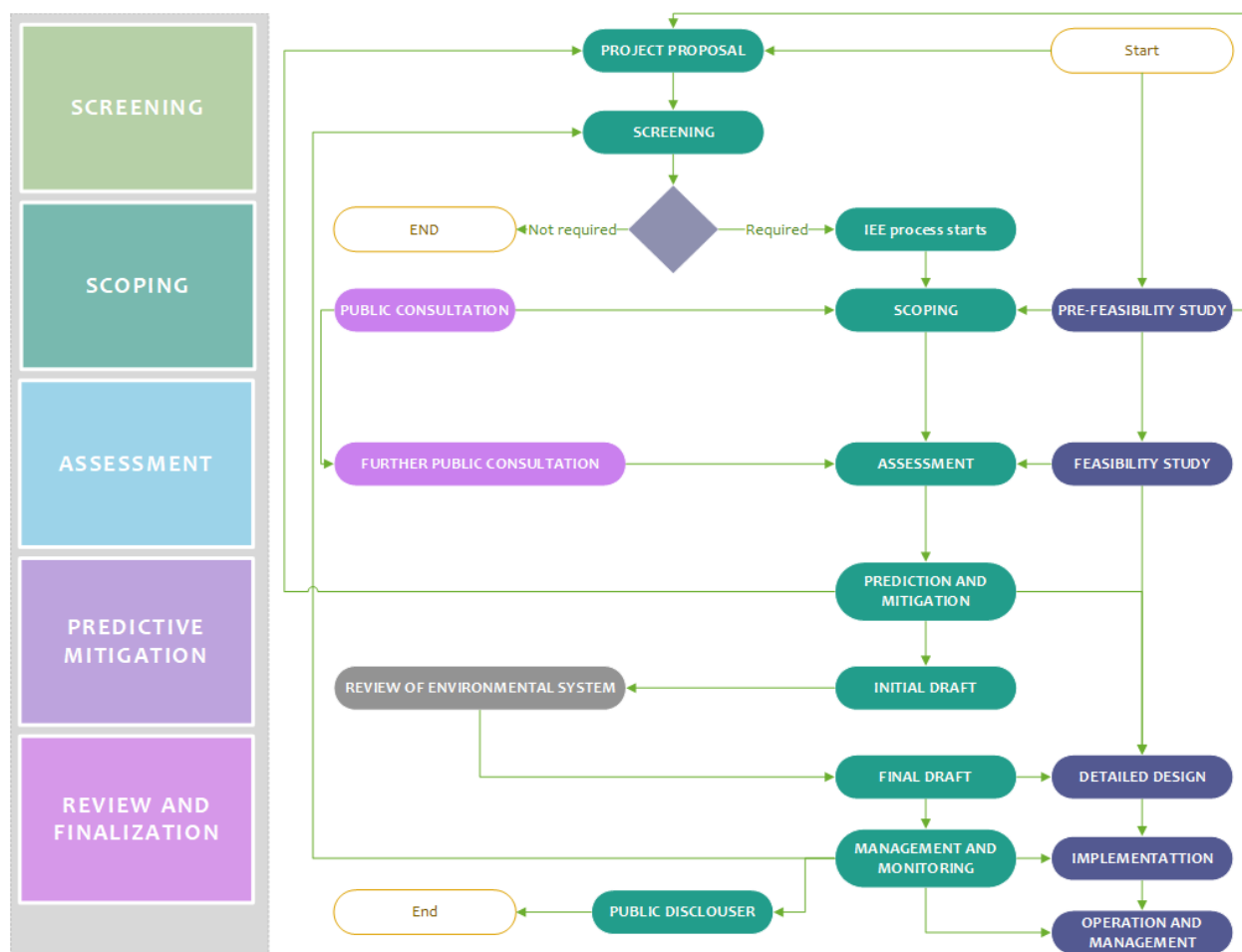


Figure VI-1 IEE process adopted for this study

Table VI-1 Impact categorization and typology adopted for this study

Impact parameter	Types of impact				Sign
Direction of change relative to baseline conditions	POSITIVE		NEGATIVE		+/-
Magnitude of impact in relation to ability of people and ecosystem to cope with change	NONE	MINOR	MAJOR	SEVERE	D/C/B/A
Spatial extent of effects	LOCALIZED		WIDESPREAD		Loc/Wid
Duration of effects experienced	TEMPORARY		PERSISTENT		Tem/Per
Timing of effects experienced	INTERMITTENT		CONTINUOUS		Int/Con
Nature of cause-and-effect linkage between project activity and impact experienced by receptors	DIRECT		INDIRECT		Dir/Ind
Relationship of project activities to impacts from other sources in landscape	ISOLATED		CUMULATIVE		Iso/Cum

b. Spatial Scope of Analysis

87. The area of influence of an infrastructure project is defined in the SPS 2009 (p. 31) as follows:

- (i) The primary project site(s) and related facilities that the borrower/client (including its Contractors) develops or controls, such as power transmission corridors, pipelines, canals, tunnels, access roads, borrow pits and disposal areas, and construction camps;
- (ii) Associated facilities that are not funded as part of the project (funding may be provided separately by the borrower/client or by third parties), and whose viability and existence depend exclusively on the project and whose goods or services are essential for successful operation of the project;
- (iii) Areas and communities potentially affected by cumulative impacts from further planned development of the project, other sources of similar impacts in the geographical area, any existing project or condition, and other project-related developments that are realistically defined at the time the assessment is undertaken; and
- (iv) Areas and communities potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location. The area of influence does not include potential impacts that might occur without the project or independently of the project.

152. The project activities at the KWT campus where physical works will take place; these include a full-fledged Nursing institute including office and laboratories, access roads and possibly a construction camp at site. It is expected that materials like sand and gravel will be purchased on the open market, rather than obtained from project-specific borrow pits or quarries.

153. With respect to cumulative impacts, the proposed development does need to be understood as a single piece of investment in urban structures only affecting the vicinity of the respective institute.

154. The last category to consider as being part of the area of influence - areas and communities potentially affected by developments that can be expected to result from the development of the project - is certainly relevant. The proposed developments at the KWT are likely to facilitate and perhaps even be a significant driver of the local environmental development trajectory, especially in the field of water congestion and drainage. The infrastructure improvements can be expected to contribute to lessening the waterlogging and drainage congestion in the vicinity thus less disrupting the local life, commerce and trade. The scale of induced development is difficult to forecast at the time of writing, but the general nature of the anticipated change in the local economy is nevertheless taken into consideration as part of impact analysis.

155. At the site level, defining the area of influence for the purposes of assessing impact potential is a subjective, context-dependent exercise. Noise and dust from construction activity, for example, are localized impacts likely to be experienced mostly within about 100 m of the construction site boundary.

c. Substantive Scope of Analysis

156. This IEE development considers the following parameters for scope of analysis:

- (i) biodiversity, species of concern and critical habitat areas including forests, wetlands, and protected areas;
- (ii) surface water bodies and groundwater;
- (iii) air quality, including dust and emissions;
- (iv) agriculture and fertile soils;
- (v) tree cutting;

- (vi) local acoustic environment;
- (vii) drainage and waterlogging;
- (viii) waste management (construction waste and operation phase waste);
- (ix) climate change mitigation and adaptation;
- (x) land use and livelihoods;
- (xi) traffic congestion;
- (xii) community life and interaction;
- (xiii) private property and public utilities;
- (xiv) public health and safety;
- (xv) occupational health and safety, including as they relate to the COVID-19 pandemic unfolding during implementation of the Investment Project;
- (xvi) physical cultural resources;
- (xvii) possible transboundary impacts, including transmission of disease vectors, spread of invasive species, and harmful patterns of natural resource exploitation; and
- (xviii) induced development effects and cumulative impacts.

157. The degree of emphasis placed on the key parameters identified here depends on their particular relevance, given the nature of the planned infrastructure and the characteristics of sites and receptors.

d. Temporal Scope of Analysis

158. Analysis of impacts and definition of suitable mitigation measures should be taken in all phases of the project infrastructure's development. Impacts may arise most obviously and visibly during construction, but the impacts of design and siting decisions made in the pre-construction phase, as well as the effects of intended and unintended activity at facility sites over the entire duration of the infrastructure's operating period, also need to be considered.

159. **Pre-construction phase (design impacts):** The design process offers considerable opportunities to reduce environmental impacts, through appropriate choice of materials, equipment and physical systems and features. For example, equipment and climate-control systems with the lowest associated greenhouse gas emissions (e.g., high-efficiency electric motors and lighting) shall be used during construction as much as possible so that the project inserts minimum of carbon footprint. A well-designed hydrological model set-up for 100 years may suggest the dimensions of the drainage passage to design. Incorporating such elements will help to maximize climate change mitigation as a feature of the project.

160. **Pre-construction phase (siting impacts):** The selection of a facility site has the potential to generate environmental impacts based on:

- (i) the physical characteristics of the site itself (e.g., topography, soils, drainage, exposure to natural hazards, past and present land uses);
- (ii) the proximity of the site to impact receptors (e.g., water bodies, sensitive habitats, residences, schools, hospitals, public spaces);
- (iii) the amount and type of work required to connect the facility to transport networks and service infrastructure; and
- (iv) the distance between the facility and other facilities to which it is functionally linked.

161. **Pre-construction phase (procurement impacts):** Procurement decisions with negative impact potential during the construction and operation periods are related to both materials and service providers. Construction materials obtained from afar, especially those that are heavy and needed in very large quantities, can generally be expected to have a large carbon footprint due

to increased emissions associated with their transport. Materials obtained from unsustainable sources contribute to environmental problems elsewhere. Use of construction and maintenance Contractors with a poor record of environmental and social safeguards compliance significantly increases the probability of all manner of negative impacts during the construction period, as well as the creation of problems whose effects will be felt far into the future. And hiring mainly or exclusively local workers accrues substantial project benefits to the local economy, while hiring workers from outside the project area may create social strife and requires establishment of construction camps, which typically have significant potential for negative environmental impacts.

162. Construction phase impacts: Impacts likely to arise during the construction phase relate to the physical activities that take place both at construction sites and at locations where related activity occurs, such as access roads, haul roads, and any borrow pits, quarries or spoil dumps established specifically to support construction of the site or sites in question. Although infrastructure construction is an inherently disruptive activity, many impacts of construction activity are well understood and amenable to minimization with appropriate construction site management.

163. Operation phase impacts: Impacts during use of infrastructure are generally of lesser magnitude and severity than construction impacts, and arise from regular operations and maintenance activity, but also from things that go wrong with these activities, such as accidents, fires, explosions and releases of harmful substances. Proper preparation and use of operations and maintenance manuals and protocols, as well as training of personnel and regular monitoring, are key means of preventing and minimizing operation phase impacts.

e. Impact Mitigation and Enhancement

164. Objectives of mitigation: The central goal of impact assessment is to determine how best to mitigate (make less serious, severe, or damaging) potential negative effects before they arise, and to identify opportunities for enhancing potential positive impacts, which may or may not be part of the project rationale. The IEE considers the specific activities that implementation will involve, from site selection through to operation, and defines the impacts that can be expected to arise in view of the particular features of the receiving environment. The analysis and discussion of impacts uses an integrated approach, in which environmental and social impacts are considered together in relation to each set of road development activities.

165. Mitigation hierarchy: Identification of an appropriate proactive approach for each expected impact in this IEE makes use of the standard mitigation hierarchy advocated by the ADB and other multilateral donors. In the mitigation hierarchy, top priority is given to measures that enable outright prevention or avoidance of impacts. Where prevention or avoidance is not possible, the next most preferred option is to minimize impacts to the greatest extent possible, within reasonable limits of feasibility. Finally, and only once it has been confirmed that there is no feasible way to reduce an impact below a reasonable threshold of social acceptability, it will be appropriate to consider measures to compensate for the loss or damage caused to people and nature through reimbursement, replacement or some other means.

166. Impact enhancement: For positive impacts, there is no hierarchy as for mitigation, only one objective: to adopt measures to enhance or reinforce positive effects whenever possible, through thoughtful adaptation during site selection, design and implementation.

167. Environmental Management Plan (EMP): Measures will be prescribed for mitigation or enhancement of each predicted impact. Such prescriptions do not carry any weight unless they

are made part of an obligatory implementation plan. The EMP translates the measures prescribed in this section of the IEE into costed action items assigned to specific actors and makes implementation of the action items subject to regular monitoring of compliance and effectiveness. The EMP is presented in Chapter 9 of this IEE report.

B. Findings of Impact Assessment: Pre-construction phase

1. Siting related impacts

168. Impacts related to siting of the infrastructure at the KWT are partly locked in by the established location of the already existing drains and roads owned by the Trust, which will be redeveloped with some expansion (i.e., widening). Some location-related impact areas are discussed below.

a. Climate change, drainage and waterlogging

169. **Impacts:** The Kumudini Hospital region in Mirzapur, Tangail represents one of Bangladesh's most climate-vulnerable areas, situated strategically on the banks of the Louhajang River in the north-central hydrological zone⁷². The region experiences a tropical monsoon climate with annual rainfall averaging 2,014mm, with 68% concentrated during the monsoon season from June to September⁷³. This concentrated precipitation pattern, combined with the area's low-lying topography and proximity to major rivers including the Jamuna, Dhaleswari, and Louhajang, creates significant challenges for any architectural development in the region.

170. Climate change has intensified these vulnerabilities, with Tangail district experiencing increasingly erratic rainfall patterns, untimely floods, cyclones, and prolonged waterlogging⁷⁴. The region has witnessed devastating floods affecting over 175,000 people in 196 villages across six upazilas, with river erosion devouring hundreds of houses⁷⁵. These climatic stresses directly impact the design considerations for the proposed six-storied Nursing Institute academic building, necessitating comprehensive climate-responsive architectural strategies.

171. The poor drainage capacity manifests in several critical ways affecting the project area. The region's flat topography, combined with inadequate cross-drainage structures and blocked natural channels, creates conditions where stormwater cannot effectively discharge⁷⁶. During monsoon periods, the combination of heavy rainfall, river flooding, and inadequate drainage creates a compound flooding scenario that can persist for weeks. The Kumudini Hospital complex itself has experienced flooding for over 15 days, with staff traveling by boat within the campus, highlighting the severity of local drainage failures.

172. Figure VI-2 shows the climate trend in tangail District over the period of 1979-2025. Tangail has experienced a clear warming trend, with mean yearly temperatures rising and warmer-than-average months becoming more frequent and intense since the late 1990s. Precipitation patterns have become more variable, with some years marked by drought and others by heavy rainfall, reflecting increased climate extremes.

⁷² https://kumudini.org.bd/index.php?Page=AllSisConLst&sister_concern=MQ%3D%3D

⁷³ https://openjicareport.jica.go.jp/pdf/11814605_14.pdf

⁷⁴ <https://theindependentbd.com/printversion/details/236572>

⁷⁵ <https://www.tbsnews.net/environment/floodwater-recedes-tangail-not-peoples-sufferings-108661>

⁷⁶ <https://www.scribd.com/document/526398563/v-6-j-2>

⁷⁷ <https://www.dhakatribune.com/bangladesh/Nation/349946/one-hour-rainfall-accumulate-knee-deep-water-on>

173. Climate trends in Tangail are causing more frequent and severe waterlogging due to extreme rainfall events that overwhelm drainage systems. Increased intensity and variability of precipitation result in runoff exceeding the capacity of existing channels and culverts, which were built for milder conditions. Although warming mainly raises evaporation rates, it also intensifies storms, leading to heavier downpours and further stressing drainage infrastructure.

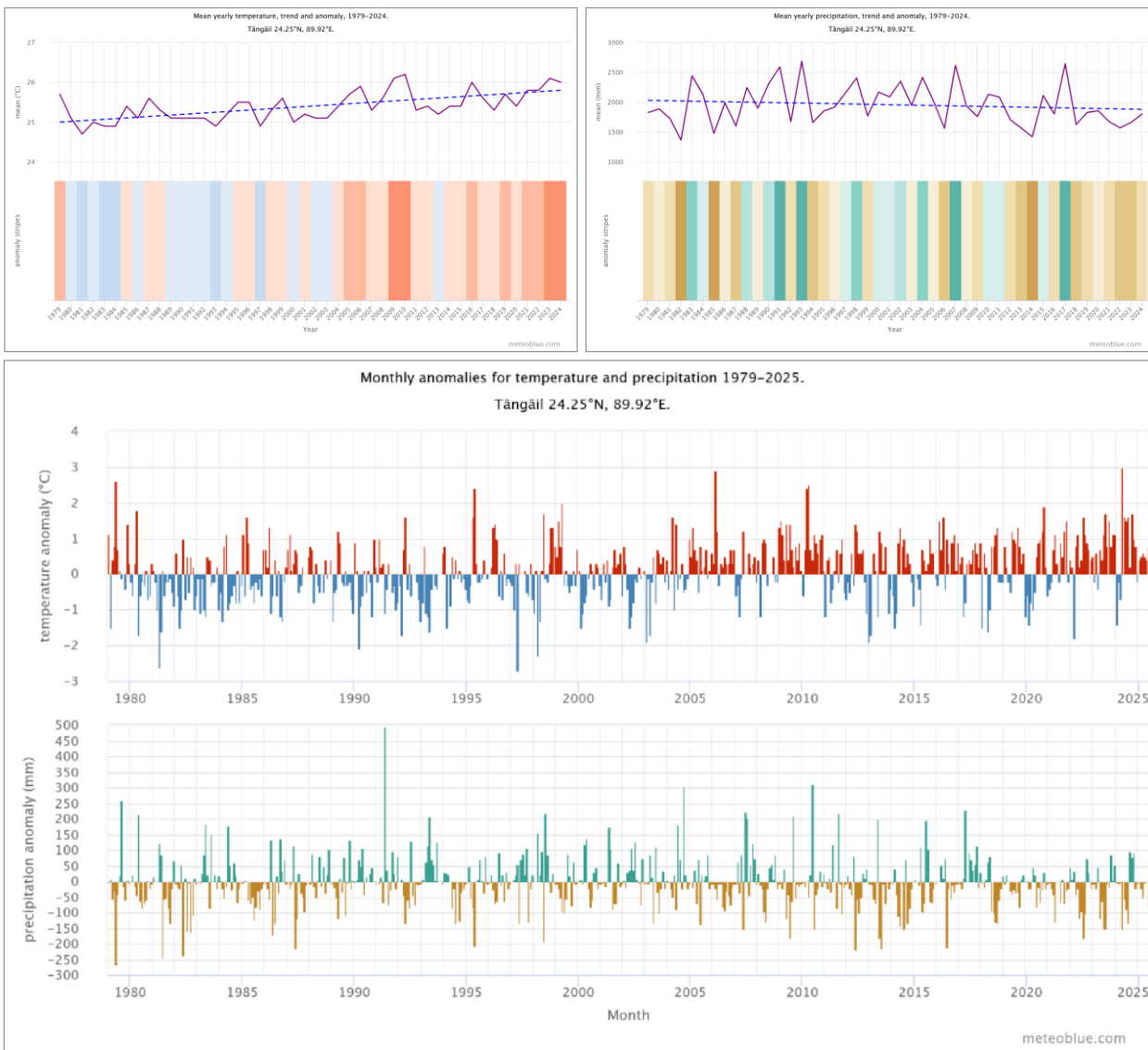


Figure VI-2 (upper left) Trend of mean yearly temperature (1979-2025); (upper right) trend of mean yearly precipitation (1979-2025); (bottom) Monthly anomalies of temperature and precipitation (1979-2025) in Tangail District.

Source: www.meteoblue.com

174. The architectural design of the proposed Nursing Institute must address multiple climate-related challenges evident in the uploaded plans. The building's substantial footprint of 277,655 square feet across six floors, with ground floor area of 42,181 square feet, presents both opportunities and risks in the flood-prone environment. The design shows awareness of local

flooding conditions through several features: the ground floor is elevated to +750mm above the plinth level, and the building incorporates substantial plaza and green areas totaling 39,515 square feet, which can serve as natural water retention zones.

175. The extensive hardscape areas and building footprint may contribute to increased surface runoff, exacerbating local flooding conditions. The building's location in an area that experiences regular inundation during monsoon seasons means that critical infrastructure, including the substation, generators, and emergency facilities shown on the ground floor, face potential flood damage. The underground water reservoir tank, while providing water security, may be vulnerable to contamination during flood events if not properly sealed and protected.

176. **Mitigation:** The design phase presents crucial opportunities to implement climate-resilient features that can significantly reduce the building's vulnerability while contributing to regional flood management. Elevation and flood-proofing measures should be enhanced beyond the current +750mm ground floor elevation. Best practices from Bangladesh's climate-resilient housing initiatives suggest elevating critical infrastructure and utilities to at least the 100-year flood level plus projected sea-level rise impacts. The building's mechanical, electrical, and plumbing systems should be relocated to upper floors or adequately protected flood-resistant enclosures.

177. Advanced drainage integration represents a critical design opportunity. The building should incorporate comprehensive rainwater harvesting systems, utilizing the extensive roof areas across all six floors to capture and store monsoon rainfall. The plaza and green areas shown in the plans should be redesigned as bioretention systems with enhanced infiltration capacity, incorporating permeable paving materials and engineered soil systems that can handle large volumes of stormwater while reducing runoff to the already overburdened municipal drainage system.

178. Sustainable water management systems should include multiple redundant approaches. The design should integrate gray water recycling systems, particularly important given the institution's educational function and high water demand. Rainwater harvesting infrastructure should include first-flush diverters, multi-stage filtration systems, and adequate storage capacity to provide water security during both flood and drought periods. The building's wastewater treatment systems should be designed to continue functioning during flood events, preventing contamination of flood waters.

179. Climate-responsive architectural elements should be enhanced throughout the design. The building should incorporate natural ventilation strategies, higher ceiling heights, and strategic placement of openings to promote air circulation and reduce cooling loads during increasingly hot and humid conditions. The extensive use of locally-sourced materials like brick, shown in the elevation drawings, should be complemented by high-performance insulation and reflective roofing materials to address rising temperatures.

180. Landscape-based flood mitigation offers significant potential for the large site. The green areas should be designed as constructed wetlands and bioswales that can temporarily store floodwater while providing educational opportunities for the nursing students. Strategic tree planting can provide wind protection during cyclonic events while reducing the urban heat island effect. The plaza areas should incorporate permeable surfaces and be graded to direct stormwater to designated retention areas rather than contributing to regional flooding. Landscape-based flood mitigation, also known as natural flood management (NFM), uses green infrastructure and nature-based solutions to reduce flood risks by leveraging natural processes such as

infiltration, storage, and evapotranspiration⁷⁸. Unlike conventional flood control methods that rely on concrete structures, this approach mimics natural drainage patterns and restores ecosystem functions⁷⁹.

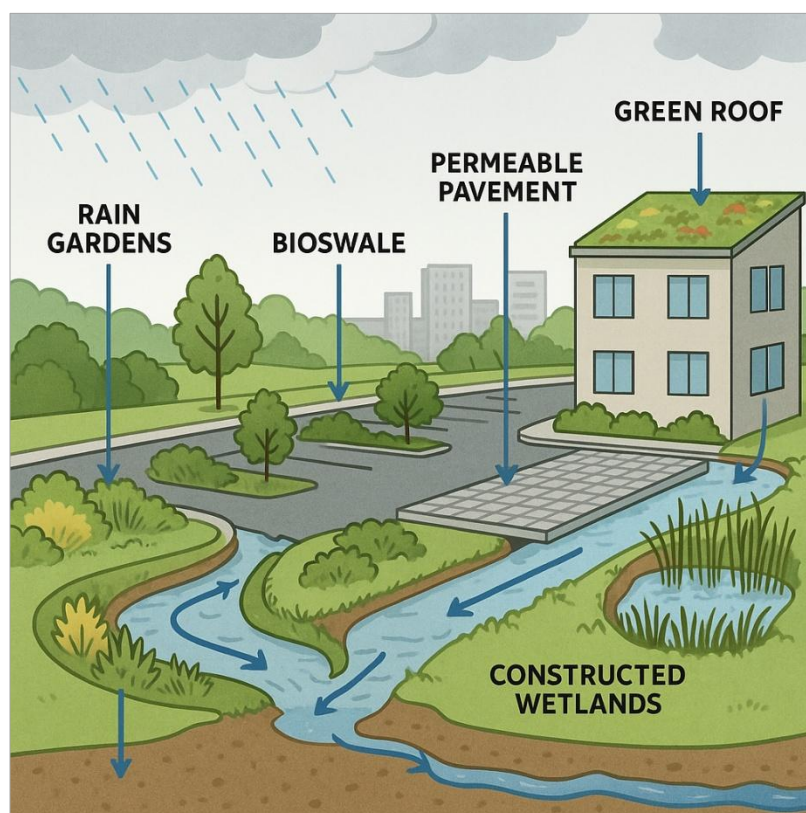


Figure VI-3 Illustration of a Landscape based Flood Mitigation plan

Source: AI generated

b. Flora and fauna

181. **Impacts.** As pointed out in the baseline section of this report, the proposed site within the KWT is located in inside the campus which are barren areas which are devoid of vegetation and fauna. Therefore, no impact is expected.

182. **Mitigation.** Although no impact is envisaged for the proposed construction of Acedimic building for Nursing Institute, a green area is suggested to develop in the KWT campus area.

183. **Enhancement.** Tropical forests help cool the average global temperature by more than reducing carbon dioxide levels alone⁸⁰. Tropical trees pull in and store 95% of all tree-based CO₂ sequestration on the planet⁸¹. However, a pair of recent studies show that rising temperatures are

⁷⁸ <https://pinnacleiit.com/blogs/nature-based-flood-mitigation-the-eco-friendly-way-to-reduce-flood-risks/>

⁷⁹ <https://www.bgs.ac.uk/geology-projects/suds/>

⁸⁰ Forests help reduce global warming in more ways than one - Science News. <https://www.sciencenews.org/article/forest-trees-reduce-global-warming-climate-cooling-carbon> Accessed 4/11/2023.

⁸¹ <https://www.communitycarbontrees.org/climate-change-solutions> Accessed 4/11/2022

shortening the lives of trees in tropical forests and reducing their capacity to absorb carbon dioxide². The KWT campus still have plenty of space for afforestation. Afforestation with tropical trees can help in reducing CO₂. Hence, a small afforestation program is suggested within the campus which should be coupled with the constructed wetland for flood mitigation as suggested in the previous section.

2. Design related impacts

a. Climate change

184. **Impacts:** Development of the Nursing Institute at KWT will unavoidably generate greenhouse gas emissions. Although it is not possible at this point in the design process to credibly calculate an impact in tons CO₂ equivalent, it is nevertheless useful to consider design elements that can make the facility's contribution to climate change greater or smaller. Certain materials have much higher embodied emissions than others; concrete is a particularly carbon-intensive material. Materials that are not available locally, particularly very heavy materials—also drive up the emissions associated with building. Installed equipment that is not modern and efficient represents a missed opportunity to lower the carbon footprint of facilities, as does failure to integrate design measures that allow for natural cooling, natural light, and reduced water pumping needs.

185. **Mitigation:** Integration of GHG-mitigating design elements in the new Nursing institute facilities is an opportunity to enhance the facilities' contribution to climate change mitigation, relative to existing standards of construction for public infrastructure in Bangladesh. Key strategies for reducing emissions, and that should be considered for incorporation in the Nursing Institute infrastructure are outlined in Table VI-2. A number of the general design innovations recommended are considered useful and feasible for at least some of the buildings planned for Nursing Institute at KWT and are already reflected in the preliminary designs.

Table VI-2 Possible design phase measures for climate change mitigation

Climate change mitigation measure	Rationale
1. Substitute other materials for concrete where feasible	- Concrete is among the most carbon-intensive of building materials
2. Use low-carbon concrete as much as possible	- Using a lower proportion of cement (and longer cure time to compensate) can reduce the carbon intensity of concrete
3. Create designs that maximize use of building materials that are available locally	- Reduced transport emissions
5. Integrate photovoltaic generation into the electrical plan	- Reduce reliance on coal-generated electricity - Reduce reliance on back-up diesel generator - Possibly reduce size of generator needed
6. Specify only high-efficiency electrical and mechanical equipment	- Reduce reliance on coal-generated electricity - Reduce reliance on back-up diesel generator - Possibly reduce size of generator needed
7. Specify most fuel-efficient backup generator available	- Reduce diesel consumption
8. Maximize cross-ventilation by use of courtyards, openable windows and favorable building orientation	- Reduce demand for air conditioning
9. Prioritize shade in the landscaping plan, with plentiful wide-crowned shade trees on all parts of site	
10. Incorporate hollow wall structures	

Climate change mitigation measure	Rationale
11. Use overhangs above large windows to prevent excessive solar penetration	
12. Maximize interior natural light by use of favorable building orientation and courtyards	- Reduce use of electrical lighting during daytime
13. Specify water-saving toilets, faucets and showerheads	- Reduce need for pumping and treating water
14. Design dedicated plumbing system for drinking and cooking water	- Reduce volume of water requiring energy-intensive water treatment
15. Aim to meet all water heating needs with solar heaters	- Eliminate use of electricity for heating water
16. Specify high-intensity, full-time lighting only where strictly necessary	- Reduce consumption of energy for lighting spaces that don't need it (e.g., parking lots that are only used at peak times)
17. Specify solar-powered lighting for outdoor applications	- Reduce energy used by lighting
18. Base landscape plan around drought-tolerant perennial Native species	- Reduce the need for pumping water
19. Design site layout and inspection process to minimize the length of time vehicles have their engines running during their passage on Love Road	- Reduce direct greenhouse gas emissions
20. Incorporate green roofs wherever roof area is not needed for solar panels and solar water heaters	- Reduce cooling needs
21. Incorporate lightning arrester in the structural design	- Lightning has been a critical source of infrastructure and economic recently.

b. Public health and safety

186. **Impacts:** The proposed Nursing Institute is located within the KWT campus. The road is quite busy with patients, ambulance and other emergency vehicles.

187. *Water Safety and Plumbing Systems.* The building design includes multiple toilet facilities on each floor (male, female, and staff facilities), overhead water reservoirs, and comprehensive plumbing infrastructure. Given the healthcare education context and proximity to Kumudini Hospital, water safety is paramount. The design shows proper separation of drinking water systems from other water uses, with dedicated plumbing shafts for systematic distribution

188. *Firesafety.* The architectural plans reveal a comprehensive fire safety approach with six separate stairwells distributed throughout the building, providing multiple egress routes essential for a 6-story educational facility housing potentially 1,000+ occupants daily. Fire hose locations are strategically positioned on each floor, and the building includes proper corridor widths (ranging from 3,075mm to 9,700mm) that exceed minimum egress requirements. The design incorporates fire-rated separations between different building zones and includes dedicated service areas that can contain utility-related fire hazards.

189. *Waste management.* The proximity to Kumudini Hospital creates unique waste management challenges, as the academic building will generate both educational waste and potentially hazardous materials from laboratory activities. Bangladesh's healthcare waste management system significantly lags behind sustainable practices, with inadequate collection

and treatment facilities. The building design must accommodate proper waste segregation, storage, and disposal systems compatible with both educational and healthcare waste streams.

190. With regards to public health, the COVID-19 pandemic has highlighted vulnerabilities related to human proximity that were previously under-appreciated. To the extent that public facilities such as commercial areas cause people to be packed closely together in indoor spaces, they facilitate the spread of communicable disease. Although the COVID-19 pandemic seems likely to have abated well before the new nursing institute comes into service, it may just be a matter of time before another viral agent causes a similar crisis.

191. **Mitigation:** the following mitigation measures should be deployed:

- Installation of comprehensive automatic fire detection and alarm systems throughout all floors, with particular attention to laboratory areas.
- Implementation of emergency lighting systems with backup power supply, ensuring minimum 10 lux illumination in corridors and exit routes. Regular fire drills and evacuation training specific to educational facilities, incorporating lessons from successful school safety programs in Bangladesh.
- Installation of smoke and heat vents in appropriate locations and ensuring all exit doors meet the 0.9-meter minimum width requirement with outward-swinging mechanisms.
- Implementation of comprehensive Water Safety Plans (WSPs) following WHO guidelines for educational facilities, including regular water quality testing and treatment systems.
- Installation of point-of-use water treatment systems where necessary, proper backflow prevention devices, and regular flushing protocols for fire systems and emergency fixtures to prevent biofilm development.
- Establishment of water quality monitoring protocols specific to the healthcare education environment, with particular attention to laboratory water supplies.
- Implementation of comprehensive waste segregation systems with color-coded collection points throughout the building. Establishment of dedicated hazardous waste storage areas with proper ventilation and containment systems.
- Development of waste management protocols that align with healthcare facility standards, including proper handling of biological specimens and laboratory chemicals.
- Partnership with certified waste management services for proper disposal of hazardous materials and regular training for staff and students on waste handling procedures.

c. Waste management

192. **Impacts:** The design phase of the proposed Nursing Institute Academic Building presents significant opportunities and challenges for sustainable waste management in the Kumudini Hospital region of Mirzapur, Tangail. Based on the architectural drawings, the six-story structure with a total built-up area of 277,655 square feet will generate substantial construction and demolition waste during its construction phase, which research indicates can account for up to one-third of all construction waste if not properly managed. The building's complex program, including specialized laboratories, clinical spaces, examination halls, and administrative areas, requires careful consideration of waste management systems from the earliest design decisions. The facility's location within the Kumudini Hospital complex, which already operates a combined waste management system inaugurated by the Prime Minister of India, presents both integration opportunities and potential strain on existing infrastructure. The design phase impact extends beyond construction waste to encompass the long-term operational waste streams that will be

generated by the nursing institute's educational and clinical activities, including biomedical waste from laboratory training, pharmaceutical waste from clinical instruction, and substantial volumes of general waste from the facility's projected occupancy of over 1,000 students and faculty across multiple academic programs.

193. Mitigation: The architectural design can incorporate several critical mitigation measures to minimize waste generation and optimize management systems throughout the building's lifecycle. First, the design should integrate dedicated waste management infrastructure, including segregated collection points with color-coded systems consistent with WHO guidelines, centralized storage areas with adequate ventilation and security features, and appropriate routing for safe waste transport that separates clean and contaminated pathways. The building's layout should incorporate efficient waste collection routes that minimize staff exposure time to potentially infectious materials by more than 80% compared to manual methods, following best practices from automated hospital waste management systems. Second, the design should include space provisions for on-site waste treatment facilities, potentially incorporating microwave technology for medical waste treatment as implemented in other major Bangladeshi hospitals, or steam-based autoclaving systems for Class B infectious waste treatment. The laboratory spaces should be designed with built-in waste minimization features, including efficient fume hood systems, chemical storage areas with appropriate containment, and dedicated sharp disposal systems integrated into laboratory benches.

d. Site enhancement

194. Enhancement. Based on the analysis of the proposed Nursing Institute academic building project in Mirzapur, Tangail, Bangladesh, several comprehensive site improvement schemes can enhance the functionality, sustainability, and user experience of this educational facility. The current site encompasses 85,274 square feet with a six-story academic building serving nursing education, and strategic improvements can transform it into a model campus for healthcare education.

195. Landscape and Green Space Development. The current site plan shows significant potential for landscape enhancement around the academic building. Creating healing gardens and therapeutic landscapes should be prioritized, as research demonstrates that well-designed green spaces in healthcare education settings reduce stress, improve mental health, and enhance the overall learning experience. Native Bangladeshi plantings including shade trees like mahogany, rain trees, and ornamental plants such as bougainvillea and jasmine can create a lush campus environment while requiring minimal maintenance. Strategic placement of trees around the building perimeter will provide natural cooling, reduce energy costs, and create pleasant outdoor study areas. The existing plaza areas shown in the drawings can be enhanced with flower beds, water features, and seating arrangements to create tranquil spaces for reflection and informal learning.

196. Outdoor Learning and Simulation Areas. Given the nature of nursing education, outdoor simulation areas represent an innovative improvement scheme that can significantly enhance practical training. The site plan indicates ample space for creating outdoor clinical practice zones where students can conduct health screenings, practice community health assessments, and engage in disaster preparedness exercises. An outdoor amphitheater or stepped seating area could serve multiple purposes including lectures, ceremonial events, and large group activities. These spaces should be designed with flexible infrastructure to accommodate various weather conditions, potentially incorporating covered pavilions or retractable canopies.

3. Procurement related impacts

a. Contractor selection

197. **Impacts:** The success or failure of environmental mitigation in infrastructure development hinges to a significant degree on the primary Contractor's sense of environmental responsibility and commitment to compliance with prescribed safeguards measures. If Contractors with a poor track record of compliance are hired, it is more likely that environmental impacts that can be easily prevented or minimized will become more serious than they reasonably should. It is expected that the investments at the Nursing Institute and KWT will be implemented through a contract, so the choice of primary Contractor is doubly critical.

198. Upon award of the contract, the Contractor will be required to prepare a detailed Contractor Environmental Management Plan (CEMP) to demonstrate how it will meet its obligations under the EMP in relation to the investment site at the Nursing Institute. The plan will be reviewed and approved by the construction supervision consultant (CSC) and the safeguards oversight unit (SOU) within the PIU; this review process is a critical opportunity to ensure that the selected Contractor understands and is committed to full implementation of its safeguards' responsibilities. A sample outline of a CEMP is provided in Appendix 11.

199. **Mitigation:** Only Contractors with a demonstrated commitment to safeguards implementation - as can be confirmed by previous construction supervision consultants and monitoring reports from past projects - should be hired. Bidding documents should stress safeguards requirements, and the documentation provided by bidding firms should be carefully scrutinized, including by following up on references to recent works completed. All Contractors and sub-Contractors must be registered with the Ministry of Labor and Employment.

200. Contractor candidates should be required to provide details of the age and fuel efficiency of their equipment and vehicle fleets in bids, and this information should be scrutinized and weighed in the selection process as a means of helping to limit the greenhouse gas generation potential of the investments. Construction contracts should require the primary Contractor and all of its sub-Contractors to use only modern, fuel-efficient machinery, and the employer (most likely the PIU) should have the reserved right to require removal and replacement of machinery it deems unacceptable in this regard at any time during the construction phase.

b. Labour sourcing

201. **Impacts:** Procurement of labor has two main potential impacts, which can be either positive or negative, depending on where most workers come from. First, use of mostly or exclusively non-local labor means that a construction camp will be needed, and this has significant potential for environmental and social impacts, including water pollution of local surface waters with untreated sewage and grey water; social discord due to worker behavior off-site, cultural misunderstanding and resentment about jobs going to outsiders; spread of communicable diseases including sexually transmitted ones; and occupational health and safety risks due to contractor failure to provide decent facilities. Hiring all local workers, by contrast, may mean that the need for a construction camp is eliminated.

202. Second, hiring mostly non-local workers is a missed opportunity for the project to bring benefits to the local community. The people who live in nearby areas will bear the brunt of any negative impacts that arise during the construction and operation phases, and employment opportunities will go some way in compensating for the inconveniences and discomforts

experienced. When all the jobs go to workers from other regions, wages do not stay in the local community. It is not uncommon in Bangladesh for progress on project works to be frustrated by deliberate actions of local factions angered by the use of non-local labor.

203. **Mitigation and enhancement:** In order to minimize and prevent construction camp impacts and maximize the project's benefits to the local community, the primary Contractor and all of its sub-Contractors should be contractually required to hire mostly or exclusively local residents for construction jobs. This should be stipulated in the bidding documents and contracts.

c. Material sourcing

204. **Impacts:** Generally speaking, materials that come from afar - especially very heavy materials - will have more significant environmental impacts associated with them, because of the extra energy used in transport. Transport often accounts for the greatest proportion of GHG emissions embedded in earthworks. Materials sourced from suppliers who obtain their wares by illegal and unsustainable means, such as hill-cutting, coercive farmland mining or riverbed mining (all notable problems in Bangladesh) effectively expand the environmental footprint of the infrastructure that is built with them.

205. **Mitigation:** Contractors should be required to prioritize proximity in sourcing materials such as gravel, sand and cement, provided that proximate sources are also not illegally or unsustainably obtained. The supplier is required under National law to furnish a Certificate of No Objection from the District Commissioner or Local Upazila Nirbahi Officer (UNO); Contractors should be contractually prohibited from purchasing materials from any supplier who is unable to show such a certificate and should be required to secure copies of the certificate for inspection by the construction supervision consultant.

C. Findings of Impact Assessment: Construction phase

1. Biophysical impacts

a. Water quality

206. **Impacts:** The construction phase poses multiple threats to water quality in the Kumudini Hospital region. Excavation activities for the building's 10-storey foundation (though initially constructing only 6 storeys) will generate substantial amounts of disturbed soil and sediment, which can easily migrate to nearby water sources during monsoon periods. The project area's location within the Madhupur tract, characterized by non-calcareous dark grey floodplain soils, makes it particularly susceptible to erosion and sediment runoff. During the excavation of foundation trenches and installation of underground utilities, loose soil particles can be transported by surface runoff directly into the Louhajang River, which serves as a critical water source for the hospital and surrounding communities.

207. Construction activities will inevitably lead to temporary drainage congestion, especially during Bangladesh's monsoon season when rainfall can exceed 3000mm annually in the Tangail region. The disruption of natural drainage patterns around the construction site will create ponding areas where contaminated water can accumulate before eventually reaching groundwater or surface water sources. This is particularly concerning given that the project area relies heavily on groundwater extraction through tube wells, which are already vulnerable to contamination from surface pollutants..

208. *Hazardous Material Contamination Risks.* The construction process involves extensive use of potentially hazardous materials including diesel fuel for generators and construction equipment, hydraulic fluids, lubricants, paints, concrete additives, and chemical solvents. Accidental spills or improper storage of these materials pose severe risks to both groundwater and surface water quality. The permeable nature of the floodplain soils in the area means that any surface contamination can rapidly infiltrate to groundwater aquifers that supply the numerous tube wells serving Kumudini Hospital and surrounding facilities. Given that water quality studies in the Mirzapur area have already identified elevated iron levels in some groundwater sources, additional contamination from construction chemicals could exacerbate existing water quality problems.

209. *Sewage and Sanitation Challenges.* The influx of construction workers will create significant demands on local sanitation infrastructure. Inadequate sanitation facilities for the construction workforce can lead to direct contamination of soil and groundwater through improper waste disposal practices. This is particularly problematic in the hospital environment where water quality standards must remain exceptionally high to prevent healthcare-associated infections and maintain sterile conditions for medical procedures.

210. **Mitigation:** To address drainage congestion issues, the project must implement a multi-layered approach combining temporary and permanent solutions. Installation of temporary pumping systems will be essential for removing accumulated rainwater from foundation excavations during monsoon periods, preventing the creation of stagnant pools that can become contaminated and eventually overflow into surrounding areas. The construction of temporary earth or brick-lined drainage channels around the perimeter of the construction site will direct runoff away from sensitive areas and toward appropriate treatment or infiltration zones. These temporary drains must be regularly maintained and cleared of sediment accumulation to remain effective throughout the construction period.

211. For long-term water quality protection, the project's connection to Kumudini Welfare Trust's existing central sewage treatment plant represents a crucial mitigation measure. This biological treatment system processes wastewater before releasing treated effluent to the Louhajang River, ensuring that construction-related wastewater does not contribute to river pollution. However, the increased load from construction activities may require temporary upgrades or supplementary treatment capacity to maintain treatment efficiency.

212. The following mitigation measures should be implemented:

- (i) **Groundwater Protection Protocols.** Protecting groundwater resources requires strict controls on construction water usage and contamination prevention. The contractor must establish alternative water sources for construction activities to avoid depleting local groundwater supplies that serve the hospital and surrounding communities. When groundwater extraction is necessary, it must be conducted through properly constructed and sealed wells to prevent cross-contamination between aquifer layers. Regular water quality monitoring should be implemented at strategic locations around the construction site, with testing conducted semi-annually for key parameters including pH, dissolved oxygen, total dissolved solids, electrical conductivity, and potential contaminants such as petroleum products and heavy metals.
- (ii) **Hazardous Material Management.** A comprehensive hazardous material management plan must be implemented to prevent spill-related contamination. This includes establishing designated storage areas with impermeable flooring and secondary containment systems for all petroleum products, chemicals, and other

potentially harmful substances. These storage areas must be elevated above potential flood levels and equipped with spill response materials including absorbent pads, containment booms, and neutralizing agents. All storage containers must be properly labeled and inspected regularly for signs of deterioration or leakage. Personnel handling hazardous materials must receive specialized training in spill prevention and response procedures.

- (iii) **Sediment and Erosion Control.** The implementation of erosion and sediment control measures is critical given the monsoon climate and soil characteristics of the region. Installation of silt fences around the construction perimeter will help trap sediment-laden runoff before it can reach nearby water bodies. Temporary sediment ponds or retention basins should be constructed to allow settling of suspended particles from construction runoff. These facilities must be regularly maintained and cleaned to prevent sediment accumulation and potential failure during heavy rainfall events. Revegetation of disturbed areas should begin as soon as construction activities are completed in each zone to establish natural erosion protection.
- (iv) An Emergency Response Plan encompassing spill response should be a required element of the Contractor Environmental Management Plan (CEMP). Appropriate contents of an Emergency Response Plan are listed on the sample outline of a CEMP provided in Appendix 9.
- (v) Surface water pollution from construction camps can be effectively controlled by requiring the responsible Contractor to install appropriately sized septic systems to accommodate effluent from all on-site toilets, and to maintain them properly. This should be one set of specifications in a broader Construction Camp Management Plan, which the primary Contractor should be contractually required to produce. The primary Contractor should be held responsible for ensuring the plan is effectively implemented, even if the camp is occupied exclusively by workers hired by one or more sub-contractors. A sample outline of a Construction Camp Management Plan is provided in Appendix 11.
- (vi) Runoff from active construction sites should be of sufficient quality to prevent violation of minimum water quality standards in the receiving water body, as specified in the Environment Conservation Rules, 2023.

b. Drainage congestion

213. Impacts. Construction of the Kumudini Nursing Institute academic building will involve excavation for foundations, underground utilities, material stockpiling, and temporary access arrangements, all of which can disrupt existing surface drainage pathways within the KWT campus and its connection to the wider Mirzapur drainage regime. Given the area's flat topography, monsoon-dominated rainfall (with prolonged wet periods from June to October), and documented tendencies for localized waterlogging, temporary obstruction of drains or reduction in overland flow capacity may result in:

- Accumulation of stormwater within excavated pits and low-lying areas of the construction site, delaying works and increasing safety risks for workers;
- Overflow of sediment-laden runoff into campus drains and adjacent low areas, contributing to siltation and reduced hydraulic capacity;
- Short-term flooding of nearby access roads, pedestrian routes, and open spaces during intense rainfall events; and
- Increased risk of soil erosion, turbidity in runoff, and deterioration of local drainage efficiency, particularly during peak monsoon periods.

214. Without adequate management, these impacts could aggravate the existing drainage congestion challenges already experienced in the Mirzapur area during heavy rainfall events.

215. **Mitigation.** To prevent construction-induced drainage congestion and associated waterlogging, the Contractor shall incorporate the following measures within the Contractor's Environmental Management Plan (CEMP):

- Temporary Drainage Network:
 - (i) Construct temporary earth- or brick-lined peripheral drains around the construction footprint to intercept and safely convey runoff away from excavations and working areas.
 - (ii) Ensure temporary drains are hydraulically connected to existing campus drainage channels without causing backflow or blockage.
- Dewatering and Water Control:
 - (i) Install portable pumping systems to rapidly remove accumulated rainwater from foundation pits and low-lying work zones during monsoon periods.
 - (ii) Discharge pumped water through sediment traps or silt screens before releasing into campus drains to prevent clogging and turbidity.
- Sediment and Debris Management:
 - (i) Provide silt fences, sediment barriers, or temporary settling basins at drainage outfalls and along site boundaries.
 - (ii) Prohibit stockpiling of soil, sand, or construction materials within natural or man-made drainage paths.
- Routine Maintenance:
 - (i) Conduct daily inspection and desilting of temporary drains, culverts, and catch pits, especially after rainfall events.
 - (ii) Immediately clear any construction debris obstructing water flow.
- Construction Planning for Monsoon Season:
 - (i) Schedule major excavation and earthworks, where practicable, outside peak monsoon months.
 - (ii) Stabilize exposed soil surfaces using compaction, temporary covering, or geotextile sheeting to minimize erosion and sediment runoff.

216. Implementation of these measures will maintain effective surface water conveyance during construction, prevent localized flooding and congestion, and protect the existing drainage system of the KWT campus and surrounding areas throughout the construction phase.

c. Air quality

217. **Impacts:** In any construction site, dust generation is inevitable. Since the location is set in a busy urban premises with lots of pedestrian movement, generations of dust might create havoc. Additionally, a few other constructions are ongoing near the site. This means, during construction when sand and cement are brought in for mixing, dust generation can be elevated.

218. Again, emissions from construction equipment and haul trucks are sometimes a significant issue at urban construction sites, where there are many human receptors living and working in proximity to large scale active works. The proposed site is located in the KWT campus characterized by relatively low traffic, hence air quality in and around the proposed site is relatively better (Figure VI-4).

219. **Mitigation:** Dust is easily minimized by implementation of a regular routine of light spraying with water. All dust-generating surfaces, including those on the construction site and the haul road for at least 200 m from the site, should be treated as frequently as is needed to avoid dust reaching nuisance levels. Structures undergoing demolition should also be misted throughout the process. All stockpiles of sand and soil should be kept tightly covered with

tarpaulins whenever they are not in active use. All haul trucks should be equipped with tightly fitted tarpaulins to prevent releases of dust from dry materials during transport. Ambient air quality at the perimeters of the two construction sites should meet the standard indicated in Air Pollution (control) Rules 2022.

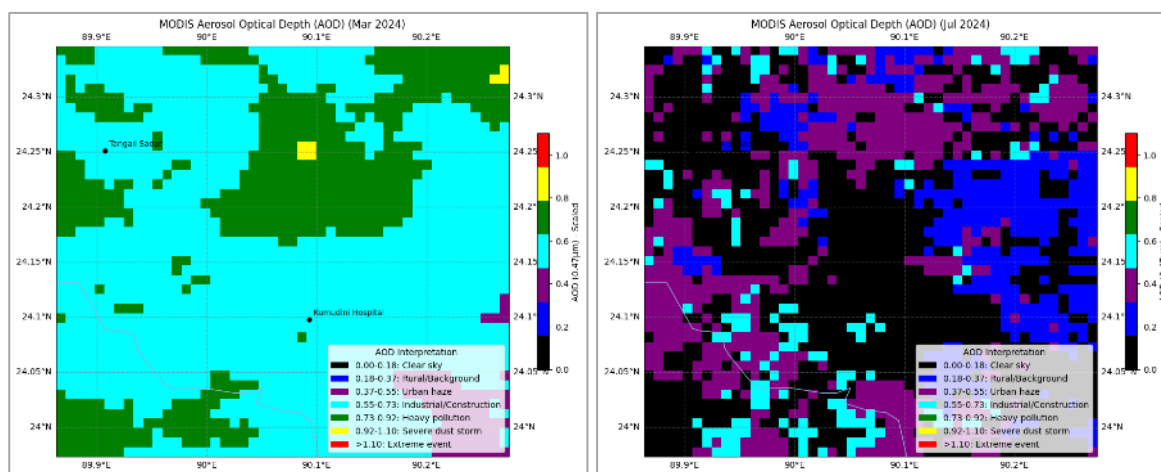


Figure VI-4 Air quality (dust) in March 2024 (left image) and July 2024 (right image) derived from MODIS data

220. Although emissions impacts are expected to be negligible, all motorized construction equipment and all haul trucks should, as a later of good practice, be maintained to a high standard, most particularly their fuel and exhaust systems. Emissions from motorized machinery used in construction should meet the standard indicated in Air Pollution (control) Rules 2022.

d. Soil quality

221. **Impacts:** During the construction phase of the six-story academic building, several soil quality impacts are anticipated based on the regional characteristics and project scale. Excavation activities for the foundation work will disturb approximately 42,181 square feet of ground floor area, potentially exposing deeper soil layers and altering natural soil structure. The construction of the building with its 10-story foundation design indicates substantial excavation depth requirements, which may encounter varying soil bearing capacities as teams progress through different geological layers.

222. Soil erosion represents a primary concern during earthwork operations, particularly given the region's annual rainfall of approximately 1,469mm and the area's susceptibility to seasonal flooding. The acidic nature of local soils combined with their moderate to low fertility status makes them vulnerable to degradation during construction activities. Compaction from heavy construction equipment poses additional risks to soil structure, potentially reducing permeability and increasing surface runoff, which could exacerbate the region's existing drainage challenges.

223. Contamination risks during construction include potential spillage of construction chemicals, fuel, and lubricants into the soil, which could compound existing environmental concerns in an area already affected by heavy metal contamination. The construction phase also involves temporary storage of materials and establishment of worker camps, both of which can introduce organic and inorganic pollutants into the soil system if not properly managed..

224. **Mitigation:** Comprehensive soil management during construction should begin with detailed geotechnical investigation beyond the standard requirements to fully characterize spatial variability in soil properties across the construction site. Implementation of erosion control measures including silt fences, temporary drainage ditches, and sediment basins will help minimize soil loss during excavation and grading activities.

225. *Contamination prevention protocols* should include designated areas for fuel storage and equipment maintenance, spill response procedures, and regular soil monitoring in areas adjacent to construction activities. Given the region's history of lead contamination, soil testing protocols should be implemented to ensure that construction activities do not redistribute contaminated materials or create new contamination pathways.

226. *Water management strategies* must address both dewatering requirements during construction and long-term drainage considerations. Installation of temporary pumping systems during foundation work, combined with strategic placement of construction access roads to avoid creating new drainage barriers, will help maintain site stability. Restoration of natural drainage patterns after construction completion is essential to prevent contributing to the region's existing waterlogging problems.

227. *Soil conservation techniques* including stockpiling of topsoil for later restoration, minimizing the construction footprint, and implementing phased construction approaches to limit simultaneous soil disturbance can help preserve soil quality. Compaction management through designated traffic routes and use of appropriate equipment will minimize structural damage to remaining soil areas..

e. **Flora and fauna**

228. **Impacts.** The effects of construction work on species of conservation concern - and on local wildlife and habitats in general - will be negligible, provided that the location is in an industrial setting, devoid of any vegetation nearby. Soil is effectively kept out of site runoff and construction activity is kept away from water bodies. Therefore, as described in the baseline section, the sites are located in urban areas which are devoid of flora and fauna nearby. Therefore, no impact is envisaged.

229. **Mitigation.** No special mitigation is needed to address potential wildlife impacts.

230. **Enhancement.** Tree plantation, especially fruit bearing Native trees, are suggested around the site. Trees are to be planted so that their root expansion does not cause damage to the building of plaza area. The trees will help is carbon sequestration, provide necessary shade during summer, as well as play an important role in campus aesthetics.

2. **Socioeconomic impacts**

a. **Traffic Congestion**

231. **Impacts.** The proposed Nursing institute academic building is located in Mirzapur Upazila, Tangail, directly on the Old Dhaka-Tangail Highway (Mirzapur Road), which serves as a critical transportation artery connecting Dhaka to northNern Bangladesh. This highway already experiences significant traffic challenges, with frequent 20-30 kilometer tailbacks during peak periods and holiday seasons. The region witnesses heavy traffic congestion particularly at

Mirzapur sections, where vehicles often move at crawling speeds due to inadequate road capacity and ongoing infrastructure development projects.

232. The construction site's proximity to Kumudini Hospital, a 1,050-bed facility that serves patients from across Bangladesh, adds complexity to the traffic management challenge. The hospital generates substantial daily traffic from patients, visitors, medical staff, and ambulances, creating a continuous flow of vehicles throughout the day. The existing Mirzapur town road network, classified as National Highway N403 with a length of 3.732 km, already operates near capacity, making any additional construction-related traffic particularly disruptive.

233. *Anticipated Construction Phase Traffic Impacts.* The construction of the six-story academic building with a total area of 277,655 square feet will generate significant traffic impacts over the estimated 24-30 month construction period. Heavy construction vehicles, including concrete mixer trucks, material delivery vehicles, and construction equipment transporters, will create substantial additional load on the already strained road network. The project's phased construction approach, while beneficial for educational continuity, will extend the duration of traffic disruption, potentially affecting the community for over two years.

234. Construction-related traffic will include daily movements of cement trucks, steel delivery vehicles, ready-mix concrete plants, excavation equipment, and worker transportation. Given the building's substantial size and complexity, including specialized facilities like nursing labs, examination halls, and a library, the material delivery requirements will be considerable[attachment]. The most severe impacts are expected during the foundation and structural phases, when heavy concrete pours and steel erection activities will require multiple truck movements within short time windows.

235. Peak construction traffic will likely coincide with existing traffic peak hours, particularly the morning rush (7:00-9:00 AM) and evening rush (3:00-6:00 PM), when hospital staff changes shifts and general commuter traffic is highest. This overlap will compound existing congestion problems, potentially creating gridlock conditions that could impede emergency vehicle access to Kumudini Hospital and disrupt the broader regional transportation network..

236. **Mitigation.** A traffic management plan (TMP) must be devised prior to construction and approved by the environmental specialist from SDCMU and approved from local zilla parishad/police station. A sample TMP has been attached with this IEE as Appendix 4.

237. The most effective mitigation approach involves strategic scheduling of construction activities to avoid peak traffic periods. Heavy material deliveries should be restricted to off-peak hours, ideally between 10:00 AM and 2:00 PM, and after 7:00 PM when traffic volumes are lower. This approach, commonly implemented in urban healthcare construction projects, can reduce traffic conflicts by up to 40%. Additionally, coordinating with local authorities to establish designated construction vehicle routes that bypass the most congested areas near the hospital main entrance will minimize disruption to critical medical traffic.

238. *Advanced Traffic Control Infrastructure.* Implementation of temporary traffic signal systems and dedicated turning lanes at the construction site entrance will prevent construction vehicles from blocking through traffic. Installing variable message signs (VMS) to provide real-time traffic information and alternate route guidance will help distribute traffic load across available road networks. The use of trained flagmen at site access points, operating 24/7 during active construction periods, will ensure safe and efficient movement of both construction and civilian traffic

b. Noise and vibration

239. **Impacts.** As noted in the baseline section of this report, the proposed site is located in the urban busy Zone, by the side of semi-busy roads. Therefore, the site is not exposed to high pitch noise. Noise and vibration from construction activity can be a serious nuisance for people living near active construction site, the potential for impacts is quite high due to high population density, and there are in fact residences in close proximity to some parts of the development site. Depending on the particular configuration of the site, construction activity may end up being carried out close to these buildings. People living in nearby structures will experience some measure of nuisance during busy construction periods, particularly if any pile-driving is carried out, or if construction activity is conducted at night. People living along the roads, that will inevitably be used to bring bulk materials to the building sites, may notice an increase in noise from haul trucks and construction activities such as mixing, hammering etc.

240. **Mitigation.** To minimize noise and vibration impacts for residents living within earshot of the vicinity of construction site, construction activity should be strictly limited to daylight hours. To avoid adding to the traffic noise for roadside residents, all haul trucks must be kept in good repair, and fitted with functional mufflers. Proper maintenance of machinery and trucks shall be done not to cause extra vibration. Emissions of noise from the project construction sites should not be of a level sufficient to cause an exceedance of maximum ambient noise levels as specified in the Noise Pollution Control Rules 2006. Emissions from individual pieces of machinery and vehicles used in construction should not be allowed to exceed the maximum acceptable levels indicated in Noise Pollution Control Rules 2006.

c. Occupational health and safety

241. **Impacts:** Construction activity and construction sites carry inherent risks for workers. These risks include falls, contact with moving machinery, flying and falling objects, dust, burns, cuts, exposure to intense light from arc welding, electric shock and electrocution, and crushing from collapsing earth walls, amongst other things. Where construction is conducted in public rights-of-way, there are also dangers associated with vehicles moving past the work site.

242. The recent COVID-19 pandemic has heightened concern about workplaces as transmission points for viral illnesses. Although much construction work is conducted in the open air and thus can be considered relatively low risk, this is not always the case, especially as the construction process advances and doors and windows are installed. Whether it is COVID-19 or the next serious viral threat to come along, construction sites are potential trouble spots.

243. Construction camps are problematic in terms of occupational health and safety because Contractors tend to invest as little as possible in their construction, operation and upkeep, partly on the assumption that camps are by nature temporary, and also based on a characterization of construction workers as rough people accustomed to rough living conditions. This lack of investment in camps usually results in crowded and unsanitary living conditions, inadequate toilets and washing facilities, low-quality water supplied for drinking, cooking and bathing, and various dangers such as single exit sleeping sheds, lack of fire extinguishers, and exposed wires. The health risks for residents of construction camps are heightened dramatically when viral illnesses are circulating in the general population, as has been the case in 2020/2021 with COVID-19. In Bangladesh, it is not uncommon for construction workers to sleep in rows in poorly ventilated sheds, with less than 1 m between them and less than 2 m² space per person overall; workers also often gather to eat in the same sheds, for lack of dedicated mess halls or other eating space.

244. **Mitigation.** Risks to worker safety on the job site can be successfully minimized through proper worker training, and by strict use of task-appropriate personal protective equipment (PPE). All workers and site supervisors should be provided workplace safety training prior to the start of construction, and at regular intervals thereafter. Training should be repeated whenever new crews are brought on to the site, and whenever monitoring by the primary Contractor or construction supervision consultant reveals declining standards of practice on the site. The primary Contractor should ensure that all workers are provided with adequate PPE suited to any task they may be given, and also strictly enforce its use at all times.

245. In order to limit the spread of COVID-19 or other future viral threats on the project construction sites, preventive measures must become standard practice. All workers must undergo temperature checks at least once per day. Suitable face masks must be supplied to all workers and replaced daily; use of masks should be required at all times except when using other types of masks required for particular work activities, or when eating, bathing and sleeping. Hand washing and sanitizing stations should be positioned at any site location where workers may eat or drink, including at canteens, camp kitchens and eating spaces, and also near toilets. Data on temperature checks, mask provision and re-stocking of sanitizing soaps and sprays should be collected by the Contractor and reported in monthly compliance reporting to the supervision consultant.

246. Risks to workers from poor conditions in construction camps can be greatly minimized by full implementation of a site-specific Construction Camp Management Plan for each camp that will be established. The Construction Camp Management Plan will be appended to the CEMP. The Construction Camp Management Plan should specify, at minimum,

- (i) dormitories with good cross-ventilation at least 4 m² living space per person;
- (ii) two or more working exits and at least one high-capacity fire extinguisher maintained in good working order for all residential structures;
- (iii) indoor eating space separate from sleeping areas;
- (iv) kitchens with off-floor food storage, raised working surfaces of a material that can be easily sanitized, and a ready supply of clean water;
- (v) toilet facilities with at least one functional toilet (protected from the elements and affording full visual privacy to the user) per ten resident workers, with a ready water source for washing;
- (vi) roofed and partitioned wash-up areas with floors and proper drainage;
- (vii) physical separation between sleeping spaces on the one hand, and kitchens and storerooms on the other;
- (viii) wiring that meets the requirements of the Bangladesh National Building Code; and
- (ix) provision of unlimited drinking water that meets the standards indicated in the Environment Conservation Rules, 2023.

d. Public health and safety

247. **Impacts.** Public safety risks associated with construction activity are primarily related to proximity; works carried out in densely populated localities offer many more opportunities for members of the public to come into contact with heavy machinery, fall into holes, and get injured by unstable stockpiles of materials. All the sites will offer heightened risk in this regard, given the high density of residents nearby. During heavy hauling periods, safety risks may be slightly elevated for people using the two road corridors serving sites, although construction traffic will represent a small incremental increase relative to the steady flow of trucks heading to and from the outer KWT area, especially Police Plaza area.

248. Public safety - especially the safety of women and girls - can also be threatened by operation of construction camps in proximity to local settlements, especially when camps house many non-local workers who may feel unencumbered by the norms and mores of their faraway home communities. Camps may become a locus for prostitution, and the violence that often accompanies it. Sometimes, local resentment over the hiring of non-local workers, perhaps exacerbated by cultural misunderstanding or racial and religious animus, can lead to violent conflict between resident workers and local people.

249. Public health is most often affected by construction activity when dust levels are very high for long periods, and also when poorly managed construction camps are situated near existing settlements. Especially when camps house large numbers of workers from other regions, their presence near communities may lead to elevated incidence and spread of communicable diseases, particularly sexually transmitted ones, in the local population. This is especially true if the camp is allowed to become a hub for prostitution.

250. **Mitigation.** The construction sites must be adequately fenced, and security should be provided at all times to keep curious people from entering. The construction site at KWT should be planned in such a way that protected means of access are provided for users and staff of the existing facilities even as new ones are under construction. A low-speed limit should be imposed on haul trucks.

251. The best means of limiting construction camp-related public safety impacts is to avoid the need for camps at all, by hiring only local workers; given the high local unemployment rate and workforce accustomed to heavy work in the stone-crushing works around the area, it seems likely it will be feasible to hire mostly local workers. If a camp must be established, resident workers should be given awareness training, and subject to strict controls on off-site travel and behavior. The Contractor responsible for the camp should work proactively with local community leaders - including female leaders - to monitor interaction between the resident worker population and the local public and promptly address emerging problems such as prostitution and bad worker behavior off-site. These measures should be included in the Construction Camp Management Plan, which will be appended to the CEMP (see Appendix 9).

252. Elevated dust levels can be effectively mitigated with regular light spraying of dust-generating surfaces with water, as noted above in relation to air quality impacts. Again, it should be emphasized that impacts from construction camps can be most effectively prevented by hiring only local workers. If this is not feasible, the Contractor in charge of the camp should provide regular sexually transmitted disease awareness training, and also work with local community leaders to proactively curb the development of prostitution at and around the camp. These and other measures for managing construction camp impacts should be specified in the Construction Camp Management Plan, appended to the CEMP.

e. GBV/SEA-SH risks

253. **Impacts.** Once the Kumudini Nursing Institute academic building becomes operational, daily presence of large numbers of female students, trainees, academic staff, hospital-linked visitors, service workers, and external service providers (cleaning, security, maintenance, transport, vendors) will increase social interaction within and around the campus. While the KWT environment is generally institutional and controlled, expanded footfall, extended operating hours, and use of shared facilities (libraries, laboratories, hostels, pathways, sanitation blocks, and transport pick-up points) may create exposure to gender-based violence (GBV) and sexual

exploitation, abuse, and harassment (SEA-SH), particularly for young female students and junior staff.

254. Potential operational-phase risks include:

- Verbal harassment, unwanted attention, or intimidation in classrooms, corridors, stairwells, washrooms, and outdoor spaces with limited visibility;
- Inappropriate behavior or abuse of authority by staff, security personnel, service providers, or visitors;
- Increased vulnerability during early morning or evening hours due to reduced supervision or lighting; and
- Under-reporting of incidents due to fear of stigma, retaliation, or lack of confidential reporting mechanisms.
- Given the institutional setting and the IEE's emphasis on worker and community grievance systems and campus safety management, proactive controls are essential to prevent social harm during operations

255. **Mitigation Measures.** To minimize GBV/SEA-SH risks during the operational phase, KWT and facility management shall integrate the following institutional, physical, and behavioral safeguards:

256. Institutional Policies and Codes of Conduct: (i) Enforce a zero-tolerance GBV/SEA-SH policy applicable to all staff, students, contractors, and service providers; (ii) Require signed Codes of Conduct for campus employees, security staff, and outsourced service providers, explicitly prohibiting harassment and abuse.

257. Safe Campus Design and Management: (i) Ensure adequate lighting in corridors, staircases, parking areas, walkways, and building entrances; (ii) Maintain clear sightlines, functional locks, and controlled access to sensitive areas such as hostels, washrooms, and laboratories; (iii) Deploy trained security personnel, including female guards where feasible, during operational hours and peak movement periods.

258. Awareness and Capacity Building: (i) Conduct regular awareness sessions for students and staff on respectful behavior, consent, reporting mechanisms, and available support services; (ii) Integrate GBV/SEA-SH prevention modules into student orientation programs and staff induction training.

259. Confidential Reporting and Response Mechanisms: (i) Operationalize a confidential, survivor-centered grievance and referral system linked to the project GRM structure; (ii) Provide multiple reporting channels (hotline, focal person, suggestion box, digital platform) with clear timelines for response; (iii) Ensure referrals to medical, psychosocial, and legal support services when needed.

260. Monitoring and Enforcement: (i) Assign a trained gender or safeguards focal person within KWT to oversee implementation, track complaints, and ensure corrective actions; (ii) Apply disciplinary measures promptly in line with institutional regulations for any substantiated incidents.

261. Through these integrated operational controls, the Nursing Institute can maintain a safe, inclusive, and respectful learning environment while minimizing GBV/SEA-SH risks and strengthening institutional accountability throughout the facility's lifecycle.

3. Waste management related impacts

a. Construction waste

262. **Impacts.** Waste generated during construction will consist mainly of packaging, from both construction materials and food products consumed by workers. The volume of waste produced is likely to be relatively small but can easily get strewn and blown across the landscape and end up in local water bodies, if not appropriately managed.

263. **Mitigation.** Suitable receptacles should be positioned at strategic locations around the work sites to facilitate containment and collection of solid waste. Construction waste should be sorted to segregate recyclables, and regular pickup of these by a local recycling business should be arranged. Non-recyclable waste should be transported to the nearest legal landfill site, and never burned, buried or dumped on the site. Waste oil and other noxious fluids and associated used containers should be recycled through a reputable business providing this service. The primary Contractor should be required to specify all waste management arrangements - including the identity of recycling enterprises and legal landfill operators able to accept expected wastes - in a site-specific Waste Management Plan embedded within the CEMP. Appropriate contents of a Waste Management Plan are specified in the sample CEMP outline provided in Appendix 9.

D. Findings of Impact Assessment: Operation phase

1. Socioeconomic impacts

a. Public safety

264. **Impacts.** It is to be hoped that some public safety impacts related to the campus facilities like open drain (without top slab), unsafe cleaning areas inside the drain, lack of gas/odor release vents from drains, large height difference between footpath and road etc. will be addressed during design phase. Yet, damage to the top slab, clogging of gas vents etc. may threaten the pedestrians that are walking by the gate close to road in front of the KWT campus area near the proposed site.

265. **Mitigation.** Facility operations should be monitored, and any emerging public safety issues should be addressed as needed.

b. Waste management related impacts

266. **Impacts.** The academic building will accommodate approximately 1,500 students and staff across multiple educational functions including classrooms, laboratories, examination halls, administrative offices, library, canteen, and healthcare training facilities. Based on research findings, educational institutions typically generate 0.31-0.38 kg of waste per capita daily, suggesting this facility could produce approximately 465-570 kg of mixed waste daily during full operation. The waste composition will likely include 65-90% organic/biodegradable materials (primarily food waste from the 100-person capacity canteen), 10-20% recyclable materials (paper, plastic, glass), and 5-10% non-recyclable general waste.

267. Healthcare training components will generate specialized biomedical waste including contaminated materials from nursing skill laboratories, anatomy labs, physiology labs, and microbiology labs. Research indicates that nursing education facilities produce approximately 0.8-

1.67 kg of biomedical waste per bed equivalent daily, with 15% classified as hazardous infectious waste requiring specialized treatment. The facility's multiple laboratory spaces and clinical training areas could generate 50-75 kg of biomedical waste daily, including sharps, contaminated personal protective equipment, culture materials, and pharmaceutical waste.

268. The municipality generates approximately 70 tons of waste daily with limited collection and processing capacity, resulting in 55% of solid waste remaining uncollected and disposed of in unauthorized locations. Adding 465-570 kg of daily waste from the nursing institute to this already overburdened system poses significant risks. Improper disposal could contaminate local water sources, particularly affecting the Louhajang River that serves surrounding communities. The biomedical waste component presents heightened risks, as research shows that poorly managed healthcare waste contributes to disease transmission, antibiotic resistance development, and long-term environmental contamination. Without proper segregation and treatment, infectious materials could mix with general waste streams, contaminating the entire waste management chain and exposing waste handlers, students, and community members to health hazards.

269. **Mitigation.** *Source Reduction and Waste Minimization:* Implementing comprehensive waste reduction strategies including digital documentation systems to minimize paper consumption, reusable laboratory equipment where safely possible, and sustainable procurement policies favoring products with minimal packaging. Educational programs should emphasize waste prevention principles among students and staff, creating a culture of environmental responsibility that extends beyond the institution.

270. *Advanced Segregation Systems:* Establishing color-coded waste segregation following WHO guidelines with black containers for general waste, yellow for infectious biomedical waste, brown for pharmaceutical and chemical waste, and separate containers for recyclables. Each laboratory, classroom, and common area requires appropriate containers with clear labeling in both Bengali and English. Staff training programs must ensure 100% compliance with segregation protocols, as research demonstrates that proper segregation at source is critical for effective waste management.

271. *Biomedical Waste Treatment Infrastructure:* Installing on-site autoclaving capacity for infectious waste treatment, reducing reliance on external waste management services that may be unreliable in the Tangail region. The facility should establish partnerships with certified medical waste treatment providers like PRISM Bangladesh Foundation, which operates treatment facilities in Dhaka and surrounding areas. All biomedical waste should be tracked through manifest systems ensuring complete chain of custody documentation.

272. *Organic Waste Processing:* Implementing on-site composting systems for food waste and organic materials from the canteen and grounds maintenance. Given that 65-90% of institutional waste is biodegradable, composting could reduce overall waste volume by two-thirds while producing valuable fertilizer for landscaping. Vermicomposting or aerobic composting systems appropriate for tropical climates should be installed with proper ventilation and pest control measures.

273. *Water and Wastewater Management:* Installing rainwater harvesting systems and wastewater treatment facilities to minimize environmental impact on local water resources. The facility's substantial roof area provides excellent opportunities for rainwater collection, reducing dependence on groundwater and municipal supplies. Wastewater from laboratories requires specific treatment protocols before discharge to prevent contamination of local waterways.

E. Cumulative Impact Assessment

274. The planned six-story academic building for Nursing Institute in Mirzapur, Tangail, marks a major institutional project in an environmentally sensitive area of Bangladesh. This region, home to rich biodiversity and numerous water bodies, already faces significant pollution from local industries, including textile dyeing and printing, which have impacted rivers like Bonshai and Jhenai. The cumulative environmental assessment for the 277,655 square foot building must account for not only its direct effects but also how it adds to ongoing resource depletion and environmental degradation caused by existing industrial activity.

275. The cumulative assessment reveals that this project intersects with multiple environmental stressors affecting the Tangail region's ecological integrity. The construction phase will contribute to regional air quality deterioration through particulate matter emissions from material transport and construction activities, adding to existing high SPM and PM₁₀ concentrations documented in the area. Water resource impacts are particularly concerning given the regional context of groundwater contamination and surface water pollution from industrial discharge. The building's water demand during construction and operation will compound existing stress on local aquifers, while potential runoff and waste generation could further degrade already compromised water bodies. The cumulative effect of this development, when combined with ongoing deforestation pressures and climate change impacts including increased flooding frequency in the region, represents a significant addition to environmental stress that requires comprehensive mitigation measures and long-term monitoring to ensure sustainable development outcomes aligned with Bangladesh's environmental conservation objectives.

F. Summary of Impact Assessment

276. The planned six-story academic building for Nursing Institute in Mirzapur, Tangail requires an environmental impact assessment under Bangladesh's regulations. As per the 2023 Environmental Conservation Rules, this project falls under the "Orange" category, requiring an Initial Environmental Examination and an Environmental Management Plan to obtain environmental clearance.

277. The environmental impact assessment for this academic building project encompasses multiple phases including pre-construction, construction, and operational stages, each presenting distinct environmental considerations. During the pre-construction phase, the project requires careful site assessment of the existing environmental conditions in Mirzapur, including evaluation of soil quality, groundwater resources, air quality baseline conditions, and noise levels. The Mirzapur area, being part of the Madhupur Tract and Old Brahmaputra Floodplain agroecological zones, possesses highly productive soil suitable for supporting different ecosystems, making soil protection a critical consideration during construction activities. The project site's proximity to regional waterways and the flat topography of the area between Mirzapur and Tangail, which has experienced flooding in the past, necessitates careful drainage planning and stormwater management.

278. Construction phase impacts are anticipated to be the most significant environmental concerns for this academic building project. These impacts include air quality degradation due to dust generation from excavation, material handling, and vehicular movements; noise pollution from construction machinery and transportation activities; soil disturbance and potential contamination from construction materials and equipment; waste generation from construction activities including concrete, steel, wood, and packaging materials; and temporary disruption of local drainage patterns. The construction of specialized facilities within the nursing institute, such

as laboratories, clinical training areas, and technical spaces, may involve handling of specific materials that require additional environmental precautions. Water quality impacts may occur through runoff from construction sites, particularly important given the area's vulnerability to flooding and the need to protect local water bodies.

279. The operational phase environmental impacts of the nursing institute building are expected to be more manageable but still require careful consideration. These include energy consumption for lighting, heating, cooling, and specialized equipment in laboratories and clinical training facilities; water consumption for domestic use, laboratory activities, and landscape irrigation; wastewater generation from toilets, laboratories, and kitchen facilities requiring proper treatment before discharge; solid waste generation from academic activities, food service operations, and laboratory waste requiring segregated collection and appropriate disposal; and traffic-related impacts from increased vehicular movement by students, faculty, and staff. The building's design incorporating specialized spaces such as anatomy laboratories, nursing skill laboratories, computer laboratories, and clinical training areas may generate specific waste streams requiring specialized handling and disposal procedures.

280. Mitigation measures for minimizing environmental impacts should follow established environmental management principles including implementation of dust suppression techniques through regular water spraying during construction; noise control measures such as restricting construction activities to daytime hours and using noise barriers where necessary; proper construction waste management through segregation, recycling, and appropriate disposal; soil and water protection measures including erosion control, proper site drainage, and prevention of contamination; and adoption of energy-efficient building design features to reduce operational environmental impacts. The project should incorporate sustainable building practices such as rainwater harvesting systems, energy-efficient lighting and HVAC systems, waste segregation facilities, and landscaping with Native species to enhance environmental performance.

281. Environmental monitoring during construction and operation phases should include regular monitoring of air quality parameters, noise levels, water quality of nearby water bodies, soil conditions, and waste generation and disposal practices. The project proponent should establish clear reporting mechanisms to the Department of Environment and implement corrective measures if environmental parameters exceed acceptable limits. Given the educational nature of the institution, the project presents an opportunity to demonstrate environmental stewardship and incorporate the building as a teaching tool for environmental awareness among nursing students and faculty, promoting sustainable practices within the healthcare education sector.

282. The cumulative environmental impact of this academic building project, when considered alongside existing and planned developments in the Mirzapur area, should be assessed to ensure that the regional environmental carrying capacity is not exceeded. The project's contribution to local economic development through job creation during construction and operation phases represents a positive socio-economic impact that should be balanced against environmental considerations. Stakeholder consultation with local communities, environmental groups, and relevant government agencies should be conducted throughout the project lifecycle to address concerns and ensure transparent environmental management. The successful implementation of comprehensive environmental impact assessment and management measures for this nursing institute project can serve as a model for similar educational infrastructure developments in Bangladesh, demonstrating the compatibility of institutional growth with environmental protection principles..

283. Taking into the account all the foregoing, it is considered that the impacts expected from this component of the Investment Project do not rise to a level of magnitude, severity or complexity that would justify further detailed study and development of novel or specialized mitigation strategies. The investments at this location are appropriately assigned to Category B for the Environment.

G. Summary Impact Matrix

284. Given the assessed level of impacts for the Nursing Institute at KWT campus construction project discussed in the earlier sections, the following Table VI-3 give a summary assessment based on the method explained in Table VI-1.

Table VI-3 Summary Impact assessment matrix of Nursing Institute at KWT construction project

KEY: +/-: positive/negative impact; D/C/B/A: none/minor/major/severe; Loc/Wid: localized/widespread; Tem/Per: temporary/persistent; Int/con: intermittent/continuous; Dir/Ind: direct/indirect; Iso/Cum: isolated/cumulative. Please refer to Table VI-1 for detail methodology.

Item	Impact		Ratings (when not mitigated)										Discussions		
			Construction phase					Operation phase							
			Magnitude	Spatial extent	Duration	Timing	Nature	Relationship	Magnitude	Spatial extent	Duration	Timing		Nature	Relationship
Pollution	1	Air Quality	B-	Loc	Tem	Con	Dir	Iso	D	-	-	-	-	-	Construction phase: Air quality is already deteriorated in the target site due to heavy traffic and other construction activities. Construction machineries and vehicles will be used during the construction works which will cause the degradation of ambient air quality (dust, SOx, NOx, etc.). It depends on the current road traffic volume, but road blockage will deteriorate the traffic congestion temporarily, which may worsen air quality too. Operation phase: Ambient air quality may improve when construction is done.
	2	Water Quality	B-	Loc	Tem	Con	Dir	Iso	D	-	-	-	-	-	Construction phase: Runoff water from construction site may include suspended materials or contaminants. Domestic wastewater of workers can be discharged without proper treatment. Further, contaminated water can run off from mixing areas, fuel reserve areas and sewage from construction camps. Operation phase: No water contamination is anticipated.
	3	Soil Quality	C-	Loc	Tem	Con	Dir	Iso	D	-	-	-	-	-	Construction phase: Soil pollution will possibly be caused by leakage of lubricants and fuel oil from construction vehicles and machinery. However, given the magnitude of construction the impacts are assessed minor and manageable by mitigation measures. Operation phase: Drain facilities within the KWT are all paved and they will not likely pollute soil, so that no specific negative impact is anticipated.
	4	Noise and vibration	A-	Loc	Tem	Con	Dir	Cum	C-	Loc	Per	Con	Dir	Cum	Construction phase: Noise and vibration will be increased and their impact level will become significant due to the operation of heavy machinery, trucks and vehicles. Given the target site is beside a urban busy road, the noise pollution is anticipated to be severe. Operation phase: Noise and vibration will be decreased if the subprojects achieve improvement in traffic flow and traffic congestions around the road intersections. However, due to drainage improvement, traffic is expected to be faster with less honking, thus producing less noise but more vibration. Given that the target sites are already urbanized with elevated noise level, the impact, therefore, is anticipated to be minor.
	5	Offensive odors	D	-	-	-	-	-	D	-	-	-	-	-	Construction phase: There is no specific negative impact anticipated as the construction of drainage will not likely generate odors. Operation phase: There is no occurrence of odor from domestic waste anticipated.
	6	Waste	B-	Loc	Tem	Int	Dir	Iso	C-	Loc	Tem	Int	Ind	Cum	Construction phase: Construction wastes will be generated, which will be recycled for backfilling. They remain small-scale. The construction camps are also likely to produce waste, both in the forms of liquid and solid. Since the waste is generated, but is possible to mitigate, the impact is assessed as moderate. Operation phase: There is no specific negative impact anticipated as no waste is generated once the construction is done. Post construction demobilization will also be expected to produce a lot of waste, which if not managed, can create local nuisance. Therefore, the expected impact rating has been put as moderate.

Item	Impact		Ratings (when not mitigated)										Discussions		
			Construction phase						Operation phase						
			Magnitude	Spatial extent	Duration	Timing	Nature	Relationship	Magnitude	Spatial extent	Duration	Timing		Nature	Relationship
Natural Environment	7	Protected Area	D	-	-	-	-	-	D	-	-	-	-	-	There is no any protected area designated by Bangladesh's laws or international treaties and conventions around the subproject sites, so that no specific negative impact is anticipated.
	8	Cultural heritage	D	-	-	-	-	-	D	-	-	-	-	-	There is no cultural heritage within 5km of the proposed sites. So, no impact is expected.
	9	Ecosystem	C-	Loc	Tem	Con	Dir	Iso	D	-	-	-	-	-	Construction phase: The subproject site is planned in the developed areas, so that they will not likely cause extensive losses of natural environment. Moreover, the planned developments are along the existing structures. The extension of structures, such as extension of the drainage line or new drainage line are not expected to intrude to any sensitive ecosystem. However, during construction, contaminated water from the construction sites may run though the current drainage channels to the discharge points which may pollute the ecosystem. Thys the impact has been assessed as minor. Operation phase: There is no specific negative impact anticipated.
	10	Surface hydrology	A-	Loc	Tem	Int	Dir	Iso	C-	Loc	Tem	Int	Ind	Cum	Construction phase: Site located adjacent to shallow valley that drains hilly surface runoff can be quite problematic during rainy season. Drainage congestion can flood the site if not well managed. However, this impact is only prominent during peak rainy season, over the period of June – October.
	11	Topography and Geology	C-	Loc	Tem	Con	Dir	Iso	D	-	-	-	-	-	Construction phase: Soil erosion may occur at the waste soil disposal sites, if proper prevention measures are not taken. However, given the scale of construction, the impact has been assessed as minor. Operation phase: Slope failures or landslides are not expected as the subprojects are planned in the flat area.
Social Environment	12	Land acquisition	D	-	-	-	-	-	D	-	-	-	-	-	No land acquisition is needed.
	13	Disturbance to livelihoods	C-	Loc	Tem	Con	Dir	Iso	D	-	-	-	-	-	Construction phase: There are some subprojects which require relocation / setbacks of structures. Their profiles shall be identified in the detailed survey. Operation phase: No major impact is anticipated since no land acquisition or resettlement will likely occur.
	14	Disturbance to Ethnic Minority Groups and Indigenous People	D	-	-	-	-	-	D	-	-	-	-	-	There are no ethnic minorities and indigenous peoples living around the project sites, so that no specific negative impact is anticipated.
	15	Deterioration of Local Economy	C-	Loc	Tem	Con	Dir	Iso	D	Loc	Per	Con	Dir	Cum	Construction phases: Shops might be relocated or shut down during construction period if they are among those structures that require setback or temporary relocation. The degree of impacts is unknown. On the other hand, the project implementation may create local employment and commercial opportunities Operation phase: Once the building is constructed, it is likely that the temporary shops are not allowed near the structures.
	16	Land Use and Utilization of Local Resources	C-	Loc	Tem	Con	Dir	Iso	D	Loc	Per	Con	Dir	Cum	Construction phase: During construction the local playground might be blocked for few months during piling operation. Operation phase: Once construction is done, playground will be open with much improved grass plantation (as per deign).

Item	Impact		Ratings (when not mitigated)										Discussions		
			Construction phase						Operation phase						
			Magnitude	Spatial extent	Duration	Timing	Nature	Relationship	Magnitude	Spatial extent	Duration	Timing		Nature	Relationship
	17	Disturbance to Water Usage, Water Rights, etc.	D	.	.	.	.	.	D	.	.	.	.	.	Construction phase: No major impact is anticipated since the subproject does not affect water usage or water rights. Operation phase: No major impact is anticipated as the subprojects are nothing to do with water use.
	18	Disturbance to the Existing Social Infrastructure and Services	B-	Loc	Tem	Con	Dir	Iso	D	.	.	.	.	.	Construction phase: Traffic increase may occur mainly due to road blockages, but it remains temporary and insignificant. Operation phase: During operation, the Nursing institute is not expected to generate a significant traffic volume.
	19	Traffic congestion	B-	Loc	Tem	Con	Dir	Iso	D	.	.	.	.	.	Construction phase: during construction, traffic blockage and havoc are anticipated, especially given that the drain side roads are narrow. The impact is assessed as severe. Operation phase: Once the construction is over, no project related traffic increase is expected.
	20	Misdistribution of Benefits and Losses	D	.	.	.	.	.	D	.	.	.	.	.	No specific impacts to the local communities are anticipated both in construction period and operation period.
	21	Local Conflicts of Interest	D	.	.	.	.	.	D	.	.	.	.	.	No specific impacts to the local communities are anticipated both in construction period and operation period.
	22	Cultural Heritage	D	.	.	.	.	.	D	.	.	.	.	.	Construction phase: The subprojects are planned at the existing sites away from heritage sites so that possibilities that the subprojects damage local archeological, historical, cultural, or religious heritage sites are not anticipated. Operation period: No major impact is anticipated as the projects are away from heritage sites.
	23	Landscape	D	.	.	.	.	.	D	.	.	.	.	.	Almost all subprojects are planned at the existing site so that no specific impact on the surrounding landscape is anticipated.
	24	Gender	B-	Loc	Tem	Con	Dir	Iso	D	.	.	.	.	.	Construction phase: Construction camps often seen as a potential disturbance to the local culture. This also affects local men and women, mostly when workers are hired from outside of the locality. Sometimes, uncontrolled workers can introduce local prostitution, conflicts with communities, etc. Since all these potential offenses to local community, especially to women can be manageable by enforcing strict regulation at workers camp, the impact is assessed as moderate. Operation phase: The Nursing Institute will facilitate equal opportunity to male-female teachers to access highest level of training and modern equipment.
	25	Children's Rights	D	.	.	.	.	.	D	.	.	.	.	.	Construction phase: No specific impacts are anticipated both in construction period and operation period. Operation phase: None.
	26	Infectious Diseases	B-	Loc	Tem	Int	Dir	Iso	D	.	.	.	.	.	Construction phase: Infectious diseases among construction workers may occur, although the subprojects are small-scale and construction works would take only a short time if proper prevention measures are not taken. Operation phase: No major impact is anticipated.

Item	Impact		Ratings (when not mitigated)										Discussions		
			Construction phase					Operation phase							
			Magnitude	Spatial extent	Duration	Timing	Nature	Relationship	Magnitude	Spatial extent	Duration	Timing		Nature	Relationship
	27	Work Environment (Including Work Safety)	B-	Loc	Tem	Con	Dir	Iso	C-	Loc	Tem	Int	Ind	Iso	Construction phase: Occupational safety and health may not be well maintained, and accidents may occur through the construction work if 1) Contractors do not abide the law, and 2) no proper prevention measures are taken. Operation phase: Accidents may occur during maintenance work.
Other	28	Accidents	B-	Loc	Tem	int	Dir	Iso	C-	Loc	Tem	Int	Ind	Iso	Construction phase: Accidents may occur due to the construction work, and traffic accidents may occur due to the increase of traffic volume. Operation phase: Accidents can occur and increase during maintenance work.
	29	Cross-boundary Impact and Climate Change	D	-	-	-	-	-	D	-	-	-	-	-	Deterioration of traffic congestion will increase CO ₂ emission. However, no major impacts are anticipated as subprojects remain small-scale

VII. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

A. Rationale and Requirements for Disclosure and Consultation

285. It is considered necessary and useful for the interests and concerns of the people and institutions who will be affected by infrastructure projects (stakeholders) to be taken into account in planning and design from the earliest stages. Effective communication between the proponents of a project and the people whose lives will be affected by it (i) helps to ensure that positive impacts of the infrastructure are maximized while negative ones are prevented or minimized; (ii) honors basic democratic principles; and (iii) aids in forestalling development of social and political conflict surrounding allocation of public resources.

286. Consultation and information disclosure require that stakeholders of all kinds both have an opportunity to learn about infrastructure proposals and are given an effective means of providing their knowledge and voicing their concerns as inputs to project planning and implementation. The SPS mandates timely disclosure of project information and consultation with people and institutions that stand to be affected by their implementation throughout the project cycle.

287. **Disclosure.** The SPS requires that project information is made publicly available at key stages of project development and implementation. At a minimum, basic details of the project rationale, objectives, preliminary infrastructure proposals and operation-phase activity need to be disseminated as part of consultations during the project preparatory phase, and the IEE needs to be disclosed on ADB's website.

288. **Consultation.** The SPS mandates that consultations should be carried out, at a depth commensurate with the significance of the expected impacts of the infrastructure, as an integral part of the environmental and social assessment process. The particular form that consultation may take is appropriately tailored to the cultural and social context, as well as the types of infrastructure and project activities that are proposed. Consultations often involve some combination of interviews with key informants, public meetings, and focus group discussions.

B. Stakeholder Identification

289. Given the nature of the project that the Nursing Institute is going to be constructed within the existing campus areas, the stakeholders identified for the proposed infrastructure development include officials from Finance Ministry and relevant polytechnic teachers and students whose lives may be affected—positively or negatively—by implementation of the investments. Project stakeholders were initially identified on a theoretical level through a series of scoping discussions amongst the multi-disciplinary Technical Assistance study team, encompassing such matters as physical proximity, land use, resource flows, traffic composition, local employment, and business. The understanding of stakeholder groups was further refined in cooperation with the locally stationed polytechnic Principals who understand the project very well and are aware of the local socio-economic and environmental setting.

C. Stakeholder consultation history

1. Consultation with officials of the Finance Department, MoF

290. Consultations with the Finance Department, Ministry of Finance (MoF) took place in April 2025 at SDCMU established under SEIP (later SICIP). The Project Director (PD) of SEIP who is also in charge of SICIP, officials from Finance Department relevant to the project and ADB project team attended the meeting and discussed various aspects of the proposed Nursing Institute and possible safeguards system. Discussions on possible 'green building' components and locations of establishment of the Nursing Institute within the KWT campus were held.

2. Consultation with the KWT teachers and students

291. During the time of field visit to KWT (July 2025) the technical assistance team sat with the KWT officials and talked to students informally. Discussion took place in various places on the KWT campus. The discussions took place on various educational issues, as well as campus environment issues.

3. Consultation with the students, campus staff, and nearby community

292. To ensure adequate community coverage, a structured consultation session was conducted with (i) students (female/male), (ii) campus staff (administration, security, cleaners, maintenance), and (iii) nearby residents and businesses surrounding the campus perimeter potentially affected by construction-related nuisance. The consultation will cover: (a) construction schedule and working hours, (b) dust/noise and vibration management, (c) traffic/access and pedestrian safety, (d) waste management and drainage protection, (e) SEA/SH risk awareness and worker code of conduct expectations, and (f) functioning of the project GRM with confidential reporting options.

Table VII-1 Consultations Conducted

Date	Type of consultation	Place	Male	Female	Total	Key issues raised	Response / action taken
Nov 2022	Meeting with Finance Division (MoF), SEIP/SICIP, ADB	SDCMU (SEIP)	03	01		Safeguards integration; siting; need for green building features	Commit to incorporate SPS/EMP requirements in design and bid docs; include sustainability measures (energy/water efficiency)
July 2025	Informal consultation with KWT staff	KWT campus	04	00		Dust/noise, academic continuity, site safety, traffic/access	Include strict CEMP, work-hour controls, barriers/hoarding, traffic plan, communication plan and GRM
July 2025	Structured consultation with students, campus staff, nearby residents/businesses	KWT campus venue	03	06		Nuisance impacts, pedestrian safety, waste/drainage, SEA/SH concerns	Update EMP/CEMP; define communication channels; strengthen GRM and SEA/SH measures; finalize design enhancements
TOTAL			10	07	17		



Figure VII-1 Consultation at KWT in July 2025.

D. Outcomes of stakeholder consultation

293. **Meetings with Finance department and KWT officials.** The technical assistance (TA) team met the MoF and KWT several times during project preparation. Apart from the possibilities and process of implementation of the whole project, the points of discussion also included the need assessment of construction of Nursing Institute facilities with the KWT campus. The technical assessment team was comprised of an architect, TVET specialist, economist, environment specialist, gender specialist, social specialist and an education reform and implementation expert. Hence the discussions took on many dimensions. This IEE extracted the construction/repair/improvement related activities and environmental concerns from all the discussions. The summary of the discussions is presented in the following Table.

Table VII-2 Summary of the point of discussions with KWT officials

Environment-related questions	Summary of salient points of discussion
Is there any environmental problem within the campus or nearby the campus?	Generally, the KWT campus is not flood prone, but due to unplanned development around, highwater drainage has been very slow in recent years. The flood water can come from the north and recede towards the south – towards the Louhojong river. The in-campus drain are well maintained and can attain heavy flow during extreme rainfall events.
Our natural surroundings (air, water, trees and other plant life, land, open space) generally affect the quality of our lives, including our ability to make a living. How do you feel about the current quality of the local environment?	Within the KWT campus, the campus has some vegetation, although not so thick. The campus is not that noisy.
Are you aware of any problems having to do with natural resources (air, water, farmland, trees, animals, open space) in this area?	We have a filtering system installed on the campus. The drinking water quality is generally good in Tangail, and salinity/arsenic is not yet an issue in the area. Yet, due to safety of the patients and staff filtering systems always run at campus.

Environment-related questions	Summary of salient points of discussion
Thinking about the construction work that may happen here under the project (list infrastructure that may be built at this campus), how do you think this will affect the quality of the local environment, or your quality of life?	The area is currently barren. The proposed site is on low land, which is currently sand filled and elevated.
Traffic may increase as a result of this project, once construction has been completed. How do you think this will affect the local environment, or the quality of life in the community?	The main road is already busy with vehicles and pedestrians. There are also some construction works nearby. Hence the traffic is already elevated. Anyway, we think during construction work, we need to adopt proper precautions.
What additional considerations can be taken to enhance the quality of KWT and the campus?	- Installing a higher capacity water filtering system, since higher number of students are expected - Installing drainage system and raising the overall plinth of the Nursing Institute. - Connect the Nursing Institute to the current STP. We can consider to connect newly proposed STP for the two new buildings.

E. Future Stakeholder Engagement and disclosure

294. **Disclosure.** Once the IEE has been approved, ADB will, in accordance with its Public Information Policy, disclose the document on its website, from where it can be accessed and downloaded by any interested person at no cost. This should be repeated in the event that significant site or design changes require the formal updating of the IEE and EMP. As the approved project's implementation proceeds, details of key implementation stages—most notably the start of construction, should be publicly disclosed in advance by the proponent. Monitoring reports submitted by the proponent on a twice-yearly basis to ADB will be disclosed on the ADB website.

295. **Consultations.** The SPS indicates that consultation should be understood as an ongoing and iterative process that takes place throughout the project cycle. Consultations are considered especially necessary and appropriate at key inflection points after the project preparatory phase, including (i) following any major design changes, up-scaling or site changes introduced during the detailed design phase, especially ones that may change the nature, scale or severity of potential environmental and social impacts; (ii) prior to the start of construction, with a special focus on safety and quality of life impacts during the construction phase; (iii) prior to the start of facility operations; and (iv) following any significant emergency or accident involving construction sites. Additional rounds of consultations in all of the contexts mentioned above should be organized and conducted by KWT, with the support and guidance of the Safeguards Oversight Unit (SOU) within the Project Implementation Unit (PMU).

296. As pointed out by the teachers during discussions, local residents are close by the proposed site and there is a gate beside the residential area which can be used by the Nursing Institute users. But to be able to use the gate, a high priority should be placed on engaging a local stakeholder who are currently using the area and project-affected people in the next rounds of stakeholder engagement. Depending on the public health circumstances surrounding the next rounds, this could fruitfully incorporate both (i) larger-format events to capture the participation of people from more sectors (e.g., truck drivers, residents, laborers, local traders etc.); and (ii) targeted outreach tools (e.g., community walks, door-to-door surveys, in-community focus group discussions).

297. The EAs/IAs will send a written endorsement to ADB to disclose these documents on the ADB website. The PIU will provide relevant safeguards information in a timely manner, in an accessible place and in a form and language understandable to affected people and other stakeholders. For illiterate people, other suitable communication methods will be used. Disclosure will follow ADB's Public Communication Policy, 2011⁸².

⁸² <https://www.adb.org/sites/default/files/institutional-document/32904/files/pcp-2011.pdf>

VIII. GRIEVANCE REDRESS MECHANISM

A. Grievance Redress Mechanism

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

299. **First level of GRM:** The first level and most accessible and immediate contact for the fastest resolve of grievances are the Contractors, with assistance from Design Supervision Consultants (DSC) on site. Prior to construction of any works, the PIU will ensure local community meetings are held to notify residents and businesses of any temporary disturbances, and to inform them of the Project and the GRM. If any complaints arise, the Contractors, with assistance from DSC can immediately resolve the complaint on site. The Contractor's and DSC's office phone number will be posted in public areas within the subproject areas and construction sites. Any person with a grievance related to the project work can contact the project to file a complaint. The Contractor may seek the assistance of the DSC safeguards specialists (the environmental specialist or social safeguards specialist) to resolve the issue. The DSC safeguards (environment and resettlement) focal person will immediately address and resolve the issue with the Contractor within 1-2 days, if the complaint remains unresolved at the field level. The PIU safeguards focal person will fully document the following information: (i) name of the person; (ii) date complaint was received; (iii) nature of complaint; (iv) location, and (v) how the complaint was resolved.

300. **Second level of GRM:** Should the grievance remain unresolved; the Contractor with assistance from DSC will forward the complaint to the PIU safeguards focal person. The person filing the grievance will be notified by DSC safeguards focal person that the grievance was forwarded to the PIU safeguards focal person. The PIU will address the grievance. Grievances will be resolved through continuous interactions with affected persons, and the PIU will answer queries and resolve grievances regarding various issues including environmental or social impacts. Corrective measures will be undertaken at the field level by the PIU safeguards focal person within 7 days. He/she will fully document the following information: (i) name of the person; (ii) date the complaint was received; (iii) nature of complaint; (iv) location and (v) how the complaint was resolved.

301. **Third level of GRM:** Should the grievance remain unresolved, the PIU's project director will activate the third level of the GRM by referring the issue (with written documentation) to a Grievance Redress Committee (GRC), which will, based on review of the grievances, address them in consultation with the PIU, Contractor, DSC, and affected persons. The GRC will consist of TMED/IA representative as chairperson, and other relevant stakeholders. A meeting will be called with the GRC, if necessary, where the affected person can present his/her concern and issues. The process will promote conflict resolution through mediation. The GRC will meet as necessary when there are grievances to be addressed. The GRC will suggest corrective measures at the field level and assign clear responsibilities for implementing its decision within 15 days. The functions of the GRC are as follows: (i) to provide support to affected persons on problems arising from environmental or social disruption, asset acquisition (where required), and eligibility for entitlements, compensation, and assistance; (ii) to record grievances of affected persons, categorize and prioritize them, and provide solutions within 15 days; and (iii) to report to

the aggrieved parties' developments regarding their grievances and decisions of the GRC. The TMED/IA safeguards focal person will be responsible for processing and placing all papers before the GRC, recording decisions, issuing minutes of the meetings, and taking follow-up action to see that formal orders are issued, and the decisions carried out.

302. Safeguard monitoring reports will include the following aspects pertaining to progress on grievances: (i) number of cases registered with the GRC, level of jurisdiction (first, second, and third levels), number of hearings held, decisions made, and the status of pending cases; and (ii) lists of cases in process and already decided upon may be prepared with details such as affected person, date of notice, date of application, date of hearing, decisions, remarks, actions taken to resolve issues, and status of grievance (i.e. open, closed, pending). All costs involved in resolving the complaints (meetings, consultations, communication and reporting / information dissemination) will be borne by the TMED/IA.

303. Where an affected person is not satisfied with the outcomes of the 3 levels of the Project GRM, the affected person should make good faith efforts to resolve issues working with the South Asia Regional Department through ADB's Bangladesh Resident Mission. As a last resort, the affected person can access ADB's Accountability Mechanism (ADB's Office of Special Project Facility or Office of Compliance Review). ADB's Accountability Mechanism, including information on how to file a complaint, will also be explained to affected households.

304. The grievance redress mechanism and procedure are depicted in Figure VIII-1.

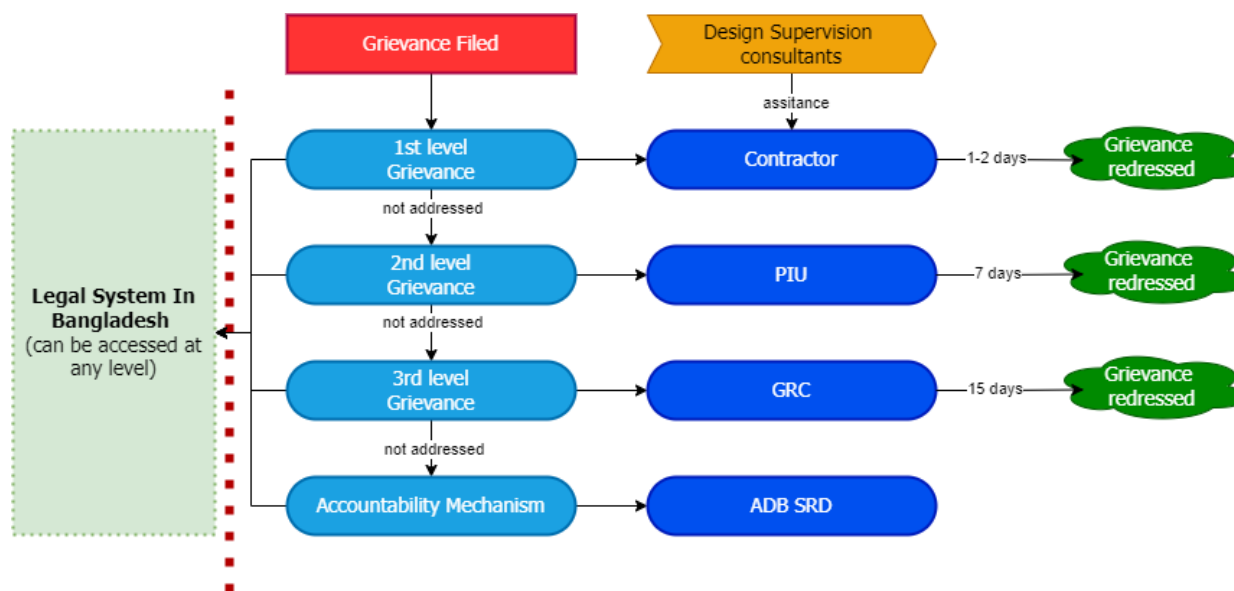


Figure VIII-1 Grievance Redress Mechanism (GRM) adopted for SICIP

305. **Access to Country's legal system.** An aggrieved person shall have access to the country's legal system at any stage, and accessing the country's legal system can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM.

B. Administration of Grievance Redress Mechanism

306. The SOU shall be responsible for making the public aware of the GRM in all project locations, explaining how it works and how to use it, and maintaining its accessibility and operability for the full duration of the construction phase and the defects period. Public awareness campaigns should be carried out at the local level in advance of the start of civil works. Contact information, including for written, telephone and in-person filing of grievances, shall be firmly established at the GRM's inception, and kept up to date and publicly available through the end of the defects period.

307. Records of grievances received, corrective actions taken, and their outcomes will be properly maintained by the SOU in a central grievance redress database. Grievances and resolutions will be included in the EAs' quarterly progress reports and the semi-annual environmental monitoring reports submitted to ADB. Any fatal accidents involving the project's implementation or project sites should be reported to the GRC and ADB immediately. The costs of operating the GRM will be very modest, and will be covered by the operating budget of the SOU.

C. Grievance Redress Mechanism for Workers

308. An additional mechanism shall be set up by the SOU to accept and address complaints from workers employed in the construction works, concerning working conditions, living conditions in construction camps, safety and health issues, labor rights violations, mistreatment, or any other matter. All laborers, skilled workers, and site engineers employed on site by the primary Contractor or by any of its sub-Contractors shall have access to the mechanism. All workers will receive an orientation to the workers' GRM during pre-construction induction training. Workers will be able to lodge grievances with on-site personnel of the CSC, who will record the complainant's name, position, employer, and contact information, as well as a description of the complaint and the time, date and place at which the complaint was reported. The CSC will inform the SOU, which will record the grievance in a grievance register. The CSC will convene a meeting of the complainant or complainants, the sub-Contractor involved, the Primary Contractor, and any labor syndicate to which the complainant(s) may belong, in an effort to decide on an appropriate resolution of the complaint. The CSC will work with the relevant Ministry, Environmental Safeguards Focal Person at SDCMU and on-site Environment, Health and Safety Officer to monitor implementation of the proposed resolution and confirm absence of retaliation on the part of the Contractor involved. If the complaint cannot be resolved to the satisfaction of the complainant(s), the CSC will provide the complainant(s) with the necessary contact information to file a complaint with MOLE. The CSC will compile a complete record of the grievance, including measures taken for resolution and follow-up checks by the ESFP and EHSO, as well as any referral to MOLE and subsequent evolution of the case, and provide the record to the SOU for preservation in its grievance register.

IX. ENVIRONMENTAL MANAGEMENT PLAN

A. Objectives of The Environmental Management Plan

309. This environmental management plan (EMP) has been prepared for the ADB supported SICIP in accordance with the ADB SPS (2009). Specific measures are developed in relation to the design, construction and operation of each project component, to address the physical, biological, cultural and socio-economic impacts identified and discussed in the chapter on Anticipated Impacts and Mitigation Measures of the Initial Environment Examination (IEE) report.

310. The EMP for the project defines mitigation and monitoring measures and identifies the institutions, responsibilities and mechanisms that will ensure their implementation. Such institutions and mechanisms will seek to ensure continuous improvement of environmental protection activities during the pre-construction, construction, and operation phases of the project, in order to manage adverse impacts.

311. The EMP's purpose is served by fulfilment of several key objectives:

- (i) To present a comprehensive and systematic list of measures for mitigating and enhancing anticipated environmental and social impacts, as discussed and prescribed in Chapter 6 of the IEE;
- (ii) To define and specify institutional arrangements to support implementation of the prescribed measures;
- (iii) To clearly assign responsibility for implementation of each prescribed measure;
- (iv) To clearly assign responsibility for systematic monitoring of implementation of the prescribed measures and overseeing corrective action as needed;
- (v) To establish a system for regular reporting on EMP implementation;
- (vi) To identify training and capacity-building needed to enable effective implementation of the EMP; and
- (vii) To provide sound estimates of the costs that will have to be budgeted by various entities to enable full and effective implementation of all prescribed measures to address likely impacts.

B. Roles and Responsibilities in EMP Implementation

312. Effective implementation of the EMP relies on inputs from multiple entities, spanning the pre-construction, construction and operation phases of the project. Specific tasks are identified and assigned in the next section of the EMP, but the roles and responsibilities are explained in general terms below, beginning with an outline of the entities that are to be involved.

1. Key Institutional Entities

a. Skills Development Coordination and Management Unit (SDCMU)

313. The Skills Development Coordination and Management Unit (SDCMU) established under SEIP will act as the Project Management Unit (PMU) for the Ministry of Finance. The SDCMU will host the Safeguards Oversight Unit (SOU) in charge of implementing the EMP. The SDCMU will consist of the Project Director (PD) as overall coordinator, Assistant Project Direction (APD) heading the SOU, an Environmental Specialist, A gender Specialist and a Social Specialist.

b. Project Implementation Unit (PIU) at KWT

314. A PIU will be established at KWT to enable coordinated management of the Investment Project, including implementation of the EMP. The PIU is a vital mechanism for ensuring coordination and cooperation between the SDCMU and the Implementing Partner agencies participating in infrastructure development at each investment location. The PIU will appoint a Project Manager to drive successful implementation of the works, including meeting all safeguards' requirements. The PIU can be established under SDCMU.

c. Safeguards Oversight Unit (SOU) at SDCMU

315. A central safeguards implementation function is considered critical to effective implementation of the EMP, including monitoring compliance with all safeguard's requirements of the ADB and National government at multiple locations, most of which will see infrastructure development activities carried out by the SDCMU at Ministry of Finance (MoF). The central SOU will be established under the SDCMU, and the location specific SOU will be established at KWT. While the central SDCMU should be staffed by at least one senior environmental professional known as the Environmental Safeguards Focal Person (ESFP), the PIU at KWT should be staffed with at least 2 environmental professionals, one for overall coordination at site, one specially dedicated to day-to-days site supervision known as the Environment, Health and Safety Officer (EHSO).

d. Environmental Safeguards Focal Person (ESFP)

316. The SDCMU will have a designated Environmental Safeguards Focal Person (ESFP), whose role will be to oversee the safeguards compliance process for all Investment Project sites under the SDCMU's control, heading the central SOU and liaising with the other SOUs at all investment sites while supported by Environment, Health and Safety Officers (EHSOs) working in the field. The ESFP may appropriately be a Deputy Project Director (DPD) or other senior managers or engineers within the SDCMU and will answer directly to the SDCMU's Project Director (PD). The ESFP will work closely with the SDCMU, DOE and ADB Safeguards team to ensure that safeguards requirements are included and effectively addressed as part of Project implementation at this location.

e. Environment, Health and Safety Officer (EHSO)

317. The PIU at KWT will designate an EHSO, answering to and supporting the ESFP as well as the designated coordinator from the ETEC itself, to oversee EMP implementation at the proposed site. The EHSO may appropriately be assistant engineers with other duties in the case of PIU with only small investments under the Investment Project, but where this is the case, it is critical that adequate time and resource allocations for its EHS responsibilities are firmly established in their job descriptions. In most cases it will be preferable for the EHSO to be a dedicated staff position or consultant. A proposed Terms of Reference (ToR) for the EHSO position is presented in Appendix 17. The EHSO may be appointed to cover more than one location, where this is deemed feasible in view of proximity and the scale of works in each location.

f. Construction Supervision Consultants (CSCs)

318. One or more Construction Supervision Consultants (CSCs) will be engaged by the PMU to monitor, guide and support the work of construction Contractors carrying out the works under the Investment Project. The CSC(s) will have environmental specialists on staff to assist SDCMU

with environmental matters and ensure strong environmental compliance. The CSC should be required to maintain a site office at each investment location, to enable its inspectors and site engineers to maintain a daily presence at each active construction site.

g. Contractors

319. The planned works are to be packaged and tendered as contracts. As the planned infrastructure components are each of relatively limited scale, work at multiple locations may be grouped under single contracts. Primary Contractors will be required to develop a Contractor Environmental Management Plan (CEMP) covering the construction works under their control, including work carried out by their sub-Contractors. Each primary civil works Contractor will designate an EHS Representative, who will oversee the implementation of the CEMP at all sites under the Contractor's control, including regular monitoring of site conditions and effective implementation of prescribed mitigation measures by both the primary Contractor and all sub-Contractors.

h. Department of Environment

320. As a key regulator of industry, the DOE is mandated to review and approve infrastructure proposals based on consideration of possible environmental effects. The agency remains involved throughout a project's life cycle, during which environmental clearances must be annually renewed, with environmental monitoring results being a key reference point in renewal decisions.

i. ADB

321. As the financing institution, ADB will exercise its due diligence and oversight functions, and maintain strong interaction with the PSC, SDCMU and SOU.

2. Responsibilities in EMP Implementation

322. Each of the entities identified above has multiple responsibilities, the fulfilment of which is required for full and effective implementation of the EMP. These responsibilities are detailed in Table IX-1 below.

Table IX-1 EMP implementation responsibilities

Entity	Responsibilities in EMP Implementation
Skills Development Coordination and Management Unit (SDCMU)	• Prepare operations and maintenance procedures for facilities under construction, ensuring their compliance with the EMP • Work with the SOU to train facility personnel on EHS aspects of facility operation in advance of commissioning, to ensure effective EMP implementation during the operation period
Project Implementation Unit (PIU) at KWT	• Ensure that EMP implementation is recognized as a critical element of overall project implementation • Enable and adequately staff SOU • Oversee rigorous review of bids and prioritize selection of Contractors with strong environmental compliance track records • Coordinate with SDCMU as needed to ensure smooth implementation of EMP

Entity	Responsibilities in EMP Implementation
Safeguards Oversight Unit (SOU) under SDCMU	• Ensure EMP provisions are fully reflected in civil works bid documents • Advise and support PIU on Contractor selection and other procurement decisions • Guide and support ESFP and EHSOs to ensure timely and competent execution of site-level oversight activity • Collect and collate progress reports and environmental monitoring reports for each location to assemble comprehensive quarterly monitoring reports for submission to ADB. • Work with CSCs and primary Contractors to develop and deliver periodic EHS training for sub-Contractors and their workers • Work with CSCs to train facility managers or their EHS personnel in advance of commissioning, to ensure effective EMP implementation during the operation period • Administer the GRM • Support PMUs in obtaining environmental clearances and renewals
Environmental Safeguards Focal Person (ESFP) under SDCMU	• Oversee the safeguards compliance process for all Investment Project sites under the PMU's control, liaising with the PIU-appointed Project Manager and with support from SOU and EHSO • Prepare and submit quarterly progress reports for the sites owned by their home agencies to the PIU and SOU • Chair LGRC when needed to address Level 2 grievances regarding project implementation activities
Environmental coordinator/manager at KWT	• Oversee the safeguards compliance process for the investment site at KWT • Liaison with the ESFP for monthly report and day to day update • Supervise the EHSO
Environment, Health and Safety Officer (EHSO)	• Conduct regular monitoring of conditions on site, including compliance with prescribed mitigation strategies, and submit EHS monitoring reports on a monthly basis to the Environmental Coordinator at PIU • Identify worker training needs and support SOU and CSC in development and delivery of training
Construction Supervision Consultants (CSC)	• Review and approve CEMPs and quarterly environmental monitoring reports submitted by Contractors • Guide and assist PMUs, through ESFPs, in monitoring of CEMP implementation and site conditions, including preparation of quarterly progress reports for submission to SOU • Direct and supervise corrective action by Contractors as needed • Collaborate with SOU on development of safeguards training for sub-Contractors and workers
Contractors	• Prepare and implement CEMP for each site, based on EMP prescriptions and international best practices • Conduct quarterly EHS monitoring on all sites under their control and submit quarterly monitoring reports to CSC for review • Implement corrective actions as directed by CSC and/or ESFP
Department of Environment (DOE)	• Review environmental clearance applications, including IEE and EMP • Review annual environmental monitoring reports submitted by SOU during construction phase • Review applications for environmental clearance renewals
ADB	• Review and approve IEE and EMP • Publicly disclose IEE on ADB website • Review quarterly environmental monitoring reports prepared by PMU and publicly disclose them on ADB website

323. The intersecting roles and responsibilities in EMP implementation during the construction phase - including monitoring of implementation - are further illuminated in Figure IX-1 below.

During the operation phase, EMP implementation is simplified considerably, as the temporary entities formed or engaged to carry out and oversee the construction process are wound down or move on to other projects, and permanent entities assume responsibility for ensuring that the EMP continues to guide infrastructure operations and maintenance. Responsibilities for EMP implementation in the operation phase are also shown in Figure IX-1.

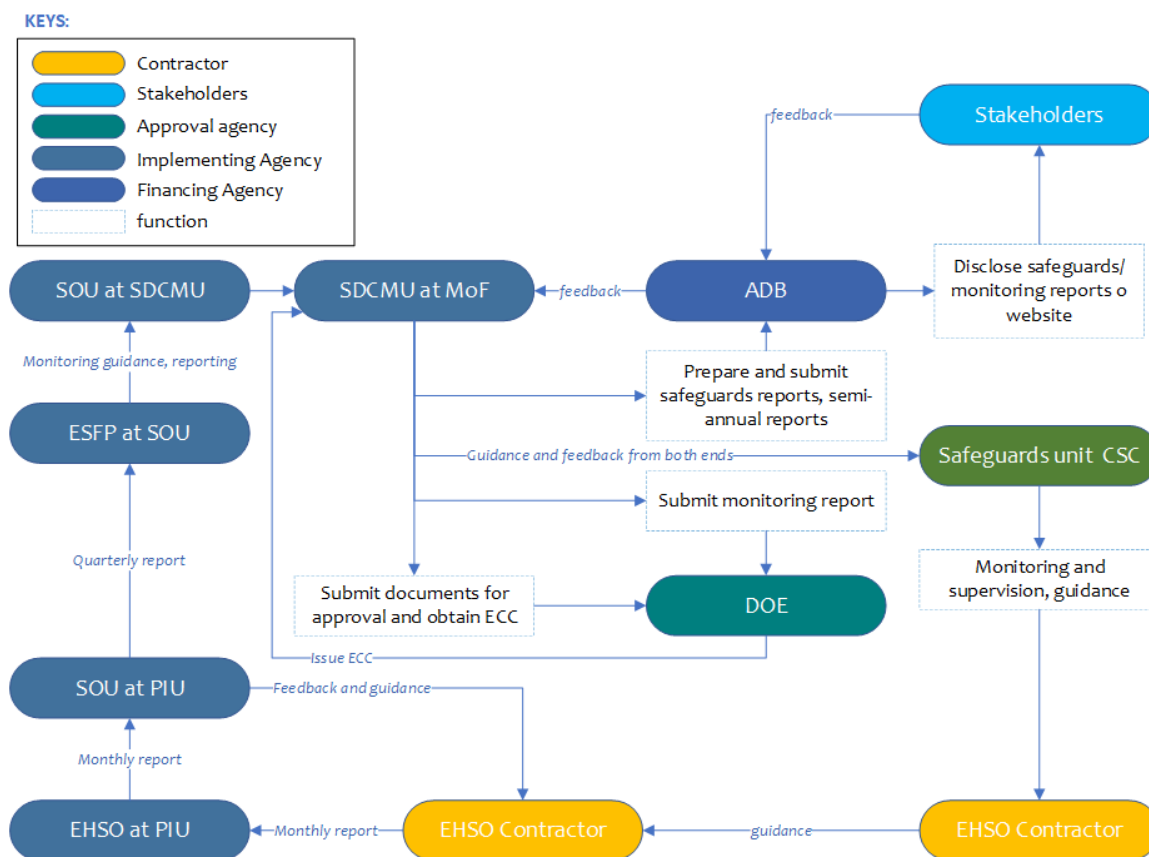


Figure IX-1 EMP implementation responsibilities during construction and operation phase adopted for SICIP

3. Assessment of Project Readiness

324. Before construction, the ESFP will assess the project's readiness in terms of environmental management based on a set of indicators (Table IX-2) and report it to the ADB and the SDCMU. This assessment will verify that environmental commitments are being carried out and environmental management systems are in place before construction starts, or if this is not the case, propose corrective actions to ensure that all requirements are met.

Table IX-2 Indicators of project readiness in relation to environmental management

Indicator	Criteria	Assessment	
DoE approval	DoE approves the IEE and ECC is being obtained	Yes	No

Indicator	Criteria	Assessment	
EMP update	The EMP is updated after detailed designs are approved, and approved by ADB and DoE	Yes	No
Compliance with loan covenants	The borrower complies with loan covenants related to project design and environmental management planning	Yes	No
Public involvement effectiveness	- Meaningful consultation completed - GRM established at entry point	Yes	No
Environmental supervision in place	PIU supervision in place	Yes	No
Bidding documents and contracts with environmental safeguards	- Bidding documents and contracts incorporating the environmental activities and safeguards listed as loan assurances - Bidding documents and contracts incorporating the impact mitigation and environmental management provisions of the EMP	Yes	No
Contractor readiness	- Contractor EMPs (CEMPs) have been prepared and approved by PIU and PMU - Environmental, Health and Safety Management Plans (EHSMP) established for construction sites - Environment, Health and Safety Officers appointed - Assessment of potential disruption to utilities services conducted - Stakeholder interviews conducted to confirm issues if services are disrupted	Yes	No
EMP financial support	Required funds have been set aside to support the EMP implementation according to the financial plan	Yes	No

C. Environmental Impacts and Prescribed Mitigation and Enhancement Measures

325. The findings of the environmental impact analysis are presented in Section VI of the IEE report. The potential impacts and corresponding measures that are prescribed in order to mitigate the negative impacts or enhance positive ones are collected in Table IX-3 below. The measures prescribed apply to the pre-construction, construction and operations phases of the infrastructure development at the KWT Nursing institute site. All measures listed in Table IX-3 are requirements, based on the infrastructure plan as proposed at the time of preparation, whose fulfillment is assigned. All measures assigned to Contractors should be reflected in bidding documents, and serve as the basis for the CEMPs, which must be prepared to cover all sites at this investment location.

Table IX-3 Prescribed environmental mitigation and enhancement measures

KEYS: ADB: Asian Development Bank; CSC: Construction Supervision Consultant; Con: Contractor; DOE: Department of Environment; EAs: Executing Agencies; EHSO: Environment, Health and Safety Officer; ESFP: Environmental Safeguards Focal Person; NQC: No Quantifiable Cost; PIU: Project Implementation Unit; SOU: Safeguards Oversight Unit; TMED: Technical and Madrasa Education Division; KWT: Kumudini Welfare Trust, EMP: Environmental Management Plan, EMoP: Environmental Monitoring Plan.

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
A. PRE-CONSTRUCTION PHASE						
(i) IMPLEMENTATION READINESS						
1. IEE and EMP update	Impacts not accounted for due to post-approval modifications in alignment, design or local conditions	- Review IEE and EMP to ensure any post-approval changes are properly accounted for and addressed, by addition of mitigation measures if necessary - EMP copied in the bid document and part of legal contract of the contractor	SDCM U	SDCM U/PIU	- IEE and EMP confirmed still fully applicable - New measures added to EMP if needed to cover any changes in alignment, design or local conditions	NQC (Included in SDCMU budget)
2. Confirmation of NOCs from local agencies and authorities	Project works will not be granted clearances by DOE if NOCs are not obtained from relevant National and local authorities	- Confirm NOC has been obtained from KWT itself - Declare site clearance from KWT itself so that no conflict occurs in future, and DOE has legal documents that the site is owned by KWT	SDCM U	SDCM U/PIU	- NOCs granted by local municipal authorities - Self-declaration of ownership of land by the KWT	NQC (Included in SDCMU budget)
3. Verification of environmental clearances	Project work will not be in compliance with National environmental laws if clearances are not obtained prior to site clearing	- Confirm Site Clearance Certificate (SCC) and Environmental Clearance Certificate (ECC) have been granted, and that any conditions imposed by DOE on approval have been reflected in EMP and EMoP, as well as CEMP as applicable	SDCM U	SDCM U/PIU	- SCC and ECC granted - New measures added to EMP, EMoP and CEMP if needed to meet any conditions of approval specified by DOE	NQC (Included in SDCMU budget)
4. CEMP verification	Mitigation will be inadequate if the CEMP is not fully specified	- Review CEMP to ensure all primary Contractor responsibilities are fully reflected, including monitoring and reporting	SDCM U/CSC	SDCM U/PIU	- Any necessary changes requested, and made by Contractor - CEMP confirmed adequate by reviewers	NQC (Included in SDCMU budget and CSC amount)
5. Specialized plans verification	Mitigation will be inadequate if specialized plans have not been	- Confirm that the following specialized plans have been prepared by the Contractor: - site-specific Construction Camp Management Plan(s)	SDCM U/CSC	SDCM U/PIU	- All required specialized plans prepared to adequate standard and approved by relevant	NQC (Included in SDCMU budget and CSC amount)

BAN: Skills for Industry Competitiveness and Innovation Program (SICIP)

(IEE for Nursing Institute at KWT)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
	formulated to manage key impacts	- site-specific Waste Management Plans (embedded within CEMP) - site-specific Emergency Response Plans (embedded within CEMP) - Compensatory Tree Planting Plan - Construction Traffic Management Plan - Soil Erosion Prevention Plan - Site Reinstatement Plan - Occupational Health and Safety Plan (including COVID-19 measures stipulated by ADB and Government of Bangladesh Guidance for Social and Institutional Containment and Prevention) - Waste Management Plan			authority (as required in some cases)	
6. Grievance Redress Mechanisms	Members of the public and workers require a fair and transparent means of getting resolution to complaints about some aspect of the project's implementation	- Confirm that a central GRM and workers' GRM have been established and publicized	SDCM U/CSC	SDCM U/PIU	- Central GRM established and publicized - Workers' GRM established and explained to workers before the start of construction	NQC (Included in SDCMU budget)
7. EMP training	Without proper EMP implementation training, EMP monitoring might be delayed or hampered	- Confirm that EMP implantation training has been arranged before commencement of construction. - Involve contractor's high officials/management part, EHS specialist, construction project managers and workforce overseer in the EMP training - Quarterly Refreshers training on EMP implementation	SDCM U/CSC	SDCM U/PIU	- The EMP implementation training being conducted before the construction starts - Record of quarterly refresher's training	EMP training included in the EMP as contractor's cost. See Table IX-8. Refresher's training shall be within contractor's cost
(ii) DESIGN						
8. Climate change mitigation	Generation of GHG from construction and operations contributes to global climate change problem	- Integrate GHG-limiting measures into facility designs, including: - substitute other materials for concrete where feasible - use low-carbon concrete as much as possible - maximize use of building materials available locally - integrate photovoltaic generation into the electrical plan - specify only high-efficiency electrical and mechanical equipment - Specify most fuel-efficient backup generator available	CSC Con	MoF, SDCM U-ESFP	- All feasible GHG-reduction design measures incorporated in facility detailed designs - Soft landscaping plan (covering all site areas not occupied by structures, roadways or walkways, and including ample shade trees and dense ground cover) included in detailed site	NQC (included in CSC + Con costs)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
		- Maximize cross-ventilation by use of courtyards, openable windows and favorable building orientation - Prioritize shade in the landscaping plan, with plentiful wide-crowned shade trees on all parts of site - Incorporate hollow wall structures where feasible - Use overhangs above large windows to prevent excessive sun penetration - Maximize interior natural light by use favorable building orientation and courtyards - Specify water-saving toilets, faucets and showerheads - Design dedicated plumbing system for drinking and cooking water - Aim to meet all water heating needs with solar heaters - Specify high-intensity, full-time lighting only where strictly necessary - Specify solar-powered lighting in outdoor applications - Base landscape plan around drought-tolerant perennial Native species - Design site layout and inspection process to minimize the length of time vehicles have their engines running - Incorporate green roofs wherever roof area is not needed for solar panels and solar water heaters - Maximize carbon sequestration potential, micro-climatic cooling and runoff retention by specifying a landscaping plan covering all site areas not occupied by structures, roadways or walkways, including ample shade trees (especially near buildings) and dense ground cover in open areas			design, with plantings specified in Bill of Quantities	
9. Climate change adaptation	Infrastructure use limitations, damage, and environmental hazards due to changing conditions	- Integrate lightning arrester in building design - Design facilities so that critical components (including laboratory, backup generator and fuel tanks) are well above maximum flood level foreseen under climate change projections specified in Climate Risk and Adaptation Assessment (CRA) report and detailed hydrological study - Incorporate temperature-moderating features in KWT facility designs, including: - Green roofs where feasible - maximize use of wide-crowned shade trees in site landscaping plans, including around buildings and parking area medians	CSC Con	MoF, SDCM U- ESFP	- All critical facility components above maximum expected flood level - All feasible temperature-moderating features incorporated in facility designs	NQC (included in CSC + Con costs)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
		- maximize cross-ventilation by use of courtyards, openable windows and favorable building orientation				
10. Flora and fauna	Unnecessary loss of trees during site development	- Incorporate existing trees into site designs to the greatest extent possible, including them in design drawings so they are protected during clearing and construction - When trees must be removed, specify planting of compensatory trees elsewhere on site, including these in drawings and in the Bill of Quantities, in accordance with the approved Compensatory Tree Planting Plan	CSC Con	MoF, SDCM U- ESFP	- Existing trees incorporated in designs to extent possible - Compensatory trees specified in design drawings and Bill of Quantities, in accordance with the approved Compensatory Tree Planting Plan	NQC (included in CSC + Con costs)
11. Groundwater resources	Lack of effective water conservation contributes to local groundwater issues	- Maximize opportunities to limit water consumption and increase groundwater recharge, including adoption of: (i) rain capture on all roofs and use of stored water for non-potable uses in and around facilities (ii) high-efficiency faucets and toilets throughout the facilities (iii) plant species with low water needs in site landscaping plans (iv) stormwater infiltration swales for all runoff from paved and impervious surfaces (objective: zero site runoff)	CSC Con	MoF, SDCM U- ESFP	- All feasible and applicable water conservation measures incorporated in detailed designs for Nursing Institute facilities	NQC (included in CSC + Con costs)
12. Surface water quality	Siltation, sedimentation and contamination of water bodies receiving runoff from the site	- Slightly raise surface of minerals storage area above level of rest of site to prevent runoff from other site areas from washing through stockpiles - Include sediment traps and porous drainage channels in final drainage design for minerals storage area, to limit discharge of sediments	CSC Con	MoF, SDCM U- ESFP	- Surface of minerals storage area designed to be slightly higher than rest of site - Adequately sized sediment traps and porous drainage channels included in detailed design for minerals storage area	NQC (included in CSC + Con costs)
13. Air quality	Elevated dust in minerals storage area	- Include water supply to minerals storage area, with hose spigots in several locations around the perimeter to enable use of mobile misting apparatus	CSC Con	MoF, SDCM U- ESFP	- Detailed design includes water supply to minerals storage area, with multiple hose spigots spaced around perimeter	NQC (included in CSC + Con costs)
14. Public health and safety	Elevated risk of viral infection in KWT area	- Site Access Control and Security: - Install secure perimeter fencing and controlled entry points to prevent unauthorized access. - Maintain 24/7 security staffing and signage warning of construction hazards around the Kumudini Hospital campus. - Dust and Air Quality Management:	CSC Con	MoF, SDCM U- ESFP	- Nursing Institute building designed to maximize space between users and prevent formation of long indoor lines - Nursing Institute building ventilation system designed for maximum feasible turnover of indoor air	NQC (included in CSC + Con costs)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
		- Conduct frequent water spraying on exposed soil and haul roads to control dust, especially near hospital facilities and patient zones. - Use covered trucks for transporting construction materials and enforce speed limits on site to minimize airborne particulates. - Noise Control Measures: - Restrict noisy construction activities to daytime hours and provide advance notice to the hospital community when high-noise equipment is used. - Introduce temporary noise barriers (e.g., sheets or sound attenuation walls) near sensitive areas like patient wards. - Traffic and Pedestrian Safety: - Implement dedicated routes and clear signage for construction vehicles, ensuring separation from patient, staff, and visitor pathways. - Employ trained flagmen at site entrances, especially during peak hospital hours, to manage vehicle and pedestrian movement safely. - Restrict heavy vehicle entry and material delivery to off-peak times to reduce risk in the congested Mirzapur region. - Hazardous Materials and Chemical Management: - Store all fuels, chemicals, and hazardous substances in secure, bunded areas with spill control kits readily available. - Train staff in proper handling, spill cleanup, and emergency procedures for hazardous materials. - Worker Health and Sanitation: - Provide adequate toilets, handwashing facilities, clean drinking water, and shaded rest areas for all workers. - Mandate use of personal protective equipment (PPE), such as helmets, gloves, masks, safety glasses, and high-visibility vests. - Waste Management Practices: - Segregate, collect, and regularly remove solid construction waste, maintaining clean work areas to prevent accidents and vermin infestation. - Prohibit any dumping of construction debris or hazardous waste near water bodies or public areas of the Kumudini Hospital campus.				

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
		- Emergency Preparedness and First Aid: - Maintain a well-stocked first aid station with trained personnel available during all work shifts. - Develop and communicate a clear emergency response plan (fire, injury, hazardous material spills) to all workers and site supervisors. - Community Awareness and Complaints Handling: - Display a publicly visible sign with contact information for a designated health and safety officer to address complaints or emergencies. - Engage with hospital staff and local residents before and during construction to inform them of risks, safety measures, and complaint mechanisms. - Regular Safety Training and Toolbox Talks: - Conduct daily or weekly safety briefings ("toolbox talks") for all site workers covering specific risks and safe practices relevant to ongoing operations.				
15. Occupational health and safety	Chronic exposure of facility staff to elevated engine emissions	- Design canopies over areas used by vehicles with extra headroom and good cross ventilation or fans to evacuate emissions efficiently	CSC Con	MoF, SDCM U-ESFP	- Canopy designs enable efficient exhaust removal - site check booths designed with remote air intake and positive pressure ventilation	NQC (included in CSC + Con costs)
16. Occupational health and safety	Elevated staff exposure to viral threats	- Prepare and approve a site-specific Occupational Health and Safety (OHS) plan before mobilization. - Conduct health and safety induction and ongoing training for all workers, focusing on common hazards and site rules. - Appoint a dedicated site safety officer who is responsible for supervising OHS practices from the outset. - Ensure all workers are provided with appropriate Personal Protective Equipment (PPE) such as helmets, gloves, safety shoes, and high-visibility vests, and require their use on-site. - Establish and clearly mark safety zones, hazardous areas, and emergency assembly points prior to any site activity. - Put up visible safety signage around the site, covering hazards, first aid, and emergency contacts in Bangla and English.	CSC Con	MoF, SDCM U-ESFP	- Approved OHS plan available and site OHS officer assigned before work begins. - Training attendance records show 100% of site personnel received safety induction prior to entering site. - PPE issuance logs and regular spot checks confirm 100% of workers use required PPE. - Number and visibility of safety signage posted at all entry points and hazardous zones (minimum signage per plan). - Functioning first aid kits and extinguishers located at designated points, inventory checked weekly.	NQC (included in CSC + Con costs)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
		- Ensure first aid kits, fire extinguishers, and basic emergency medical response resources are available and accessible. - Develop and communicate emergency response and evacuation procedures. - Require pre-construction health screening for all workers to establish baseline health monitoring and fitness for duty. - Review and verify contractor qualifications and past OHS record as part of the pre-mobilization selection process. - Maintain proper site hygiene by providing sanitation facilities (toilets, washing stations) for all workers. - Establish a mechanism for reporting accidents and near-misses, with protocols for preliminary investigation and future prevention. - Coordinate with local authorities (fire, medical, police) regarding potential site incidents and emergency protocols.			- Documented health screenings completed for all workers prior to mobilization. - Emergency drill conducted and recorded prior to start of construction. - Copies of contractor OHS records and qualification assessments on file. - Sanitation facilities installed and maintained as per standard (audit checklist completed pre-mobilization). - Reports of accidents and near-misses logged and investigated, beginning from mobilization. - Records of coordination meetings and communications with local emergency services.	
17. Waste management	Pollution from inadequately managed wastes	- Anticipate waste streams and incorporate design features to collect, sort and safely dispose of each class of waste - Specify segregated collection bins in strategic indoor and outdoor locations where waste is generated - Include waste storage and sorting areas in facility designs - Incorporate easy access for waste and recyclables collection vehicles - Designate outdoor space for thermophilic composting of organic waste from kitchens and canteens - Design laboratory for appropriate segregation of hazardous and non-hazardous waste streams	CSC Con	MoF, SDCM U- ESFP	- Facility designs include spaces and features for waste management, including collection, sorting, composting, storage and out-shipment - Laboratory design provides for at-source segregation of hazardous liquid and solid wastes	NQC (included in CSC + Con costs)
(iii) PROCUREMENT						
18. Selection of CSC and Contractor, EMP training	Contractors with low commitment to safeguards compliance limit success of EMP implementation	- Prioritize selection of Contractor with strong compliance track record, as verified by references from previous CSCs - Select only Contractors registered with MOLE - Conduct EMP training with the contractor and implementing staff/officers	SDCM U	MoF	- Selected CSC and Contractor has verified track record of good performance on safeguards compliance - EMP training arranged	NQC (Included in SDCMU costs) EMP training cost is included in the EMP implementation cost

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
19. Labor	Use of non-local labor reduces positive impact of project on local livelihoods and triggers social conflict	- Hire exclusively or mostly local workers	Con	MoF, SDCM U-ESFP, PIU	- Workers from outside Tangail represent less than 10% of total workforce	NQC (Included in Con costs)
20. Materials sourcing	Gravel and sand obtained from environmentally damaging riverbed mining, hill cutting or farmland strip-mining	- Obtain valid Certificate of BSTI from suppliers of bulk materials	Con	MoF, SDCM U-ESFP, PIU	- Certificate of BSTI obtained and filed for each purchase of bulk materials	NQC (Included in Con costs)
21. Materials sourcing	Undue GHG emissions from transport of materials sourced far from point of use	- Prioritize bulk materials suppliers using less distant sources	Con	MoF, SDCM U-ESFP, PIU	- Materials sourced from within reasonable distance	NQC (Included in Con costs)
22. Materials Sourcing	Knock-on environmental effects of sourcing from unsustainable suppliers	- Select suppliers with strong green credentials (verified by review of certifications received)	Con	MoF, SDCM U-ESFP, PIU	- International suppliers of materials have favorable environmental certifications	NQC (Included in Con costs)
B. CONSTRUCTION PHASE						
(i) BIOPHYSICAL ENVIRONMENT						
23. Surface water	Siltation and sedimentation of watercourses from soil erosion and entrainment of fine materials, blockage of the surface drains near the Kumudini site	Implement approved Soil Erosion Prevention Plan, including (inter alia): - Install silt fences and sediment barriers around the construction site perimeter to prevent runoff carrying soil into nearby water bodies. - Construct sedimentation ponds or traps to collect and allow sediment in runoff water to settle before discharge. - Stabilize exposed soil areas promptly with vegetation, mulching, or geotextile mats to minimize erosion. - Limit earthworks during rainy season and schedule major excavation during dry weather to reduce the risk of runoff and sediment transport. - Cover soil stockpiles with tarpaulins or other suitable materials and locate them away from drainage paths. - Install diversion drains or bunds to redirect clean stormwater away from disturbed areas.	Con	MoF, SDCM U-ESFP, PIU, CSC	- Turbidity or total suspended solid (TSS) levels in runoff water from site (measured and recorded at least weekly). - Percentage of exposed/disturbed soil area stabilized within 7 days of earthworks. - Frequency of maintenance/inspection of sediment control measures (e.g., weekly, after rainfall). - Number of reported incidences of siltation in adjacent drains or water bodies during construction.	BDT 30,000 for tarpaulins; BDT 200,000 for bulk organic material for temporary soil protection (Included in Con costs)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
		- Regularly inspect and maintain all erosion and sediment control structures to ensure their effectiveness. - Provide training for construction workers on the importance of sediment control measures and proper implementation.			- Proper covering and location of soil stockpiles confirmed in site inspection checklists. - No visible sediment-laden runoff leaving the site after rainfall events. - Records of worker training sessions on sediment management practices.	
24. Surface water, groundwater and soils	Contamination at site might occur due to leaks and spills of hazardous fluids that will be used during the construction process.	- Keep all motorized equipment in good repair - Maintain a regiment of systematic daily checks to detect leaks, following up with prompt repair as needed - Strictly require use of drip mats and pans during refueling and servicing to catch spills and drips - Store fuels and other noxious fluids within roofed, rain-exclusive containment structures with capacity at least 115% of the volume of the largest container stored, constructed only in locations with zero probability of flooding during heavy rains - Provide training in spill prevention and spill response to all workers involved in refueling or equipment servicing	Con	MoF, SDCM U-ESFP, PIU, CSC	- Fuels, lubricants and other noxious fluids stored in appropriate structure - Lack of evidence of leaks from construction equipment - Lack of oil patches on soil surface - Lack of oily sheen on site runoff water	BDT 180,000 for drip mats (Included in Con costs)
25. Surface water	Excessive enrichment of surface waters from raw sewage discharged by construction camps lacking adequate septic systems	- Install an adequate number of toilets to accommodate all workers, and septic systems of sufficient capacity for the expected effluent volume, in accordance with Construction Camp Management Plan	Con	MoF, SDCM U-ESFP, PIU, CSC	- At least one working toilet per 10 resident workers installed - Absence of visual evidence of enrichment	TBD (Included in Con costs)
26. Air quality	Dust from construction works create nuisance and health hazard for residents near work sites and roads	- Implement a regimen of misting all dust-generating surfaces throughout the workday during dry weather - Tightly cover stockpiles of fine materials with tarpaulins whenever they are not in active use to prevent wind erosion - Equip all haul trucks with tightly fitting tarpaulins and enforce their use	Con	MoF, SDCM U-ESFP, PIU, CSC	- Levels of airborne dust are below nuisance level in roadside communities - No significant dust accumulation observed on roadside crops and structures - No complaints from public registered - Ambient air quality at perimeter of work sites and on main road near the Kumudini site meet the standard indicated in the Air Pollution (control) Rules 2022.	BDT 200,000 for sprayer unit (Included in Con cost)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
27. Air quality	Emissions from equipment and vehicles used in construction degrade local air quality	- Maintain all motorized equipment used in construction to a high standard - Use only fuel-efficient equipment	Con	MoF, SDCM U-ESFP, PIU, CSC	- Absence of black smoke in construction equipment exhaust - No complaints from public - Ambient air quality at perimeter of work sites and on the Kumudini Hospital Road near proposed site meet the standard indicated in the Air Pollution (control) Rules 2022. - Emissions from motorized machinery used in construction should meet the standard indicated in the Air Pollution (control) Rules 2022.	NQC (Included in Con cost)
28. Soil	Loss of topsoil to erosion	- Implement approved Soil Erosion Prevention Plan, including (inter alia): - o Protect disturbed soil from rain by keeping exposed areas covered with mulches, fiber mats and other temporary coverings - o Arrange work site drainage to prevent concentration of surface runoff in the vicinity of exposed soils - o Promptly establish vegetative cover on soil surfaces in locations where construction activity has been completed - Implement approved Site Reinstatement Plan, including (inter alia): - o Reserve topsoil and store separately for later use - o Promptly prepare soil surfaces for plantings once construction work has been completed in each part of site - o Establish vegetative cover in accordance with landscaping plan in detailed site design, Bill of Quantities and Compensatory Tree Planting Plan - o Implement a watering and tending regimen to help ensure success of plantings - o Monitor progress of vegetation establishment until end of defects period, and implement infill planting as necessary to achieve full coverage	Con	MoF, SDCM U-ESFP, PIU, CSC	- Prescribed soil protection measures effectively implemented at all work sites - Lack of evidence of soil erosion - Vegetative cover promptly established when construction activity completes on each part of work sites	NQC (Included in Con costs specified in relation surface water protection above)
29. Flora and fauna	Aquatic habitat in on-site watercourses	- There is natural water course near the site. The deep ditch adjacent to the site drains toward the main drainage system which is actually a canal.	Con	MoF, SDCM	- 10-m buffer established with temporary fencing along any	BDT 30,000 (Included in Con)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
	degraded	- Establish a 10-m buffer with temporary fencing along any permanent or seasonal watercourses found on site, and enforce a prohibition on any construction-related activity within the buffer for the duration of the works - Deploy silt curtains and temporary sediment traps where runoff from active work areas is directed to creeks		U-ESFP, PIU, CSC	- permanent or seasonal watercourses on site - Prohibition on construction-related activities within the buffer enforced - Silt curtains and sediment traps deployed as appropriate to limit silt delivery to on-site watercourses	costs)
30. Flora and fauna	Loss of trees	- Initiate a tree plantation plan. It is possible that within the KWT campus, more than one hundred trees can be planted. In this case Native species should be chosen. - Implement approved Compensatory Tree Planting Plan as soon as schedule of works permits	Con	MoF, SDCM U-ESFP, PIU, CSC	Compensatory Tree Planting Plan implemented as approved	BDT 10,000 (Included in Con costs)
31. Drainage and surface water management	Temporary blockage of existing drains, accumulation of stormwater in excavations, localized flooding and waterlogging during monsoon rainfall, sediment runoff reducing hydraulic capacity of campus drainage system	- Construct temporary peripheral drainage channels around construction footprint connected to existing campus drains - Install portable dewatering pumps for rapid removal of accumulated rainwater from foundation pits - Provide silt traps, sediment barriers, or settling pits at runoff discharge points - Prohibit stockpiling of soil and materials within drainage paths - Conduct regular inspection and desilting of temporary drains, especially after rainfall events - Schedule major earthworks outside peak monsoon period where practicable	Con	MoF, SDCM U-ESFP, PIU, CSC	- No standing water observed at site after rainfall - Temporary drains remain unblocked and functional - No sediment discharge into campus drainage network	Included in construction cost (NQC)
(ii) SOCIOECONOMIC AND CULTURAL ENVIRONMENT						
32. Acoustic environment	Noise and vibration from earthworks, pile-driving and materials hauling degrade quality of life for local residents	- Conduct work only during daylight hours - Impose and enforce low speed limits on haul trucks through the Police Plaza Road - Maintain all motorized equipment and haul trucks to a high standard, and inspect exhaust systems regularly	Con	MoF, SDCM U-ESFP, PIU, CSC	- Noise and vibration are below nuisance level for residents and tourism businesses along Kumudini Hospital Road - No construction work or hauling is conducted between dusk and dawn - No complaints from the public registered - Ambient noise levels outside the work sites meet the standard	NQC (Included in Con costs)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
					indicated in the Noise Pollution (control) Rules 2006. - Noise emissions from individual pieces of machinery and vehicles meet the standard indicated in the Noise Pollution (control) Rules 2006.	
33. Public safety	Elevated risks to pedestrians on approach road and in the site	- Ensure that the construction sites are adequately fenced and security is provided to prevent members of the public from entering the sites - Establish safe, marked routes for staff and facility users to continue to use the KWT facilities without having to cross active construction zones - Implement approved Construction Traffic Management Plan during hauling periods, including (inter alia): - Impose and enforce low speed limits on haul trucks through the access road	Con	MoF, SDCM U-ESFP, PIU, CSC	- Adequate fencing and security maintained at construction sites - Construction zone is configured to maintain safe access for KWT staff during construction works - Construction Traffic Management Plan prepared and observed to be implemented as appropriate - Haul trucks not observed or reported to speed through the proposed site or elsewhere along Kumudini Hospital Road near the work site	NQC (Included in Con costs)
34. Public safety	Construction camps are locus of violence against women and girls	- Give preference to local laborers to avoid the need for, or limit the size of, a construction camp - Implement approved Construction Camp Management Plan, including (inter alia): - Conduct proactive outreach with leaders of nearby communities to educate women and girls about the risks posed by an all-male camp in the neighborhood. - Give resident workers regular training on appropriate behavior in and around the camp - Adopt a zero-tolerance policy around aggression or violence against local women and girls - When women must enter the camp for employment or selling produce, limit their entry to times when resident workers are out at the work site - Prohibit prostitution on the site, and monitor activity in this regard and work with community leaders to address the problem as needed	Con	MoF, SDCM U-ESFP, PIU, CSC	- Lack of reports of worker-involved abuse or harassment - Lack of complaints from public about violence or prostitution at camp - Female access to camp for employment allowed only when workers are out at work sites	NQC (Included in each entity's costs)
35. Public safety	Construction camps serve as source of social conflict, possibly leading to violence	- Implement approved Construction Camp Management Plan, including (inter alia):	Con	MoF, SDCM U-	- Lack of complaints from public about behavior of resident workers	NQC (Included in Con costs)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
		- Provide regular training and enforcement to minimize bad worker behavior off site, including public drunkenness, sexual harassment, and theft of crops/foods		ESFP, PIU, CSC		
36. Public health	Construction camps act as vectors for spread of pathogens and disease	- Implement approved Construction Camp Management Plan, including (inter alia): - Install and maintain adequate toilet and septic systems to prevent discharge of raw sewage from camps to local water bodies or fields - Educating resident workers about sexually transmitted diseases and responsible sexual behavior - Work with local community leaders to prohibit prostitution in and around construction camps	Con	MoF, SDCM U-ESFP, PIU, CSC	- At least one working toilet per 10 resident workers installed, with septic treatment - Absence of visual evidence of raw sewage discharge - Lack of reports of prostitution around camp - Lack of concerns expressed by local community leaders about workers' off-site behavior	BDT 200,000 for toilets and septic systems (Included in Con costs)
37. Worker health and safety	Risks to worker health and safety from improper work site practices	- Implement approved Occupational Health and Safety Plan, including (inter alia): - Provide regular safety training for all workers - Provide task-appropriate PPE to all workers and enforce its use - Closely monitor works at all times to ensure strong worker compliance with safety practices	Con	MoF, SDCM U-ESFP, PIU, CSC	- Low incidence of workplace injuries - Workers observed using appropriate PPE	NQC (Included in Con costs)
38. Worker health	Risks to workers from viral illness	- Implement approved Occupational Health and Safety Plan, including (inter alia): - Institute temperature checks (at least daily) for all workers and supervisory personnel on site - Provide each worker with appropriate face mask daily or as needed, and require mask use at all times - Position hand washing and sanitizing stations at canteens and other eating areas, kitchens, and near toilets	Con	MoF, SDCM U-ESFP, PIU, CSC	- Temperature check regimen implemented consistently - Workers supplied with facemasks - Workers consistently use face masks - Hand washing and sanitizing stations provided in appropriate locations and kept stocked at all times	NQC (Included in Con costs)
39. Worker health and safety	Risks to worker health and safety from poor conditions in construction camps	- Implement approved Occupational Health and Safety Plan, including (inter alia): - Conduct monthly safety audit of camp to identify fire risks, electrocution hazards and other unsafe conditions, and assess adequacy of fire extinguishers and first aid provisions - Institute a regular cleaning and disinfection regimen for camp kitchens, latrines, wash-up areas, eating areas and sleeping sheds	Con	MoF, SDCM U-ESFP, PIU, CSC	- Safety audit results included in monthly progress reports and quarterly monitoring reports - Lack of outbreaks of infectious illnesses (e.g., influenza, pneumonia, tuberculosis) and ailments associated with unsanitary conditions (e.g., dysentery, lice, scabies)	BDT 100,000 for drinking water procurement or treatment (Included in Con costs)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
		- Provide adequate sleeping space for the number of workers to avoid overcrowding and consequent spread of communicable illnesses and infestations - Provide each worker with a raised sleeping platform with mattress or mat, bedding and mosquito netting - Test drinking water supplied to workers on a quarterly basis to ensure safety - Ensure adequate ventilation and light in all camp structures			- Living conditions meet standards specified in Construction Camp Management Plan - Drinking water test results meet standards indicated in the Environment Conservation Rules, 2023	
40. Livelihoods	Damage to property and livelihoods	- Fence perimeter of each work site prior to the start of construction and ensure maintenance of fencing for the duration of works - Prohibit all construction-related activity outside the site fences - Promptly remedy any property damage caused in consultation with the affected landowner(s), even if not formal grievance files	Con	MoF, SDCM U-ESFP, PIU, CSC	- Perimeter of each work site properly fenced prior to the start of construction, and fence maintained for duration of works	NQC (Included in Con cost)
41. Livelihoods	Employment for local people	- Hire mostly or exclusively local workers on construction sites	Con	MoF, SDCM U-ESFP, PIU, CSC	- Workers from outside Tangail represent less than 10% of total workforce on site	NQC (Included in Con cost)
42. Physical cultural resources	Damage to cultural heritage due to inappropriate treatment of unearthed artifacts	- Train all workers and site managers in the use of the chance find procedure specified in the CEMP	Con	MoF, SDCM U-ESFP, PIU, CSC	- Workers are aware of the chance find procedure	NQC (Included in Con cost)
(iii) WASTE MANAGEMENT						
43. Construction waste	Pollution from improper management of solid waste generated at work sites and construction camp	- Implement all provisions in the Waste Management Plan embedded in CEMP, including (inter alia): - Provide waste receptacles on the work sites and collect their contents daily or weekly as needed - Recycle all recyclables through local providers of this service - Compost organic waste generated by construction camp kitchens - Dispose of non-recyclable and non-organic waste based on locally available and approved disposal options	Con	MoF, SDCM U-ESFP, PIU, CSC	- All classes of waste managed in accordance with Waste Management Plan	NQC (included in Con costs)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
44. Waste oils	Water pollution from waste oils and other fluids generated in maintenance yards	- Recycle waste oils through a reputable business providing this service, as identified in the Waste Management Plan embedded in the CEMP	Con	MoF, SDCMU, ESFP, PIU, CSC	- No evidence of waste oil dumping or burning - Documentation of transfers to identified service provider available	NQC (Included in Con costs)
C. OPERATION PHASE						
(i) BIOPHYSICAL ENVIRONMENT						
45. Water quality	Contamination of nearby waterbody by release of noxious fluids used in facility operations and maintenance	- Store fluids only within dedicated indoor storage spaces with secondary containment capacity equaling or exceeding 115% of the volume of the largest container stored - Routinely inspect storage spaces and tanks for leakage, and take immediate corrective action as needed	SOU at KWT	SDCMU at MoF	- Proper storage observed. - Absence of evidence of spills and leaks	NQC (KWT operating costs)
46. Water quality	Reduced effectiveness of wastewater treatment	- Remove sludge at least once per year from all septic tanks installed, and work into the soil around on-site tree plantations for fertilization	SOU at KWT	SDCMU at MoF	- Sludge removed from all septic tanks at least annually, and appropriately used to fertilize on-site tree plantations	NQC (KWT operating costs)
47. Drinking water quality	Drinking water quality may deteriorate during operation due to various reasons, for instance due to decline of groundwater table.	- Ensure regular monitoring of the drinking water quality provided by the purification system - Ensure regular monitoring of the purification machine by the installation company	KWT authority	KWT authority	- Regular water quality maintenance log - Regular machine maintenance log	KWT operation cost
(ii) SOCIOECONOMIC AND CULTURAL ENVIRONMENT						
48. Acoustic environment	Excessive noise due to increasing traffic	- Convene a workshop with participation of people living and operating businesses along polytechnic road, local council representatives, WASA, police and other government agencies to discuss feasibility of limiting vehicle horn use in the KWT zone and formulate action as appropriate	SOU at KWT	SDCMU at MoF	- Workshop convened and action plan formulated if consensus for action found	NQC (Included in SDCMU and KWT operating costs)
49. GBV/SEA-SH Risks	Risk of sexual harassment, exploitation, abuse, intimidation, and inappropriate behavior affecting students, staff, and visitors within	- Enforce zero-tolerance GBV/SEA-SH policy and mandatory Codes of Conduct for staff, security personnel, and service providers - Ensure adequate lighting, controlled access, and security presence in all public and semi-private spaces - Conduct regular awareness and prevention training for students and staff	SOU at KWT	SDCMU at MoF	- Codes of Conduct signed and enforced - Functional reporting mechanism in place - Awareness sessions conducted regularly - Timely response and resolution of complaints	NQC (KWT operating costs)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
	campus buildings, pathways, sanitation facilities, and during extended operating hours	- Establish confidential, survivor-centered grievance and reporting mechanism linked to project GRM - Appoint trained safeguards/gender focal person to monitor incidents and corrective actions				
(iii) WASTE MANAGEMENT						
50. Medical waste	Environmental contamination at site and associated public health risks resulting from inadequate management of hazardous wastes.	- Integrate detailed laboratory waste management plan (developed by laboratory design specialist engaged during detailed design) into laboratory operations and maintenance manuals. - Provide training to laboratory technicians and maintenance staff on correct implementation of waste management protocols, before the laboratory becomes operational and on an annual basis thereafter. - Specify parameters, measurement, and reporting for annual waste audit in laboratory waste management protocols. - Conduct an annual waste management audit and implement corrective action as needed to address problematic trends - Segregation at Source: Specialized, clearly marked, and puncture-proof containers for sharps; yellow bins for infectious waste in all lab and medical practical areas. - Secured Storage: Designate a locked area within the service/storage rooms for temporary medical waste storage. This area should not be accessible to unauthorized personnel. - Safe Handling and Training: Train staff in proper handling and usage of PPE. Display procedures in local language for lab users. - Authorized Disposal: Contract licensed hazardous waste collectors who incinerate or treat/bury medical waste according to KWT regulations. - Disinfection: All reusable medical tools to be disinfected after use. Regular cleaning of storage and collection areas.	SOU at KWT	SDCM U at MoF	- Discharges of liquid waste from laboratories/medical facilities meet standards indicated in the Environment Conservation Rules 2023 (only if applicable) - Waste Segregation Rate (% of total waste correctly sorted (monthly audit): benchmark $\geq 90\%$ correctly segregated - Safe Storage (Inspection reports showing compliance in storage room conditions): benchmark 100% compliance - Staff Training record (% of relevant staff trained in last 12 months): benchmark: 100% trained	NQC (KWT operating costs)
51. Solid waste	Pollution from improper management of solid waste from Nursing Institute facility	- Segregation at Source: Provide color-coded bins for recyclables, organics, and residual waste in all public areas, offices, and canteens.	SOU at KWT	SDCM U at MoF	- Recyclable solid waste is consistently segregated and picked up by a reputable recycling business.	NQC (KWT operating costs)

Parameter	Potential impacts and/or issues	Mitigation/enhancement measures	Implementing entities	Supervision responsibility	Performance indicators	Estimated cost in BDT
	operations	- Regular Collection: Implement scheduled collection and prompt removal of solid waste to designated storage areas. - Waste Minimization: Promote reduction and reuse schemes (e.g., less packaging, double-sided printing). - Composting: Use on-site composting for organic kitchen waste.			- Non-recyclable solid waste is consistently taken to a legal landfill for disposal. - Lack of evidence of waste dumping or burning on site	

D. Environmental Monitoring and Reporting

326. The purpose of environmental monitoring is to ensure that the EMP is fully and competently implemented across all phases of the project's development, and to provide a basis for appropriate and timely corrective action when it is found not to be. The environmental monitoring process should be understood not only as a means of supervision and enforcement, but also as a vehicle for organizational learning and progress towards mainstream international best practice in construction site and facility management. Effective monitoring can also be a vital tool in forestalling conflict with the communities most likely to suffer the consequences of negative environmental impacts, as problems can be identified and corrected in a timely manner, before they grow to nuisance or dangerous levels.

327. Environmental monitoring consists of assessing both the degree to which Contractors and facility operators are fulfilling their responsibilities to implement measures specified in the EMP to manage impacts (compliance monitoring), and the degree to which their impact management efforts are successful in preventing harmful environmental conditions from arising (effects monitoring). Compliance monitoring typically makes use of checklists to confirm or disconfirm that prescribed measures are being properly implemented, while effects monitoring involves quantitative and/or qualitative sampling at designated locations. Both types of monitoring need to be conducted on a regular and consistent basis, to ensure comparability of results across monitoring periods. Monitoring should begin before site clearing, so an environmental baseline (i.e., pre-project conditions) can be established for key environmental parameters.

328. Monitoring parameters for each prescribed mitigation and enhancement measure are identified in Table IX-3 above. Specific monitoring responsibilities, including the monitoring and reporting timetable for each, are detailed in Table IX-4.

Table IX-4 Environmental Monitoring Plan

KEYS: ADB: Asian Development Bank; CSC: Construction Supervision Consultant; Con: Contractor; DOE: Department of Environment; EAs: Executing Agencies; EHSO: Environment, Health and Safety Officer; ESFP: Environmental Safeguards Focal Person; NQC: No Quantifiable Cost; PIU: Project Implementation Unit; SOU: Safeguards Oversight Unit; MoF: Ministry of Finance; KWT: Kumudini Welfare Trust

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
A. PRE-CONSTRUCTION PHASE					
(i) IMPLEMENTATION READINESS					
1. Environmental baseline	- Collect and analyze samples for key environmental parameters to establish a pre-project environmental baseline for development site	ESFP SDCMU ESFP KWT	- Ambient air quality (PM_{2.5}, PM₁₀, SO₂, CO, NO₂); compared to the Air Pollution (control) Rules 2022 (minimum 8 hr sampling period) - Adjacent surface waters (pH, BOD₅, COD, DO, SS, total coliform, Total P, Total N, turbidity); compared to the Environment Conservation Rules, 2023 - Groundwater in wells on site or nearby (pH, TDS, EC, DO, BOD₅, COD, Chloride, SS, As, Fe, Total-N, Total-P, Total coliform, turbidity, temperature); compared to the Environment Conservation Rules, 2023 - Ambient noise (dBa daytime, dBa night); compare to the Noise Pollution (control) Rules 2006	One sample prior to starting site clearing Sampling locations: to be set up by the environmental specialist employed by CSC and TMED SOU	BDT 95,000 for sampling and laboratory analysis. See Table IX-8 for details.
2. IEE and EMP update	- Review IEE and EMP to ensure any post-approval changes are properly accounted for and addressed, by addition of mitigation measures if necessary	ESFP SDCMU	- IEE and EMP confirmed still fully applicable - New measures added to EMP if needed to cover any changes in alignment, design or local conditions	Once before start of procurement	NQC (Included in SDCMU budget)
3. Verification of environmental clearances	- Confirm Site Clearance Certificate (SCC) and Environmental Clearance Certificate (ECC) have been granted, and that any conditions imposed by DOE on approval have been reflected in EMP and EMoP, as well as CEMP as applicable	ESFP SDCMU	- SCC and ECC granted. - New measures added to EMP, EMoP and CEMP if needed to meet any conditions of approval specified by DOE	Once before start of procurement	NQC (Included in SDCMU budget)
4. CEMP verification	- Review CEMP to ensure all primary Contractor responsibilities are fully reflected, including monitoring and reporting	CSC	- Any necessary changes requested and made by Contractor. - CEMP confirmed adequate by reviewers	Once before start of construction	NQC (Included in CSC amount)
5. Specialized plans verification	- Confirm that the following specialized plans have been prepared by the Contractor: - site-specific Construction Camp Management Plan(s)	CSC	- All required specialized plans prepared to adequate standard and approved by relevant authority (as required in some cases)	Once before start of construction	NQC (Included in CSC amount)

BAN: Skills for Industry Competitiveness and Innovation Program (SICIP)

(IEE for Nursing Institute at KWT)

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
	- site-specific Waste Management Plans (embedded within CEMP) - site-specific Emergency Response Plans (embedded within CEMP) - Compensatory Tree Planting Plan - Construction Traffic Management Plan - Asbestos-Containing Materials Removal and Disposal Plan - Soil Erosion Prevention Plan - Site Reinstatement Plan - Occupational Health and Safety Plan (including COVID-19 measures stipulated by ADB and Government of Bangladesh Guidance for Social and Institutional Containment and Prevention) - Laboratory Waste Management Plan				
6. Grievance Redress Mechanisms	- Confirm that a central GRM and workers' GRM have been established and publicized	ESFP SDCMU	- Central GRM established and publicized - Workers' GRM established and explained to workers before the start of construction	Once before start of construction	NQC (Included in PIU budget)
7. Acoustic environment	- Convene a workshop with participation of people living and operating businesses along polytechnic Road, local ward Council representatives, RHD/LGED, police and other government agencies to discuss feasibility of limiting vehicle horn use in the KWT zone and formulate action as appropriate	ESFP SDCMU	- Workshop convened and action plan formulated if consensus for action found	Once before end of design phase, quarterly thereafter until action confirmed	NQC (Included in PIU budget)
8. Induced development and cumulative impacts	- Arrange multi-stakeholder workshop at Police Plaza Road with participation of local, upazila and district governments, all relevant government agencies, and concerned business interests (from gravel, trading, agricultural and tourism sectors, at a minimum) to initiate a broad-based public dialogue regarding the livelihoods of the local people and the people living near the site.	ESFP SDCMU	- Multi-stakeholder workshop with suitable broad participation convened by MoF through SDCMU	Once before end of design phase, quarterly thereafter until action confirmed	NQC (Included in PIU budget)
9. EMP training	- Without proper EMP implementation training, EMP monitoring might be delayed or hampered	- Confirm that EMP implantation training has been arranged before commencement of construction. - Involve contractor's high	- The EMP implementation training being conducted before the construction starts	SDCMU/PIU	Record of quarterly refresher's training

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
		officials/management part, EHS specialist, construction project managers and workforce overseer in the EMP training - Quarterly Refreshers training on EMP implementation			
(ii) DESIGN					
10. Climate change mitigation	- Integrate GHG-limiting measures into facility designs, including: - substitute other materials for concrete where feasible - use low-carbon concrete as much as possible - maximize use of building materials available locally - integrate photovoltaic generation into the electrical plan - specify only high-efficiency electrical and mechanical equipment - specify most fuel-efficient backup generator available - maximize cross-ventilation by use of courtyards, openable windows and favorable building orientation - incorporate hollow wall structures where feasible - Use overhangs above large windows to prevent excessive solar penetration - Prioritize shade in the landscaping plan, with plentiful wide-crowned shade trees on all parts of site - Maximize interior natural light by using favorable building orientation and courtyards - Specify water-saving toilets, faucets and showerheads - Design dedicated plumbing system for drinking and cooking water - Aim to meet all water heating needs with solar heaters - Specify high-intensity, full-time lighting only where strictly necessary - Specify solar-powered lighting for outdoor applications	SOU-SDCMU, ESFP-SDCMU, ESFP-KWT	- All feasible GHG-reduction design measures incorporated in facility designs - Soft landscaping plan (covering all site areas not occupied by structures, roadways or walkways, and including ample shade trees and dense ground cover) included in detailed site design, with plantings specified in Bill of Quantities	Once before approval of detailed designs	NQC (included in SDCMU budget)

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
	- Base landscape plan around drought-tolerant perennial Native species - Design site layout and inspection process to minimize the length of time vehicles have their engines running during the border-crossing process - Incorporate green roofs wherever roof area is not needed for solar panels and solar water heaters - Maximize carbon sequestration potential, micro-climatic cooling and runoff retention by specifying a landscaping plan covering all site areas not occupied by structures, roadways or walkways, including ample shade trees (especially near buildings) and dense ground cover in open areas				
11. Climate change adaptation	- Design facilities so that critical components (including laboratory, backup generator and fuel tanks) are well above maximum flood level foreseen under climate change projections specified in Climate Risk and Adaptation Assessment (CRA) report and detailed hydrological study - Incorporate temperature-moderating features in KWT facility designs, including: - Green roofs where feasible - maximize use of wide-crowned shade trees in site landscaping plans, including around buildings and parking area medians - maximize cross-ventilation by using courtyards, openable windows and favorable building orientation	SOU-SDCMU, ESFP-SDCMU, ESFP-KWT	- All critical facility components above maximum expected flood level - All feasible temperature-moderating features incorporated in facility designs	Once before approval of detailed designs	NQC (included in SDCMU budget)
12. Flora and fauna	- Avoid removal of trees to the greatest extent possible - Incorporate existing trees as site features whenever possible, and include them in site designs - When trees must be removed, compensatory trees should be planned elsewhere on site and marked in the design drawings, and included in the Bill of Quantities, in accordance with	SOU-SDCMU, ESFP-SDCMU, ESFP-KWT	- Existing trees preserved in site designs to the greatest extent feasible - Compensatory trees included in design drawings and Bill of Quantities, in accordance with Compensatory Tree Planting Plan	Once before approval of detailed designs	NQC (included in SDCMU budget)

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
	approved Compensatory Tree Planting Plan				
13. Groundwater resources	- Maximize opportunities to limit water consumption and increase groundwater recharge, including adoption of: - rain capture on all roofs and use of stored water for non-potable uses in and around facilities - high-efficiency faucets and toilets throughout the facilities - plant species with low water needs in site landscaping plans - stormwater infiltration swales for all runoff from paved and impervious surfaces (objective: zero site runoff)	SOU-SDCMU, ESFP-SDCMU, ESFP-KWT	- All feasible and applicable water conservation measures incorporated in detailed designs for Nursing institute facilities	Once before approval of detailed designs	NQC (included in SDCMU budget)
14. Public health	- Design Nursing Institute building internal layout to maintain adequate space between individual users and prevent formation of long lines in indoor spaces - Design Nursing Institute building ventilation system to maximize turnover of indoor air	SOU-SDCMU, ESFP-SDCMU, ESFP-KWT	- Nursing institute building design enables social distancing - Nursing institute building ventilation system designed to maximize turnover of indoor air	Once before approval of detailed designs	NQC (included in SDCMU budget)
15. Water quality	- Include designated storage with secondary containment for noxious substances (fuels, lubricants, paints, etc.) used in KWT operations in detailed design - Slightly raise surface of site minerals storage area above level of rest of site to prevent runoff from other site areas from washing through stockpiles - Include sediment traps and porous drainage channels in final drainage design for minerals storage area, to limit discharge of sediments	SOU-SDCMU, ESFP-SDCMU, ESFP-KWT	- Storage spaces with secondary containment for noxious substances included in detailed designs for Nursing institute - Surface of Nursing institute site's minerals storage area slightly raised above rest of site in detailed design - Sediment traps and porous drainage channels included in detailed design of site minerals storage area	Once before approval of detailed designs	NQC (included in SDCMU budget)
16. Air quality	- Include water supply to minerals storage area, with hose spigots in several locations around the perimeter to enable use of mobile misting apparatus	SOU-SDCMU, ESFP-SDCMU, ESFP-KWT	- Detailed design includes water supply to minerals storage area, with multiple hose spigots spaced around perimeter	Once before approval of detailed designs	NQC (included in SDCMU budget)
17. Occupational health and safety	- Design canopies over areas used by heavy laboratory machineries designed with extra headroom and good cross ventilation or fans to evacuate emissions efficiently	SOU-SDCMU, ESFP-SDCMU, ESFP-KWT	- Canopies over areas used by heavy laboratory machineries designed with extra headroom and good cross ventilation or fans to evacuate emissions efficiently	Once before approval of detailed designs	NQC (included in SDCMU budget)
18. Occupational health and safety	- Design interior layout of the Nursing Institute building to maximize space	SOU-SDCMU, ESFP-SDCMU, ESFP-KWT	- Internal layout of the Nursing institute building is designed to maximize space between users and		

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
	between users and prevent the formation of long lines in indoor spaces. - Design Nursing Institute building ventilation system for maximum feasible turnover of indoor air		prevent the formation of long lines in indoor spaces - Nursing institute building ventilation system is designed for maximum feasible turnover of indoor air		
19. Occupational health and safety	- Engage qualified medical specialists to contribute to design of medical facilities/labs and associated structures, as well as preparation of operation protocols including waste management plans, to adhere to international laboratory design standards and best practices	SOU-SDCMU, ESFP-SDCMU, ESFP-KWT	- Suitable laboratory design specialist engaged to ensure design and operations of laboratory adhere to international laboratory design and operation standards and best practice	At beginning of detailed design work	NQC (included in SDCMU budget)
20. Waste management	- Anticipate waste streams and incorporate design features to collect, sort and safely dispose of each class of waste - Specify segregated collection bins in strategic indoor and outdoor locations where waste is generated - Include waste storage and sorting areas in facility designs - Incorporate easy access for waste and recyclables collection vehicles - Designate outdoor space for thermophilic composting of organic waste from kitchens and canteens - Design laboratory for appropriate segregation of hazardous and non-hazardous waste streams - Engage qualified medical laboratory specialists to contribute to design of laboratory and associated structures, as well as preparation of operation protocols including waste management plans, to adhere to international laboratory design standards and best practices	SOU-SDCMU, ESFP-SDCMU, ESFP-KWT	- Facility designs include spaces and features for waste management, including collection, sorting, composting, storage and out-shipment - Suitable laboratory design specialist engaged to ensure design and operations of laboratory adhere to international laboratory design and operation standards and best practice laboratory - Laboratory design provides for at-source segregation of hazardous liquid and solid wastes	Once before approval of detailed designs	NQC (included in SDCMU budget)
(ii) PROCUREMENT					
21. Selection of Contractor	- Prioritize selection of Contractor with strong compliance track record, as verified by references from previous CSCs - Select only Contractors registered with MOLE	SOU-SDCMU, ESFP-SDCMU, ESFP-KWT	- Selected Contractor has verified track record of good performance on safeguards compliance	Once during procurement	NQC (included in SDCMU budget)
22. Selection of Contractor	- Require prospective Contractors to provide information on the age, condition	SOU-SDCMU, ESFP-SDCMU,	- Detailed machinery and fleet information required in bids	Once during procurement	NQC (included in

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
	and fuel-efficiency of their machinery and vehicle fleets in their bids, and consider this in the selection process - Include provision in contract giving the employer the right to require removal of equipment and vehicles it deems to be unacceptably polluting from work sites at any time during construction, even if these are the property of sub-Contractors	ESFP-KWT	- Emissions potential of fleets considered in Contractor selection - Provision included in contract giving the employer the right to require removal of equipment and vehicles it deems to be unacceptably polluting from work sites at any time during construction, even if these are the property of sub-Contractors		SDCMU budget)
23. Labor	- Hire exclusively or mostly local workers	SOU-SDCMU, ESFP-SDCMU, ESFP-KWT	- Workers from Tangail and around Chattagram given first priority in hiring for construction jobs	Once prior to start of construction	NQC (included in SDCMU budget)
24. Materials sourcing	- Obtain valid Certificate of BSTI from suppliers of bulk materials	SOU-SDCMU, ESFP-SDCMU, ESFP-KWT	- Certificate of BSTI obtained and filed for each purchase of bulk materials	Prior to approval of each purchase order	NQC (included in SDCMU budget)
25. Materials sourcing	- Prioritize bulk materials suppliers using less distant sources	SOU-SDCMU, ESFP-SDCMU, ESFP-KWT	- Materials sourced from within reasonable distance	Prior to approval of each purchase order	NQC (included in SDCMU budget)
26. Materials Sourcing	- Select suppliers with strong green credentials (verified by review of certifications received)	SOU-SDCMU, ESFP-SDCMU, ESFP-KWT	- suppliers of materials have favorable environmental certifications	Prior to approval of each purchase order	NQC (included in SDCMU budget)

B. CONSTRUCTION PHASE

(i) BIOPHYSICAL ENVIRONMENT

27. Surface water	- Implement approved Soil Erosion Prevention Plan, including (inter alia): - Protect disturbed soil from rain by keeping exposed areas covered with mulches, fiber mats and other temporary coverings - Keep all stockpiles of erodible materials covered with tarpaulins whenever they are not in active use - Arrange work site drainage to prevent concentration of surface runoff in the vicinity of exposed soils and materials stockpiles - Install and regularly maintain sediment traps in site runoff channels - Promptly reinstate disturbed ground surfaces and establish vegetative cover in locations where construction activity has been completed	EHSO CSC Contractor	- Prescribed soil protection measures effectively implemented at all work sites in accordance with approved Soil Erosion Prevention Plan - Daily inspection of the existing drainage system at Nursing institute and other drainage channels constructed during construction and take cleaning actions when necessary. - Sediment traps installed in appropriate places, and maintained properly - Lack of evidence of elevated turbidity in water draining to adjacent water bodies - Vegetative cover promptly established when construction activity completes on each part of work sites - Silt curtains properly deployed where appropriate - Adjacent surface water quality (pH, BOD₅, COD, DO, SS, total coliform, Total P, Total N, turbidity)	Monthly (soil protection measures) for duration of construction Daily inspections for drainage congestion Quarterly surface water quality monitoring by EHSO at locations dictated by work activity	NQC (included in SDCMU budget) For Surface water quality: BDT 30,000 per sample, Total 8 samples over two years = 8 x BDT 30,000 = BDT 240,000
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Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
	- Deploy silt curtains and sediment traps when earthworks are carried out near ponds and other standing water - During construction wastewater and sediment laden water from construction site may clog the existing drainage which are already malfunctioning.		meets standard in the Environment Conservation Rules, 2023		
28. Surface water, groundwater and soils	- Keep all motorized equipment in good repair - Maintain a regiment of systematic daily checks to detect leaks, following up with prompt repair as needed - Strictly require use of drip mats and pans during refueling and servicing to catch spills and drips - Store fuels and other noxious fluids within roofed, rain-exclusive containment structures with capacity at least 115% of the volume of the largest container stored, constructed only in locations with zero probability of flooding during heavy rains - Provide training in spill prevention and spill response to all workers involved in refueling or equipment servicing	EHSO CSC Contractor	- Fuels, lubricants and other noxious fluids stored in appropriate structure - Lack of evidence of leaks from construction equipment - Lack of oil patches on soil surface - Lack of oily sheen on site runoff water	Monthly for duration of construction	NQC (included in SDCMU budget)
29. Surface water	- Install an adequate number of toilets to accommodate all workers, and septic systems of sufficient capacity for the expected effluent volume, in accordance with Construction Camp Management Plan	EHSO CSC Contractor	- At least one working toilet per 10 resident workers installed - Absence of visual evidence of enrichment	Once at beginning of construction, and monthly for duration of construction	NQC (included in SDCMU budget + Contractor costs)
30. Air quality	- Implement a regimen of misting all dust-generating surfaces throughout the workday during dry weather - Tightly cover stockpiles of fine materials with tarpaulins whenever they are not in active use to prevent wind erosion - Equip all haul trucks with tightly fitting tarpaulins and enforce their use	EHSO CSC Contractor	- Levels of airborne dust are below nuisance level in roadside communities - No significant dust accumulation observed on roadside crops and structures - No complaints from public registered - Ambient air quality (PM_{2.5}, PM₁₀, SO₂, CO, NO₂) meets standards indicated in the Air Pollution (control) Rules 2022.	Weekly for duration of construction (observation) (Quantitative measurement quarterly by EHSO at locations dictated by work activity)	NQC (EMP cost stipulated in Table IX-8)
31. Air quality	- Maintain all motorized equipment used in construction to a high standard - Use only fuel-efficient equipment	EHSO CSC Contractor	- Absence of black smoke in construction equipment exhaust - No complaints from public	Weekly for duration of construction	NQC (observation)

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
				(Quantitative measurement quarterly by EHSO)	
32. Soil	- Implement approved Soil Erosion Prevention Plan, including (inter alia): - Protect disturbed soil from rain by keeping exposed areas covered with mulches, fiber mats and other temporary coverings - Arrange work site drainage to prevent concentration of surface runoff in the vicinity of exposed soils - Promptly establish vegetative cover on soil surfaces in locations where construction activity has been completed - Implement approved Site Reinstatement Plan, including (inter alia): - Reserve topsoil and store separately for later use - Promptly prepare soil surfaces for plantings once construction work has been completed in each part of site - Establish vegetative cover in accordance with landscaping plan in detailed site design, Bill of Quantities and Compensatory Tree Planting Plan - Implement a watering and tending regimen to help ensure success of plantings - Monitor progress of vegetation establishment until end of defects period, and implement infill planting as necessary to achieve full coverage	EHSO CSC Contractor	- Prescribed soil protection measures effectively implemented at all work sites, in accordance with Soil erosion Prevention Plan - Lack of evidence of soil erosion - Vegetative cover promptly established when construction activity completes on each part of work sites	Weekly for duration of construction	NQC (Method: visual inspection)
34. Flora and fauna	- Establish a 10-m buffer with temporary fencing along any permanent or seasonal watercourses found on site, and enforce a prohibition on any construction-related activity within the buffer for the duration of the works - Deploy silt curtains and temporary sediment traps where runoff from active work areas is directed to creeks	EHSO CSC Contractor	- 10-m buffer established with temporary fencing along any permanent or seasonal watercourses on site - Prohibition on construction-related activities within the buffer enforced - Silt curtains and sediment traps deployed as appropriate to limit silt delivery to on-site watercourses	Weekly for duration of construction	NQC (included in SDCMU, CSC, and Contractor costs)
35. Flora and fauna	- Implement approved Compensatory Tree Planting Plan as soon as schedule of works permits	EHSO CSC Contractor	- Compensatory trees planted and tended in conformance with the approved Compensatory Tree Planting Plan	Twice during final 3 months of construction phase	NQC (included in SDCMU budget)

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
			- Planted trees healthy and seem assured of long-term survival		
(ii) SOCIOECONOMIC AND CULTURAL ENVIRONMENT					
36. Acoustic environment	- Conduct work only during daylight hours - Impose and enforce low speed limits on haul trucks through the roads nearby the site - Maintain all motorized equipment and haul trucks to a high standard, and inspect exhaust systems regularly	EHSO CSC Contractor	- Noise and vibration are below nuisance level for local residents and roadside small businesses - No construction work or hauling is conducted between dusk and dawn - No complaints from the public registered - Noise levels at roadside around the site meets standard indicated in the Noise Pollution (control) Rules 2006 (during heavy haul periods)	Weekly for duration of construction (observation) (Quantitative measurement by EHSO only during heavy haul periods)	NQC (observation) For quantitative sampling: Included in Contractor cost as EMP cost provided in Table IX-8
37. Public safety	- Ensure that the construction sites are adequately fenced and security is provided to prevent members of the public from entering the sites - Establish safe, marked routes for staff and facility users to continue to use the Nursing Institute facilities without having to cross active construction zones - Impose and enforce low speed limits on haul trucks through roads near the site area - Prepare Construction Traffic Management Plan, and implement as appropriate during hauling periods (Contractor)	EHSO CSC Contractor	- Adequate fencing and security maintained at construction site. - Construction zone is configured to maintain safe access for KWT staff. - Construction Traffic Management Plan prepared and observed to be implemented as appropriate. - Haul trucks not observed or reported to speed through the nearby roads of the site	Weekly for duration of construction	NQC (included in SDCMU, CSC, Contractor costs)
38. Public safety	- Give preference to local laborers to avoid the need for, or limit the size of, a construction camp - Conduct proactive outreach with leaders of nearby communities to educate women and girls about the risks posed by an all-male camp in the neighborhood - Give resident workers regular training on appropriate behavior in and around the camp - Adopt a zero-tolerance policy around aggression or violence against local women and girls - When women must enter the camp for employment or selling produce, limit their entry to times when resident workers are out at the work site	EHSO CSC Contractor	- Lack of reports of worker-involved abuse or harassment - Lack of complaints from public about violence or prostitution at camp - Female access to camp for employment allowed only when workers are out at work sites - Construction Camp Management Plan implemented as approved	Monthly for duration of construction	NQC (included in SDCMU, CSC, Contractor costs)

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
	- Prohibit prostitution on the site, and monitor activity in this regard and work with community leaders to address the problem as needed				
39. Public safety	- Provide regular training and enforcement to minimize bad worker behavior off site, including public drunkenness, sexual harassment, and theft of crops	EHSO CSC Contractor	- Construction Camp Management Plan implemented as approved - Lack of complaints from public about behavior of resident workers	Monthly for duration of construction	NQC (included in SDCMU, CSC, Contractor costs)
40. Public health	- Install and maintain adequate toilet and septic systems to prevent discharge of raw sewage from camps to local water bodies or fields - Educate resident workers about sexually transmitted diseases and responsible sexual behavior - Work with local community leaders to prohibit prostitution in and around construction camps	EHSO CSC Contractor	- Construction Camp Management Plan implemented as approved - At least one working toilet per 10 resident workers installed, with septic treatment - Absence of visual evidence of raw sewage discharge - Lack of reports of prostitution around camp - Lack of concerns expressed by local community leaders about workers' off-site behavior	Once at start of construction (toilets) Monthly for duration of construction (other items)	NQC (included in SDCMU, CSC, Contractor costs)
41. Worker health and safety	- Implement approved Occupational Health and Safety Plan - Provide regular safety training for all workers - Provide task-appropriate PPE to all workers and enforce its use - Closely monitor works at all times to ensure strong worker compliance with safety practices	EHSO CSC Contractor	- Low incidence of workplace injuries - Workers observed using appropriate PPE - All aspects of Occupational Health and Safety Plan implemented as approved	Weekly for duration of construction	NQC (included in SDCMU, CSC, Contractor costs)
42. Worker health	- Implement approved Occupational Health and Safety Plan - Institute temperature checks (at least daily) for all workers and supervisory personnel on site - Provide each worker with an appropriate face mask daily or as needed and require mask use at all times. - Position hand washing and sanitizing stations at canteens and other eating areas, kitchens, and near toilets	EHSO CSC Contractor	- Temperature check regimen implemented consistently. - Workers supplied facemasks. - Workers consistently use facemasks. - Hand washing and sanitizing stations provided in appropriate locations and kept stocked at all times. - All aspects of Occupational Health and Safety Plan implemented as approved	Weekly for duration of construction	NQC (included in SDCMU, CSC, Contractor costs)
43. Worker health and safety	- Implement approved Construction Camp Management Plan - Conduct monthly safety audit of camp to identify fire risks, electrocution hazards and other unsafe conditions, and assess adequacy of fire extinguishers and first aid provisions	EHSO CSC Contractor	- Safety audit results included in monthly progress reports and quarterly monitoring reports - Lack of outbreaks of infectious illnesses (e.g., influenza, pneumonia, tuberculosis) and ailments associated with unsanitary conditions (e.g., dysentery, lice, scabies)	Monthly for duration of construction (observation) Quantitative measurement	NQC (observation) Quantifiable costs: Temporary disposal

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
	- Institute a regular cleaning and disinfection regimen for camp kitchens, latrines, wash-up areas, eating areas and sleeping sheds - Provide adequate sleeping space with good cross-ventilation to avoid overcrowding and consequent spread of communicable illnesses and infestations (at least 4m² per worker) - Provide each worker with a raised sleeping platform with mattress or mat, bedding and mosquito netting - Ensure that each sleeping space has at least two working exits that remain functional at all times - Provide unlimited drinking water that meets the standards indicated in the Environment Conservation Rules, 2023 - Provide indoor eating space separate from sleeping areas; - Provide kitchens with off-floor food storage, raised working surfaces of a material that can be easily sanitized, and a ready supply of clean water; - Provide toilet facilities with at least one functional toilet (protected from the elements and affording full visual privacy to the user) per ten resident workers, with a ready water source for washing; - Provide roofed and partitioned wash-up areas with floors and proper drainage		- Living conditions meet standards specified in Construction Camp Management Plan - Drinking water quality (pH, TDS, EC, DO, BOD₅, COD, Chloride, SS, As, Fe, Total-N, Total-P, Total coliform, turbidity, temperature) meets standards indicated in the Environment Conservation Rules, 2023	quarterly by Contractor at source well	facilities BDT 100,000; Medical supplies: BDT 100,000; Drinking Water Quality: BDT 30,000 per sample = 8 times over construction period = BDT 30,000 x 8 = 240,000
44. Livelihoods	- Hire mostly or exclusively local workers on construction sites	EHSO CSC Contractor	- Workers from Tangail or nearby area given priority in hiring for construction jobs	In advance of any new crews or subcontractors being brought on site	NQC (included in SDCMU, CSC, Contractor costs)
45. Physical cultural resources	- Establish a chance find procedure and provide training to all workers regarding its triggering conditions, and to site engineers on its implementation	CSC	- Chance finds procedure included in CEMP and training provided to workers and site engineers	Once before start of construction	NQC (included in SDCMU costs)
(iii) WASTE MANAGEMENT					
47. Construction waste	- Implement all provisions in the Waste Management Plan embedded in CEMP, including:	EHSO CSC Contractor	- All classes of waste managed in accordance with Waste Management Plan embedded in CEMP	Monthly for duration of construction	NQC (included in SDCMU, CSC,

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
	- Provide waste receptacles on the work sites and collect their contents daily or weekly as needed - Recycle all recyclables through local providers of this service - Compost organic waste generated by construction camp kitchens - Dispose of non-recyclable and non-organic waste as directed in the Waste Management Plan embedded within the CEMP, based on locally available and approved disposal options				Contractor costs)
48. Waste oils	- Recycle waste oils through a reputable business providing this service, as identified in the Waste Management Plan	EHSO CSC Contractor	- No evidence of waste oil dumping or burning - Documentation of transfers to identified service provider available	Monthly for duration of construction	NQC (included in SDCMU, CSC, Contractor costs)

C. OPERATION PHASE

(i) BIOPHYSICAL ENVIRONMENT

49. Water quality	- Store fluids only within dedicated indoor storage spaces with secondary containment capacity equaling or exceeding 115% of the volume of the largest container stored - Routinely inspect storage spaces and tanks for leakage, and take immediate corrective action as needed - Remove sludge at least once per year from all septic tanks installed, and work into the soil around on-site tree plantations for fertilization	SOU-SDCMU, ESFP-SDCMU, ESFP-KWT	- Proper storage observed - Absence of evidence of spills and leaks - Sludge removed from all septic tanks at least annually, and appropriately used to fertilize on-site tree plantations	Quarterly (fluid storage) Routine inspection - Once prior to start of operations (Spill Prevention and Response Plan), then once per year	NQC (KWT budgets)
50. Drinking Water quality	- Install purification system for drinking water supply for the students and teachers	KWT	- Water quality tests of pH, DO, NO₃⁻, PO₄⁻ and E.Coli and compare to the ECR 2023 - Observe for colour and odor	Water quality test annually Observation and record keeping every month	NQC (Included KWT budgets)

(ii) SOCIOECONOMIC AND CULTURAL ENVIRONMENT

57. Public safety	- Regularly monitor facility operations for emerging public safety issues, and devise appropriate corrective action, as needed - Proactively coordinate with RHD/LGED to ensure that safety features including sidewalks, pullout and turn lanes, road markings, signage and other safety features are planned for and	SOU-SDCMU, ESFP-SDCMU, ESFP-KWT	- Safety features implemented - Accident risk low	Quarterly	NQC (KWT budget)
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Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
	implemented in future approach road upgrades				
58. Public safety	- Pursue collaboration with RHD/LGED and local community leaders regarding durable solutions to safety risks from on-road and road-adjacent commerce, such as provision of alternative spaces outside the RoW for commercial and community activity		- Low incidence of encroachment - Smooth traffic flow through settled areas - Low incidence of vehicle-pedestrian collisions	Quarterly	NQC (KWT budget)
59. Gender-Based Violence / Sexual Exploitation, Abuse and Harassment (GBV/SEA-SH)	- Implementation of a GBV/SEA-SH Action Plan including Code of Conduct for all workers, mandatory GBV/SEA-SH awareness training for contractor and project staff, establishment of a confidential Grievance Redress Mechanism (GRM) with a dedicated GBV/SEA-SH referral pathway, provision of separate and secure sanitation/rest facilities for female workers, adequate site lighting and worker accommodation safety measures, and display of GBV/SEA-SH prevention signage at the site	ESFP-SDCMU, ESFP-KWT	- Number of GBV/SEA-SH awareness sessions conducted; number of workers trained; number of GBV/SEA-SH-related complaints received, referred, and resolved through the GRM; functionality of separate facilities for women; presence and visibility of Code of Conduct and GBV/SEA-SH signage	Monthly during construction phase, with a baseline assessment prior to mobilization and immediate reporting of any incident within 24 hours of occurrence	NQC (KWT budget)
(iii) WASTE MANAGEMENT					
60. Medical waste	- Integrate detailed Laboratory Waste Management Plan (developed by laboratory design specialist engaged during detailed design) into laboratory operations and maintenance manual - Develop detailed protocols for waste classification, documentation, segregation, temporary storage and safe transport of hazardous wastes, and integrate these protocols into operations and maintenance manuals (laboratory design specialist to be engaged by Contractor during detailed design) - Provide training to laboratory technicians and maintenance staff on correct implementation of waste management protocols, before the laboratory becomes operational and on an annual basis thereafter - Specify parameters, measurement, and reporting for annual waste audit in laboratory waste management protocols	SOU-SDCMU, ESFP-SDCMU, ESFP-KWT	- Detailed hazardous waste handling protocols specified in laboratory operations and maintenance manuals - Specifications for annual waste management audit integrated into laboratory waste management protocols - Annual waste management audit performed and reported - Discharges of liquid waste from laboratory meet standards indicated in Schedule 10 (Inland Surface Water) of the Environment Conservation Rules, 2023 (only if full-service lab)	Once prior to start of operations (protocols including waste management plans) Annually (waste audit) Quarterly (discharge)	NQC (KWT budget for O&M)

Parameter type	Prescribed measures	Monitoring entity	Monitoring parameters	When to monitor	Estimated monitoring cost in BDT
	- Conduct an annual waste management audit and implement corrective action as needed to address problematic trends				
61. Solid waste	- Ensure that appropriate waste management procedures for all components of the solid waste stream are specified in each facility's operations and maintenance manual	SOU-SDCMU, ESFP-SDCMU, ESFP-KWT	- Recyclable solid waste is consistently segregated and picked up by a reputable recycling business - Non-recyclable solid waste is consistently taken to a legal landfill for disposal - Lack of evidence of waste dumping or burning on site	Quarterly	NQC (KWT O&M budget)

329. As will be noted from the preceding table and figures, several entities are expected to submit regular monitoring reports as a fundamental contribution to effective implementation of the EMP. These reporting processes are summarized in Table IX-5 for clarity. A sample outline of a semi-annual monitoring report as must be prepared by the SOU for submission to ADB (which can also be adapted for quarterly monitoring reports as must be prepared for DOE) is provided in Appendix 18.

Table IX-5 Monitoring reporting requirements

Report type	Prepared by	Submitted to	Frequency
Construction phase			
Contractor EHS monitoring reports	Contractor	ESFP	Monthly
Site EHS monitoring reports	EHSO	ESFP	Monthly
Progress reports (safeguards sections)	ESFP	PIU/SOU	Quarterly
Environmental monitoring reports	SOU	DOE	Quarterly
Environmental monitoring reports	SOU	ADB	Semi-annually
Operation phase			
Environmental monitoring reports	KWT units and SDCMU	DOE	Quarterly

E. Institutional strengthening and training requirements

330. Implementation of environmental safeguards on infrastructure projects in Bangladesh has tended to be weak, as is often evident even to the casual observer passing by poorly fenced construction sites where few workers can be seen using appropriate personal protective equipment. Incomplete EMP compliance is largely a function of two factors: (i) inadequate capacity in institutions charged with oversight; and (ii) a low level of awareness and knowledge on the part of local subcontractors and their workers.

1. Institutional capacity

331. **Project-specific oversight entities.** Oversight of EMP implementation rests in large part on the PIU (at KWT) and its SOU. SOU should, as a matter of course, be staffed by environmental professionals with strong prior knowledge of safeguards requirements and solid understanding of environmental and social impact analysis in relation to infrastructure and be supported with resources adequate to carry out its duties. Site-level oversight is to be provided by the SDCMU and KWT and their EHSOs during the construction period. The EHSOs should have prior environmental training and be adequately supported by SDCMU and KWT⁸³. Assuming professionals with appropriate qualifications and experience are engaged for environmental positions within the SOU, institutional capacity for implementing the EMP should be sufficient.

332. **EA EHS units.** Neither SDCMU nor KWT has a functioning permanent internal unit with capacity sufficient to oversee implementation of environment, health and safety safeguards at agency-owned sites and facilities. This means that implementation of the EMP during the operation phase—including monitoring of compliance and effects—have almost no likelihood of being properly carried out. This applies not only to the investments at Chattagram KWT, but to all infrastructure owned and operated by these agencies. The capacity to carry out the operational phase elements of the EMP needs to be established in both agencies. It bears emphasis that SDCMU and KWT should have this kind of in-house capacity to carry out operation-phase EMP implementation tasks for all of their infrastructure development projects, not just this one. The proposed capacity building program should be seen as an opportunity to develop capacity with

⁸³ As has been discussed above, it will be acceptable for there to be just one EHSO for the works at the KWT, given the limited scale of works and proximity of sites. SDCMU and KWT will decide how to share cost and supervision responsibility for the EHSO.

wider application; capacity building efforts mandated under future projects can build upon the foundation established under this project.

333. A capacity building program for EHS units within SDCMU and KWT should be developed and delivered in the interval between the project's approval and the end of construction on the first round of investments. The capacity development program should aim to establish stable, sustainable EHS units capable of (i) proactively and professionally driving compliance with National and multilateral-mandated environmental clearance and environmental assessment requirements in relation to proposed, under-construction and operational infrastructure investments; (ii) collaborating productively with specialists hired under the auspices of major investment projects; (iii) carrying out long-term EHS monitoring for all agency facilities; and (iv) building a culture of sustainability and safety across their home agencies through awareness-raising and educational campaigns.

334. Capacity investments should include support for hiring and resourcing adequate staff commensurate with the needs of the agency, and staff training. The capacity building program should include the following elements: (i) needs assessment; (ii) capacity-building plan including recommendations for staffing and resources; and (iii) training program for each EA's EHS unit. Design, development and delivery of the capacity building program is appropriately included in the mandate of the CSC engaged to oversee implementation of the project works. The CSC should be supported in this work by the SOU, and the ESPFs of SDCMU and KWT.

2. Training needs

335. **Contractors.** International construction contractors working in Bangladesh are well aware of safeguards requirements, and knowledgeable on global best practices in impact mitigation and site management. Effective oversight and enforcement, not training, is needed to ensure strong EMP performance from these firms. However, the local firms acting as contractors or sub-contractors, which will undertake most of the physical work of infrastructure development, can in most cases be expected to be less aware and less experienced regarding safeguards requirements, and minimally concerned with international standards of practice. Local firms will benefit from training to strengthen their knowledge and awareness and help ensure strong compliance on this project and other projects in the future.

336. Training for contractors/sub-contractors should be developed by the SOU in collaboration with the CSCs and be delivered by the CSC prior to the start of construction, and whenever weak compliance warrants refresher training. Training for contractors/sub-contractors should cover the following topics:

- (i) rationale for safeguards requirements in infrastructure development;
- (ii) ADB safeguards requirements;
- (iii) Kumudini Nursing Institutional safeguards requirements;
- (iv) primary contractors' legal and contractual responsibilities with respect to compliance with National environmental and labor rules;
- (v) sub-contractors' legal and contractual responsibilities with respect to compliance with National environmental and labor rules;
- (vi) environmental monitoring processes and enforcement;
- (vii) best practices in construction site management and environmental mitigation; and
- (viii) emergency response plans and their implementation.

337. **Workers.** Primary contractors and their sub-contractors should provide adequate training to workers in their employ to ensure safe and sanitary workplaces and full compliance with all

prescriptions of the EMP but often fall short in this regard. It is therefore usually necessary and appropriate for the PIU to implement supplemental worker training. Such training should be designed by the SOU in collaboration with the CSC and implemented by the SOU through the site-level EHSOs. Worker training should be provided prior to the start of construction, and whenever new sub-contractors and crews of workers are brought onstream; refresher training should be given any time site monitoring reveals recurrent patterns of non-compliance that can be attributed to lack of worker knowledge or awareness.

338. Training for workers should encompass the following topics:

- (i) rationale for EHS requirements on construction sites;
- (ii) workplace safety practices, including, but not limited to, proper use of task-appropriate personal protective equipment;
- (iii) safe handling of noxious substances used in construction;
- (iv) proper procedure for avoiding spills during refueling and equipment maintenance;
- (v) fire safety, including fire prevention and use of fire extinguishers;
- (vi) reporting observed spills, leaks, physical hazards and other potentially urgent matters to site managers;
- (vii) proper solid waste management practices;
- (viii) sanitation and personal cleanliness in toilets, cooking and eating areas, wash-up facilities and employer-provided accommodations; and
- (ix) existence and use of the Grievance Redress Mechanism.

339. **Facility managers.** During the operation phase, ongoing mitigation of potential impacts is subsumed within regular facility operations, guided by operations and maintenance manuals, as well as protocols for workplace safety, emergency response and routine monitoring of buildings and equipment. Work carried out at operational facilities by external maintenance contractors also needs to be monitored for compliance with the EMP by the facilities' regular personnel. Accordingly, it is appropriate for facility managers, their designated EHS personnel, and other staff to receive training to allow them to undertake such work with confidence.

340. Training for facility operators should address the following:

- (i) the EMP and its relevance to operations;
- (ii) linkages between the EMP and operations and maintenance manuals;
- (iii) best EHS practices in facility management;
- (iv) emergency response plans and their implementation;
- (v) monitoring maintenance contractors; and
- (vi) EMP reporting requirements.

341. Facility personnel should be given training prior to the end of construction, as soon as operations and maintenance manuals and emergency response plans have been finalized and approved by the SOU and CSC. Training should be designed by the CSC and organized and delivered by the new SDCMU and KWT EHS units. Periodic refresher training may be appropriate throughout the operation phase, especially following turnover of key personnel positions or if monitoring carried out by the SDCMU and KWT EHS units indicates recurrent compliance issues.

342. **Institutional strengthening.** The PMU will lead the implementation of the EMP assisted by the consultants, with responsibility for such key tasks as ensuring project readiness; reviewing and approving designs and plans; ensuring that environmental information in bid documents and environmental clauses in construction contracts are on target; providing training on environmental mitigation measures; supervising and directing environmental monitoring; and providing guidance on environmental matters whenever needed. The work and leadership of the environmental

consultants will strengthen environmental management and supervision capacity of the EA, IAs, PMU and contractors, and ensure the project's full compliance with the ADB's SPS.

343. In addition to the activity of the environmental consultants, the project's environmental management and supervision will be enhanced by engagement of a licensed laboratory to undertake quarterly site monitoring, including quantitative measurement of air quality and noise levels at all active construction sites; this importation of technical monitoring expertise will ensure adherence to DoE standards. Finally, all contractors will be required to hire an Environment, Health and Safety Officer (EHSO) for each site under their control and empower that officer to manage the implementation of an Environment, Health and Safety Management Plan (EHSMP) for the site. With the guidance, support and supervision of the environmental consultants, the EHSOs will play a key role in ensuring sound implementation of environmental mitigation measures prescribed by the EMP. It is believed that these institutional strengthening measures will enable competent and efficient environmental management of the project. The institutional strengthening plan is summarized in Table IX-6.

Table IX-6 Institutional Strengthening Measures

Target Agencies	Institutional strengthening measures	Timing
MoF	Define institutional arrangements for environmental management, monitoring and supervision Define positions and responsibilities	During project preparation
SDCMU	Recruit and contract one National environmental consultant for environmental management, environmental training, EMP compliance review, and reporting	At start of pre-construction phase
CSC / KWT	Recruit and contract licensed laboratory for quarterly environmental monitoring before and during construction phase	Prior to start of construction
Contractors	Hire Environment, Health and Safety Officers for each construction site	Prior to start of construction
Contractor / Workers	Work Health and Safety training on periodic basis	Before start of the construction and quarterly until end of construction

344. **Training.** Selected personnel of the MoF, KWT, SDCMU and contractors will receive training in environmental management, environmental monitoring and supervision, mitigation planning, emergency response, public consultation and use of the GRM, occupational and community health and safety, and other environmental management topics. The topics, methods, and estimated costs of the training are outlined in Table IX-7. Training sessions will use a workshop format. Training will be developed and provided by the environmental consultants with the support of other experts engaged under the grant implementation consultant services.

Table IX-7 Training requirements and estimated cost

Training target	Developed by	Delivered by	Timing	Estimated cost for this location
Contractor	SOU/CSC	SOU/EHSO	Once before start of construction, periodically during construction on quarterly basis	BDT 30,000 per session 9 sessions over 2 years = BDT 30,000*9 = 2,70,000
Workers	SOU/CSC	SOU/EHSO	Once before start of construction, weekly toolbox meeting at site	BDT 50,000 for first session, arrange toolbox meeting on site at Contractor cost
Facility managers	SOU	TMED EHS Unit	Before start of operations	BDT 100,000

Training Topics.

EMP Implementation: Roles and Responsibilities, Monitoring, Supervision and Reporting Procedures
 Grievance Redress Mechanism: Roles and Responsibilities, Procedures, Occupational and Community Health and Safety, Emergency Preparedness and Response, Pollution Control and Environmental Monitoring, Inspection and Reporting, Public Consultation, Contractor Engagement and Management, including EMP Enforcement, Operation-Phase Environmental Management and Monitoring

F. EMP Implementation cost

345. Cost estimates for mitigation measures, environmental monitoring, public consultations, and capacity building are summarized in Table IX-8. Contractors will bear the direct costs of all mitigation measures during construction, which will be included in the tender and contract documents; this includes features built into facility designs in order to prevent environmental impacts from arising. The MoF SDCMU and KWT will bear the costs related to mitigation measures during operation. Costs related to environmental supervision during construction will be borne by the SDCMU (for hiring a licensed laboratory to conduct quarterly monitoring), the PMU (for the activities of the environmental consultants) and by the contractors (for monitoring work carried out by the EHSOs). During the operation phase and monitoring costs will be borne by the SDCMU and KWT (for regular monitoring activity of their site EHSOs).

Table IX-8 EMP implementation cost at construction phase

Note: The EMP cost will be included in the BOQ as a provisional sum (non-competitive) item				
Sl. No	Description of activity	Unit cost (BDT)	Calculation	Cost (BDT)
1	Recruit and appoint EHSO as site for 24 months by the contractor (verified by KWT ESHO)		Refer to tender data sheet (personnel cost)	-
2	Tree plantation at site and maintenance for 2 years as required and as per direction of the E.I.C. Plantation should be following the suggestion in the EMP table. The payment is to be made only when trees are fully grown)	BDT 500 per sapling (sapling, fencing, mulching, watering etc)	10 trees x BDT 500	5,000
3	Debris disposal and waste management on camp sites. Temporary camp site waste disposal facility improvement 2 nos (1 no of organic waste and 1 no of inorganic waste disposal facility) Site cleaning, Removal and disposal activities	lump sum	BDT 100,000	100,000

Note: The EMP cost will be included in the BOQ as a provisional sum (non-competitive) item				
Sl. No	Description of activity	Unit cost (BDT)	Calculation	Cost (BDT)
4	Traffic management during construction, equipment for traffic management (traffic controller employment)	lump sum	BDT 50,000	50,000
6	Medical supplies (First Aid box), other medical requirements, note, equipment, kits, dress etc.	lump sum	BDT 100,000	100,000
7	Waste collection facilities with collection bins, scheduled disposal, carry to designated places, waste separation process etc	lump sum	BDT 100,000	100,000
8	Health safety warning signs and log maintenance, COVID-19 response as identified in the EMP	lump sum	BDT 50,000	50,000
9	Personal Protection equipment, EMP implementation briefings (monthly)	lump sum	BDT 100,000	100,000
10	Conduct environmental baseline: - Ambient air quality (PM _{2.5} , PM ₁₀ , SO ₂ , CO, NO ₂); compare to the Air Pollution Control Rules 2022 (minimum 8 hr sampling period) - Adjacent surface waters (pH, BOD ₅ , COD, DO, SS, total coliform, Total P, Total N, turbidity); compare to the Environment Conservation Rules, 2023 - Groundwater in wells on site or nearby (pH, TDS, EC, DO, BOD ₅ , COD, Chloride, SS, As, Fe, Total-N, Total-P, Total coliform, turbidity, temperature); compare to the Environment Conservation Rules, 2023 - Ambient noise (dBa daytime, dBa night); compare to Noise Pollution Control Rules 2006	Air quality: BDT 25000; Water quality: BDT 30000; Groundwater quality: BDT 30000; noise measurement: BDT 10000 per sampling time	BDT 95,000	95,000
11	Monitoring: - Ambient air quality (PM _{2.5} , PM ₁₀ , SO ₂ , CO, NO ₂) - Adjacent surface waters (pH, BOD ₅ , COD, DO, SS, total coliform, Total P, Total N, turbidity) - Groundwater in wells on site or nearby (pH, TDS, EC, DO, BOD ₅ , COD, Chloride, SS, As, Fe, Total-N, Total-P, Total coliform, turbidity, temperature) - Ambient noise (dBa daytime, dBa night)	Air quality: BDT 25000; Water quality: BDT 30000; Groundwater quality: BDT 30000; noise measurement: BDT 10,000 per sampling time	Over 2 years of construction period total 8 samples = BDT 95000 x 8 =	760,000
12	Construction of male female toilets (adequate quantities as per satisfaction of the ESFP)	Lump sum		200,000
13	Worker shed	Lump sum		200,000
14	Training cost (as described in Table IX-7)	Lump sum		420,000
15	Dust suppression, drainage management, community health & safety management etc.	Contractor cost		-
Total cost				2,180,000

Table IX-9 EMP implementation cost at operational phase

Sl. No.	Description of activity (operation phase)	Responsibility (lead)	Unit cost (BDT)	Basis / frequency	Annual cost (BDT)
1	GRM operations (general + SEA/SH-sensitive intake): maintain hotline/phone credit, grievance register/database, printing of forms, complaint box upkeep, basic stationery	KWT PIU / Environmental coordinator + SOU support	5,000 / month	12 months	60,000

Sl. No.	Description of activity (operation phase)	Responsibility (lead)	Unit cost (BDT)	Basis / frequency	Annual cost (BDT)
2	GRM meetings & resolution logistics: convene GRC meetings (as needed), communication with complainants, minor admin costs	KWT PIU + SOU/ESFP	10,000 / quarter	4 quarters	40,000
3	GBV/SEA-SH awareness materials: posters/signage (reporting steps, helplines), periodic refresh of notices	KWT admin + Proctorial/Security	40,000 / year	1 time/year	40,000
4	GBV/SEA-SH training (refresher): security/front desk + key staff (survivor-centered response, confidentiality, referral)	SOU/ESFP + KWT	60,000 / session	2 sessions/year	120,000
5	Safety walk-throughs for “hotspots” (lighting, access control points, common areas) + minor repairs follow-up (EMP-linked portion only)	KWT facilities + Security	10,000 / quarter	4 quarters	40,000
6	Operational waste segregation supplies: color-coded bin labels, liners, floor-wise signage, cleaning/disinfection for waste room (incremental EMP items)	KWT facilities	7,500 / month	12 months	90,000
7	Authorized recycler / safe disposal support: periodic pickup coordination and recordkeeping for recyclables + special waste streams (batteries, lamps, toner, small e-waste)	KWT facilities + EHS focal	5,000 / month	12 months	60,000
8	Post-construction safeguards check & reporting: simple quarterly internal EMP compliance note (GRM stats, SEA/SH actions, waste records)	KWT environmental coordinator	10,000 / quarter	4 quarters	40,000

X. CONCLUSION AND RECOMMENDATION

A. Conclusion

346. This IEE report on investments planned for Nursing institute inside the KWT campus has been prepared based on desktop study, field reconnaissance of the planned building site and surrounding areas, and consultations with institutional stakeholders and members of the public in the projected area of influence. The report comprises a comprehensive consideration of the environmental, health and safety impacts that can be anticipated to arise from the project. The EMP has been prepared in line with the ADB's Safeguards Policy Statement (SPS) and DoE environmental assessment requirements, and the mitigation strategies prescribed within it reflect current international best practices, as exemplified by the World Bank Group's Environment, Health and Safety Guidelines.

347. Minor negative impacts of the project will be felt during the construction phases which may involve minor sand erosion, water and waste pollution. The major significant impacts can come from disrupting local hydrological system and waste pollution. The impacts of noise and increase in traffic are expected to be within the existing level experienced by the local people. The contractor will be under specific orders for providing PPE to the workers engaged in the job. Strict site and labour camp health and safety regulation will be forced as per government and ADB guidelines.

348. The monitoring plan, if properly implemented during the pre-construction, construction and post-construction and operation phases will ensure taking corrective measures. The proposed project will have no residual adverse impact on the environment or the eco-system if mitigation measures are properly followed. MoF and KWT are required to take clearance from the DoE for implementing the construction projects and other ancillary works. The IEE report has been prepared with this end in view.

B. Recommendations

349. While residual negative impacts have been identified, it is also acknowledged that investments are expected to have significant positive economic impacts for local communities, and these are to be weighed against the residual negative impacts. Generally, very positive perceptions and expectations were expressed about the planned investments during consultations carried out as part of IEE preparation, and while the local communities are clearly concerned about noise and dust from the construction project, they expect that some minor problems can be faced by the local communities for the greater good. It seems clear that local community leaders see investment in

350. The major recommendations made in the IEE are as follows:

- (i) Some medium negative impacts like increased noise level, air and water pollution at the pre-construction and construction phases should be taken care of by taking proper mitigation measures as suggested in the EMP section of this IEE.
- (ii) The Site specific EMPs should be verified by the MoF/ADB appointed Environmental Specialist.
- (iii) The EMP and EMP cost must be included in the bid documents prepared by SDCMU.
- (iv) The contractor needs to prepare the site-specific CEMP prior construction works start. The CEMP must be approved by SDCMU and ADB.
- (v) MoF and KWT should get clearance from DoE before the start of the construction. This IEE is prepared with the view that this document belongs to MoF and KWT and should be used for obtaining ECC from DoE. Any further instruction conveyed from DoE prior obtaining the ECC,

MoF is responsible to update this IEE accordingly. An Environmental Specialist should be appointed by MoF at SDCMU prior construction works to develop and update the EMP.

APPENDICES

- APPENDIX 1 – Relevant national Environmental Standards
- APPENDIX 2 – Environmental Audit Report
- APPENDIX 3 – Environmental and Social Screening Checklist
- APPENDIX 4 – Sample Traffic Management Plan (TMP)
- APPENDIX 5 – COVID-19 Health and Safety Guidance for the Construction Workforce
- APPENDIX 6 – Emergency response team
- APPENDIX 7 – Sample EHS Monitoring and reporting template
- APPENDIX 8 – Sample Outline of Compensatory Tree Planting Plan
- APPENDIX 9 – Sample Outline of Contractor Environmental Management Plan
- APPENDIX 10 – Sample Outline of Soil Erosion Prevention Plan
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- APPENDIX 12 – Sample Outline of Site Reinstatement Plan
- APPENDIX 13 – Sample Outline of Occupational Health and Safety Plan
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- APPENDIX 16 – Consultation Records
- APPENDIX 17 – Proposed Terms of Reference for Environment, Health and Safety Officers
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- APPENDIX 19 – Sample Grievance Registration form
- APPENDIX 20 – Outline of chance finds protocols

Appendix 1 – Relevant National Environmental Standards

Bangladesh Ambient Air Quality Standard as adopted in 2022.

Pollutant	Objective	Average
CO	05 mg/m ³	8 hours ^a
	20 mg/m ³	1 hour ^a
Pb	0.25 µg/m ³	Annual ^b
	0.50 µg/m ³	24 hours ^a
NOx	40 µg/m ³	Annual ^b
	80 µg/m ³	24 hours ^a
PM ₁₀	50 µg/m ³	Annual ^b
	150 µg/m ³	24 hours ^a
PM _{2.5}	35 µg/m ³	Annual ^b
	65 µg/m ³	24 hours ^a
O ₃	180 µg/m ³	1 hour ^a
	100 µg/m ³	8 hours ^a
SO ₂	250 µg/m ³	1 hour ^a
	80 µg/m ³	24 hours ^a
NH ₃	100 µg/m ³	Annual ^b
	400 µg/m ³	24 hours ^a

Notes:

(a) Not to be exceeded more than once per year

(b) The objective is attained when the annual arithmetic mean is within the standard

Standard for Water as per ECR 2023

(A) Standard for inland surface water

Best Practice based classification	Parameter					
	pH	BOD mg/l	DO Mg/l	Total Coliform CFU/100	TDS (mg/l)	COD (mg/l)
a. Source of drinking water for supply only after disinfecting:	6.5-8.5	≤2	≥6	≤100	1000	10
b. Water usable for recreational activity:	6.5-8.5	≤3	≥5	≤50	1000	10
c. Source of drinking water for supply after conventional treatment:	6.0-9.0	≤3	≥5	≤5000	1000	25
d. Water usable for fish culture	6.0-9.0	≤6	≥5	≤5000	1000	50
e. Water usable by various process and cooling industries:	6.5-8.5	12	≥1	-	1000	100
g. Water used for irrigation	6.5-8.5	≤12	-	≤50,000	1000	100

Notes:

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

(B) Standard for drinking water

Sl. No.	Parameter	Unit	Standards
1	2	3	4
1	Fecal Coliform	CFU/100ml	0
2	Total Coliform	CFU/100ml	0
3	NO ₃ ⁻	Mg/l	45
4	As	Mg/l	0.05
5	Turbidity	NTU	5
6	NH ₃	Mg/l	1.5
7	Chloride	Mg/l	250
8	pH		6.5-8.5
9	K	Mg/l	12
10	Mg	Mg/l	30-35
11	Hg	Mg/l	0.001
12	NO ₂	Mg/l	1.0
13	Na	Mg/l	200
14	SO ₄ ⁻²	Mg/l	250
15	TDS	Mg/l	1000

SCHEDULE - 4
Standard for Sound
(as adopted in 2006)

Sl. No.	Category of areas	Standards determined at dBa unit	
		Day	Night
a.	Silent zone	50	40
b.	Residential area	55	45
c.	Mixed area (mainly residential area, and also simultaneously used for commercial and industrial purposes)	60	50
d.	Commercial area	70	60
e.	Industrial area	75	70

Notes:

The time from 6 a.m. to 9 p.m. is counted as daytime.

The time from 9 p.m. to 6 a.m. is counted as nighttime.

Area up to a radius of 100 meters around hospitals or educational institutions or special institutions/ establishments identified / to be identified by the Government is designated as Silent Zones where use of horns of vehicles or other audio signals, and loudspeakers are prohibited.

Standards for Sound originating from Motor Vehicles or Mechanized Vessels

Category of Vehicles	Unit	Standards	Remarks
* Motor Vehicles (all types)	dBa	85	As measured at a distance of 7.5 meters from exhaust pipe.
		100	As measured at a distance of 0.5 meter from exhaust pipe.
Mechanized Vehicles	dBa	85	As measured at a distance of 7.5 meters from the vessel which is not in motion, not loaded and is at two thirds of its maximum rotating speed.
		100	As measured at a distance of 0.5 meter from the vessel which is in the same condition as above.

* All the time of taking measurement, the motor vehicle shall not be in motion and its engine conditions shall be as follows: -

- (a) Diesel engine – maximum rotating speed
- (b) Gasoline engine – at two thirds of its maximum rotating speed and without any load.
- (c) Motorcycle – If maximum rotating speed is above 5000 rpm; two-thirds of the speed, and if maximum rotating speed is less than 5000 rpm, three-fourth of the speed.

Standard for Emission from Motor Vehicles

Parameter	Unit	Standard Unit
Black Smoke	Hartridge Smoke Unit (HSU)	65
Carbon Monoxide	gm/km Percent area	24 04
Hydrocarbon	gm/km ppm	02 180
Oxides of Nitrogen	gm/km ppm	02 600

* As measured at two thirds of maximum rotating speed.

Appendix 2 – ENVIRONMENTAL AUDIT REPORT

A. INTRODUCTION

ADB SPS, 2009 requires an environmental audit, if a project involves facilities and/or activities that already exist or are under construction, including an on-site assessment to identify past or present concerns related to impact on the environment. As per the subprojects' proposal, the investment proposed for the proposed Nursing institute will be located at the Kumudini Welfare Trust (KWT) campus, at Mirzapur upazila of Tangail district, utilizing existing infrastructures such as land, drainage, roads etc. Consequently, an environmental audit has been conducted to find out the safeguards concern within the subproject boundary. The KWT area is quite large, approximately 110 acres. The proposed Nursing Institute (Academic Building) is juxtaposed to the currently under-construction Nursing dormitory. Hence, the proposed site requires an Environmental Audit report as per the SPS 2009.

B. SUBPROJECT SETTING

Location. The project is located within the KWT campus in Mirzapur upazila of Tangail. The 2.55 ha campus parcel accommodates circulation roads, plazas and generous green belts while capping ground covering a third of the plot. Since the campus has already a 22.6% green/open space with 33.1% building footprint (Figure III 4), the proposed project takes initiatives to maintain the green space within the building area.

Built-up area. Built-up gross floor area totals 25 804 m² across six teaching storeys. Each typical plate hovers around 4 400–4 900 m², enabling phased commissioning (Phase-1 UG–3F; Phase-2 4F–5F). Floor-wise Functional Zoning includes: (i) Lower podium (GF–2F) houses labs, lecture theatres, library, café and student commons; (ii) Mid band (3F) carries tutorial suites and twin 100-place tiered halls; and (iii) Upper academic deck (4F–5F) integrates MSc classrooms, midwifery labs and a 500-seat graduate library.

C. ENVIRONMENTAL ISSUES

(i) Flooding and drainage

Water-Related Challenges constitute the most pressing environmental concern for the project site. Mirzapur upazila, where the nursing institute is located, suffers from severe water pollution due to industrial discharge from local mills and factories. The Bonshai river, Jhenai river, and Sohagpara canal in Mirzapur upazila are among the worst affected water bodies, with untreated industrial waste creating toxic conditions that have eliminated aquatic life and made water unsuitable for any use. Additionally, the region faces significant flood risks due to poor drainage systems and the inability of soil to absorb excess water. The site's low-lying topography makes it particularly vulnerable to waterlogging during monsoon seasons, which could severely impact the facility's operations and pose health risks to students and staff.

Recommendations: Sustainable Water Management Systems should be the highest priority for the nursing institute project. The design should incorporate comprehensive rainwater harvesting systems with storage capacity sufficient for the facility's needs during dry periods. Advanced wastewater treatment facilities must be installed to prevent contamination of local water bodies, following Bangladesh National Building Code (BNBC) 2020 requirements for water recycling and

reuse. The facility should implement greywater recycling systems for irrigation and non-potable uses, reducing pressure on local freshwater resources. Additionally, permeable paving materials and bioswales should be integrated into the site design to enhance natural drainage and reduce flood risks.

(ii) Waste

Waste Management Crisis in the broader Tangail area creates an challenging operational environment for the nursing institute. The absence of proper waste management infrastructure means that medical and educational waste from the facility could contribute to environmental degradation if not properly planned. The municipality lacks designated dumping sites and modern waste treatment facilities, forcing institutions to rely on inadequate local systems.

Recommendations: Comprehensive Waste Management Planning is essential for preventing environmental contamination. The nursing institute should establish segregated waste management systems that separate medical waste, recyclables, and general waste according to international healthcare waste management protocols. On-site composting facilities for organic waste can reduce disposal needs while producing useful soil amendments for landscaping. The facility should partner with certified medical waste disposal services to ensure proper treatment of potentially hazardous materials. Additionally, procurement policies should prioritize products with minimal packaging and high recyclability.

(iii) Air quality

Air Quality and Pollution Issues represent another major environmental challenge. Tangail municipality generates approximately 70 tons of garbage daily, much of which is dumped openly at town entrances and roadsides, creating putrid odors and air pollution. The practice of open burning waste produces harmful smoke that contributes to air quality degradation. The region also suffers from dust pollution due to construction activities and inadequate road maintenance, which is particularly problematic for a healthcare education facility where air quality directly impacts learning environments and respiratory health.

Recommendations: (i) Air Quality Enhancement Measures should be integrated throughout the facility design. Advanced HVAC systems with high-efficiency particulate air (HEPA) filtration can protect indoor air quality from external pollution sources. The site landscaping should include extensive tree planting and green spaces that act as natural air filters and carbon sinks. Green roofs or roof gardens can provide additional air purification benefits while reducing the urban heat island effect. The facility should also implement strict vehicle emission controls and promote alternative transportation options for staff and students.

(iv) Climate Change vulnerabilities

Climate Change Vulnerability significantly impacts the long-term sustainability of the project. Bangladesh ranks among the most climate-vulnerable nations globally, and the Tangail region faces increasing risks from extreme weather events, rising temperatures, and shifting precipitation patterns. The nursing institute's design must account for these evolving climate conditions to ensure operational continuity and occupant safety.

Recommendations: Climate Resilience and Adaptation Features are crucial for long-term facility viability. The building design should incorporate flood-resistant construction techniques, including elevated foundations and water-resistant materials in lower levels. Emergency backup systems for critical functions should be installed at levels above expected flood heights. Climate-controlled seed and specimen storage areas should be designed to maintain consistent conditions despite

external weather variations. The facility should also develop comprehensive emergency response plans that account for various climate-related scenarios. Possible design phase measures are suggested in the Table below:

Table: Possible design phase measures for climate change mitigation

Climate change mitigation measure	Rationale
1. Substitute other materials for concrete where feasible	- Concrete is among the most carbon-intensive building materials
2. Use low-carbon concrete as much as possible	- Using a lower proportion of cement (and longer cure time to compensate) can reduce the carbon intensity of concrete
3. Create designs that maximize use of building materials that are available locally	- Reduced transport emissions
5. Integrate photovoltaic generation into the electrical plan	- Reduce reliance on coal-generated electricity - Reduce reliance on back-up diesel generator - Possibly reduce size of generator needed
6. Specify only high-efficiency electrical and mechanical equipment	- Reduce reliance on coal-generated electricity - Reduce reliance on back-up diesel generator - Possibly reduce size of generator needed
7. Specify most fuel-efficient backup generator available	- Reduce diesel consumption
8. Maximize cross-ventilation by use of courtyards, openable windows and favorable building orientation	- Reduce demand for air conditioning
9. Prioritize shade in the landscaping plan, with plentiful wide-crowned shade trees on all parts of site	
10. Incorporate hollow wall structures	
11. Use overhangs above large windows to prevent excessive solar penetration	
12. Maximize interior natural light by use of favorable building orientation and courtyards	- Reduce use of electrical lighting during daytime
13. Specify water-saving toilets, faucets and showerheads	- Reduce need for pumping and treating water
14. Design dedicated plumbing system for drinking and cooking water	- Reduce volume of water requiring energy-intensive water treatment
15. Aim to meet all water heating needs with solar heaters	- Eliminate use of electricity for heating water
16. Specify high-intensity, full-time lighting only where strictly necessary	- Reduce consumption of energy for lighting spaces that don't need it (e.g., parking lots that are only used at peak times)
17. Specify solar-powered lighting for outdoor applications	- Reduce energy used by lighting
18. Base landscape plan around drought-tolerant perennial native species	- Reduce the need for pumping water
19. Design site layout and inspection process to minimize the length of time vehicles have their engines running during their passage on Love Road	- Reduce direct greenhouse gas emissions
20. Incorporate green roofs wherever roof area is not needed for solar panels and solar water heaters	- Reduce cooling needs
21. Incorporate lightning arrester in the structural design	- Lightning has been a critical source of infrastructure and economics recently.

(v) Flora and fauna

The KWT campus is devoid of any wild animal. However, there are some vegetation within the campus. Most of these trees are ornamental. The proposed site was found with only wild grass and bushes.

Recommendations: (i) the proposed site does not have much space for plantation, hence only 10-15 trees can be planted; (ii) a tree plantation plan can be proposed in the IEE report.

C. ACTION PLAN

Time Frame	Action Plan
Design Stage	Site Planning and Design Optimization - Optimize building orientation for natural lighting and ventilation to reduce energy consumption - Design rainwater harvesting system integration (underground water reservoir tank already planned) - Incorporate energy-efficient building envelope with proper insulation and thermal mass - Plan for renewable energy systems (solar panels on roof areas) - Design waste water treatment and management systems - Select sustainable, locally-sourced building materials with low embodied carbon - Plan for green spaces and landscaping to improve air quality and biodiversity - Design natural ventilation systems to reduce mechanical ventilation requirements - Incorporate water-efficient fixtures and plumbing systems - Plan for proper drainage systems to prevent waterlogging and flooding
Construction Stage	Construction Environmental Management Plan (CEMP) Implementation - Implement dust control measures including water spraying and covering materials during transport - Manage construction noise through equipment selection, working hours restrictions, and sound barriers - Establish proper waste management system for construction and demolition waste - Control air quality through regular monitoring and emission reduction strategies - Implement soil erosion control measures during excavation and landscaping - Manage hazardous materials storage and disposal according to environmental regulations - Control water pollution through proper site runoff management and sediment control - Minimize vegetation destruction and implement tree protection measures - Monitor and control vibration impacts on surrounding structures - Implement emergency response procedures for environmental incidents - Train construction workers on environmental protection measures - Establish regular environmental monitoring and reporting protocols - Coordinate with local authorities for waste disposal and environmental compliance
Operation Stage	Sustainable Operations and Maintenance Program - Implement energy management system with smart monitoring and control - Operate and maintain rainwater harvesting system for non-potable water uses - Establish comprehensive waste segregation and recycling program - Maintain indoor air quality through proper ventilation system operation - Implement water conservation measures and regular leak detection - Operate renewable energy systems efficiently with regular maintenance - Maintain landscaping with native plants requiring minimal water and chemicals - Monitor and optimize HVAC systems for energy efficiency - Implement green cleaning programs using eco-friendly products - Establish environmental education programs for students and staff - Conduct regular environmental audits and performance assessments - Maintain proper waste water treatment systems - Implement integrated pest management using minimal chemical interventions - Monitor and improve building envelope performance - Establish long-term environmental sustainability goals and tracking systems

Appendix 3 – Environmental and Social Screening Checklist

Results Based Lending Environmental and Social Screening Checklist for Bangladesh: Skills for Industry Competitiveness and Innovation Program (SICIP)

Screening for eligible activities: *This checklist will be used for screening activities that would be eligible for RBL financing. The RBL program will be categorized according to the Safeguard Policy Statement and the relevant operation manual definitions. At the concept stage, program team is required to submit the environment, involuntary resettlement and indigenous peoples categorization form to SDSS (standard template) for review and CCO's concurrence. The project team shall complete this screening checklist and include as a supplementary document to the Categorization form to be submitted to SDSS for confirmation of eligible activities under the RBL program. During preparation of the PSSA, program team is encouraged to update SDSS on the type of activities likely to be considered for funding under the RBL program.*

	Risk	Assessment
1.	Likely Environment and Social Impacts	
<i>Describe the potential environmental and social benefits, impacts and risks that are likely to be associated with the Program component activities?</i>		
	Type, sensitivity of location, scale and magnitude of potential adverse impacts and risks; - Describe the RBL program scope, the nature and type of activities, benefits and risks associated with the program - What will be the scale, severity/significance of adverse environmental and social impacts (past present and future, direct, indirect, cumulative, site specific characteristics, impact on critical habitat, potential loss or conversion of natural habitats, changes in land use, nature and scale of involuntary resettlement, changes in access to resources). - What will be the impact on indigenous peoples/ communities? - Where are the activities sited? Whether they are in an environmentally or socially sensitive location? - Whether there will be damages to cultural heritage, indigenous knowledge and livelihood systems? - What would be the extent of impact on vulnerable groups? - Will there be issues related to community safety and workers occupational health and safety?	The construction of the Kumudini Nursing Institute Academic Building within the Kumudini Welfare Trust (KWT) campus at Mirzapur, Tangail will involve multi-storey building works including excavation, foundation development, material transport, and installation of utilities. The site is located beside the Louhajang River within a floodplain-influenced hydrological setting and experiences seasonal monsoon flooding and localized waterlogging due to flat terrain and limited surface gradients. As such, while the project is situated within an existing institutional campus and not within any declared ecologically sensitive or protected areas, it is environmentally sensitive from a drainage and flood management perspective. The environmental benefits of the subproject include expansion of resilient health education infrastructure, improved institutional capacity for nursing education, and incorporation of climate-responsive design measures such as improved drainage systems, elevated plinth levels, and resource-efficient building features. The adverse environmental impacts anticipated are primarily construction-related and site-specific, including dust generation, noise and vibration, soil disturbance, sediment-laden runoff into campus drains, temporary drainage congestion during monsoon rainfall, traffic disruption along access routes, and generation of construction waste. Given the area's historical exposure to flooding and prolonged waterlogging, blockage or alteration of drainage pathways during construction could temporarily

	exacerbate localized flooding if not properly managed. No conversion of critical natural habitats or protected areas will occur, as construction is confined within the existing KWT campus footprint. Land use will remain institutional in nature, and no additional land acquisition or changes in access to natural resources are required. Involuntary resettlement impacts are not anticipated, as the project utilizes land already owned and controlled by KWT. The subproject is not expected to adversely affect indigenous peoples or small ethnic communities, as activities are within established institutional premises and do not interfere with traditional territories, livelihood systems, or cultural resources. Rather, the broader program approach promotes inclusive access to education and skills development. Vulnerable groups potentially affected during construction include nursing students, hospital patients, staff, and nearby campus users who may be sensitive to noise, dust, access disruptions, and safety risks. Occupational health and safety risks for construction workers are anticipated, including risks related to excavation, machinery operation, sanitation, and potential injuries. Community safety risks are generally limited due to in-campus construction, but require management through traffic control, site fencing, and access regulation.
2. Likely programmatic risks	
<i>This section identifies the factors that may impede successful program management and sustainability.</i>	
Program management and sustainability - Are program activities likely to interact with other planned activities that may further increase adverse impacts? - Are there risk factors that may impede successful achievement of program outcomes overtime or whose outcomes are not known (disaster risk, climate change, social conflict/fragility) - Does the borrower have adequate trained staff and capacity to manage the E&S implementation of overall govt program (not just the ADB financed portion)? - Are there governance, corruption issues and political risks associated with the proposed sector or program? - Are there any other potential roadblocks to ensuring the environmental and social sustainability of the Program?	Programmatic environmental and social risks at the KWT site are considered moderate and manageable. Construction activities may interact with other ongoing developments within the campus, such as dormitory construction, potentially compounding temporary access constraints and drainage stress if coordination is inadequate. Climate-related risks, particularly monsoon flooding, intense rainfall events, and prolonged waterlogging, may affect construction schedules and site conditions, requiring climate-resilient construction planning and effective temporary drainage controls. While the Finance Division and SDCMU have experience implementing ADB-supported programs, institutional capacity constraints remain in environmental and social safeguards staffing, particularly at site implementation level. Without adequate safeguards supervision, there is risk of non-compliance with EMP measures related to drainage management, worker safety, waste

	handling, and community protection. These risks are expected to be mitigated through establishment of dedicated safeguards units, engagement of environmental specialists, contractor CEMP implementation, and continuous monitoring. No programmatic risks related to involuntary resettlement or indigenous peoples are anticipated due to the in-campus nature of construction.
3. Likely institutional Risks	
<i>This section describes the institutional complexity and capacity with regard to environment and social impact/risk assessment, planning, implementation and management.</i>	
Institutional complexity and capacity - Describe borrowers organizational, administrative and regulatory structures related to environmental and social safeguards. - Whether borrower has the capacity to assess, plan and manage E&S safeguards/risks. - Whether the borrower has commitment and implementation experience with regard to assessment, planning and management of environment and social safeguards/risks. - Are there factors (for example complex institutional set up, involvement of multiple agencies at Nati, sub-Nati and local level agencies) that might impede borrower's capacity to effectively implement E&S safeguards/risks. - Are there other institutional barriers that might prevent the borrower from implementation of the RBL program. - Does the borrower have a system or proven track record of managing complaints related to E&S and others?	Institutional risks arise primarily from the involvement of multiple agencies, including the Finance Division, SDCMU, KWT, construction contractors, and supervision consultants, which may create coordination challenges in safeguards implementation. The absence of sufficient in-house trained environmental and social safeguards personnel within the executing agency could affect consistent monitoring and enforcement of EMP measures. To address this, the program proposes establishment of a central Safeguards Unit under SDCMU comprising environmental, social, and construction supervision specialists responsible for oversight, coordination, reporting, and capacity building. The IEE framework also includes structured GRM mechanisms, standardized CEMP templates, and regular monitoring requirements to reduce institutional risks. With these arrangements in place, institutional risks are assessed as moderate and manageable. No institutional risks related to involuntary resettlement or indigenous peoples are expected.
4. Likely contextual risks	
<i>This section refers to environment and social conditions in the program area that might influence the performance of the RBL program.</i>	
E&S conditions in the program area - Is the program working in sensitive E&S settings that may intensify the likely impacts? - Are there legacy issues or unresolved issues that might affect the commitment and the performance of the program? - Are there recent or ongoing social conflict or social fragility in the program area? - Are there factors that may cause ADB to be exposed to significant reputational risks?	The project site is not located within ecologically critical areas, protected forests, or declared environmentally sensitive zones. However, contextual environmental risks are elevated due to Mirzapur's floodplain setting, historical flooding, drainage congestion, and prolonged monsoon waterlogging. These conditions increase the importance of effective stormwater management, erosion control, and climate-resilient construction practices. There are no known legacy environmental issues, unresolved land disputes, or ongoing social conflicts associated with the KWT campus.

- Are there any known complaints by individuals or advocacy groups with regard to the components of the program or the performance of the EA/IA with regard to E&S implementation?	Reputational risks could arise if construction activities disrupt hospital services, worsen drainage conditions, or compromise community safety, emphasizing the need for strict adherence to EMP provisions. No contextual risks related to involuntary resettlement or indigenous peoples are anticipated.
5. Overall Assessment	
<i>This section describes the overall risk profile of the program. Environmental and social risks should be summarized separately.</i> - Overall environment risk assessment: The overall environmental risk is <i>moderate</i>. The overall environmental risk of the Kumudini Nursing Institute subproject is assessed as moderate. The anticipated impacts are primarily construction-phase impacts that are site-specific, temporary, and reversible, including drainage congestion risks during monsoon periods, dust and noise pollution, sediment runoff, traffic disruption, waste generation, and occupational health and safety hazards. These impacts can be effectively managed through implementation of the site-specific EMP, Contractor Environmental Management Plans, regular supervision, and monitoring. An EARF is under development by the ADB safeguards team which will set out the procedures and guidelines for environmental assessment and requirement for IEEs to prepare site specific impact assessment, mitigation measures and EMPs. Staff capacity building may be strengthened to ensure sustainability of E&S management. The program is categorized as “B” for environment due to the construction impacts which are site specific, temporary and reversible through implementation of appropriate mitigation measures. Impacts related to waste and health, sanitation and safety during operational stage can be minimized by Standard Operating Plan (SOP) for KWT. - Overall involuntary resettlement risk assessment: The program is classified as category ‘C’ for involuntary resettlement as there will be no involuntary resettlement impacts under the program since the civil works will be within the existing campus premises. - Overall indigenous peoples risk assessment: The program is categorized as category ‘B’ for Indigenous People as SEC/IP communities are anticipated to be included as project beneficiaries, which will increase participation and enhance skills of the SEC/IP communities who are engaged as Nati workforce. Negative impacts on SEC/IPs are not expected. The program activities will exclude activities that adversely affect the dignity, human rights, livelihood systems, or culture of indigenous peoples, or affect the territories or natural or cultural resources that indigenous peoples own, use, occupy, or claim as ancestral domain or an asset. The program will ensure safeguards focal to ensure monitoring and coordination for safeguards monitoring and reporting as agreed with the EA.	
6. Is the RBL suitable for proposed program?	

	Yes x	
	No	
7.	Program Teams' Comments	
The overall safeguard risk is <i>moderate</i> because (i) there is a moderate likelihood of program activities leading to some adverse impacts on environment although they are reversible by environmental measures; (ii) the adverse impacts tend not to be in environmentally or socially sensitive areas; (iii) the program operation is unlikely to have significant adverse impacts on GHG (although the construction activities will pose large carbon footprint) and would not be at risk of natural disasters; (iv) program activities are small scale, well known and manageable with existing processes/procedures; (v) the institutional, contextual and programmatic risks are well understood and limited in impact; (vi) Finance Division under the ministry of Finance have some experience in managing risks (not perfect) and capacity building/training measures may be needed; and (vii) Risk management measures are more predictable and readily available. The program activities are unlikely to result in significant impacts or risks for environment. The Program Safeguards System Assessment (PSSA) will assess any existing gaps between the current program safeguard system and GoB safeguards policies, likely impact, institutional risks, programmatic risks, and contextual risks and identify any areas for further improvement. Environmental impacts during construction and operations phase will be managed through the IEEs that are prepared for this program. EMPs stipulated within the IEEs will guide the environmental management and monitoring procedure. Civil works will be limited within the existing engineering college premises. The institutional, contextual, and programmatic risks are well understood and are limited in manageable impacts.		
8.	SDSS Comments	

(see next page for guidance on risk rating)

Risk Rating

The descriptions below provide guidance on the risk rating for safeguards in RBL. The program team will provide an overall risk rating for the proposed RBL program. This approach provides an opportunity to the program team, borrower and relevant stakeholders to identify the potential risks and allocate adequate resources for elements that need in depth analysis and stronger risk management measures.

High	- There is a strong likelihood of program activities leading to significant adverse impacts on environment and affected people. - The significant adverse impacts, cumulative impacts and/or synergistic effects with other initiatives needs complex mitigation and management plans that are not readily available or unproven. - The program operation might have significant adverse impacts on emissions resulting from changes in the intensity or efficiency of emissions generation and controls. - There is large scale land acquisition, physical and economic displacement of APs. - There are significant adverse social impacts on gender, IPs, the poor and other vulnerable groups with potential to contribute directly to increased social fragility or conflict. - The program area has large geographical footprint with different implementation agencies/jurisdictions and varying implementation capacities. - The program design and institutional arrangements are complex. - The program needs direct management intervention to deal with programmatic, contextual and institutional risks which are diverse and complex. - Borrower may have the demonstrated capacity to manage E&S impacts but its performance is not consistent and some E&S risks are beyond its direct control and needs a dedicated capacity building measures. - There is a likelihood that program activities might lead to huge number of grievances - There are ongoing Nati or international advocacy and complaints in the program area with regard to the government program or the borrower/implementing agency.
Substantial	- There is still a strong likelihood of program activities leading to significant adverse impacts on environment and affected people. - The program operation might have adverse impacts on emissions resulting from changes in the intensity or efficiency of emissions generation and controls. - The significant adverse impacts are less severe and site specific and there are less chances of strong cumulative impacts - There is still large scale land acquisition, physical and economic displacement of APs - There is a potential for adverse social impacts on gender, IPs, the poor and other vulnerable groups and may contribute to existing social fragility or conflict - The program area has a smaller geographical footprint; institutional, contextual and programmatic risks are less complex and diverse - Risk management measures are more predictable and readily available. - Borrower may have the demonstrated capacity to manage E&S impacts, but its performance is not consistent and some E&S risks are beyond its direct control and still needs some dedicated capacity building measures. - The program is less subject to National or international advocacy and complaints, but poor performance may lead to large number of grievances
Moderate	- There is a moderate likelihood of program activities leading to some adverse impacts on environment and affected people. - The adverse impacts tend not to be in environmentally or socially sensitive areas - The program operation is unlikely to have significant adverse impacts on GHG and would not be at risk of natural disasters - Program activities are small scale, well known and manageable with existing processes/procedures. - There is limited likelihood of adverse social impacts on IPs, gender, the poor and other vulnerable groups.

	- The institutional, contextual and programmatic risks are well understood and limited in impact. - The borrower/implementing agencies have a proven track record in managing risks (not perfect) and limited capacity building/training measures are needed. - Risk management measures are more predictable and readily available.
Low	- There is low likelihood of program activities leading to any adverse impacts on environment and affected people. - The program operation is unlikely to have significant adverse impacts on GHG and would not be at risk of natural disasters - The borrower/implementing agencies have a proven track record in managing safeguard risks.

Appendix 4 – Sample Traffic Management Plan (TMP)

A. Principles

One of the prime objectives of the Contractor's **TMP** is to ensure the safety of all the road users along the work zone, and to address the following issues:

- (i) the safety of pedestrians, bicyclists, and motorists travelling through the construction zone;
- (ii) protection of work crews from hazards associated with moving traffic;
- (iii) mitigation of the adverse impact on road capacity and delays to the road users;
- (iv) maintenance of access to adjoining properties; and
- (v) Addressing issues that may delay the project.

B. Operating Policies for TMP

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

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

Figure A1 to Figure A6 illustrates the operating policy for TMP for the construction of water pipes and the sewers along various types of roads.

C. Analyze the Impact Due to Street Closure

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

- a) Approval from the ULB/CMC/Public Works Department (PWD) to use the local streets as detours;
- b) consultation with businesses, community members, traffic police, PWD, etc, regarding the mitigation measures necessary at the detours where the road is diverted during the construction;
- c) Determining of the maximum number of days allowed for road closure, and incorporation of such provisions into the contract documents;
- d) Determining if additional traffic control or temporary improvements are needed along the detour route;
- e) Considering how access will be provided to the worksite;
- f) Contacting emergency service, school officials, and transit authorities to determine if there are impacts to their operations; and
- g) Developing a notification program to the public so that the closure is not a surprise. As part of this program, the public should be advised of alternate routes that commuters can take or will have to take as result of the traffic diversion.

If full road-closure of certain roads within the area is not possible, due to inadequate capacity of the detour arrangements, the full closure can be restricted to weekends with the construction commencing on Thursday night and ending on Sunday morning prior to the morning peak period.

The traffic management guidelines are as follows:

- Review construction schedule and methods;
- Identify initial traffic recirculation and control policy;
- Identify routes for traffic diversions;
- Analyze adverse impact & mitigation at the detours;
- Begin community consultation for consensus;
- Finalize or determine alternate detours;
- Identify temporary parking (on and off -street);
- Discuss with CMC, owner, community for use;
- Coordinate with the Traffic Police to enforce traffic and diversions;
- Install traffic control devices (traffic cones, signs, lightings, etc);
- Conduct campaigns, publicity, and notify public about street closure; and
- Develop a mechanism to address public grievances regarding disruptors of traffic, utilities, etc.

D. Public Awareness and Notifications

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

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

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

- a) Traffic control devices in place at the work zones (signs, traffic cones, barriers, etc.);
- b) defensive driving behavior along the work zones; and
- c) Reduced speeds enforced at the work zones and traffic diversions.

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

- a) Explain why the brochure was prepared, along with a brief description of the project;
- b) Advise the public to expect the unexpected;
- c) Educate the public about the various traffic control devices and safety measures adopted at the work zones;

- d) Educate the public about the safe road user behavior to emulate at the work zones;
- e) Tell the public how to stay informed or where to inquire about road safety issues at the work zones (name, telephone, mobile number of the contact person; and
- f) Indicate the office hours of relevant offices.

E. Install Traffic Control Devices at the Work Zones and Traffic Diversion Routes

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

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

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

The Contractor would need to consider such Traffic Management situations for these typical arrangements and others that may occur during road construction works. The Contractor would need to coordinate closely with the road management and road police authorities and submit their Traffic Management proposals, with not less than a month’s prior notice, to the PIU for obtaining prior approval, before any closure of roads are considered.

- Work on Shoulder or Parking Area;
- Work with Land Closure: Low Traffic;
- Work on Lane Closure With Yield Sign on Two Lane: Low Volume;
- Work on Lane Closure With Single Flag Operator on Two Lane : Low Volume;
- Lane Closure: Two Flag Operators on Two Lane Road; and
- Street Closure with Detour.

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

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

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

Appendix 5 – COVID-19 Health and Safety Guidance for the Construction Workforce

COVID-19 Health and Safety Guidance for the Construction Workforce

INSTRUCTIONS

Contractors are required to ensure health and safety of the workers and employees in accordance with environmental health and safety (EHS) provisions of the contract which is in line with ADB SPS 2009 and Bangladesh Labor Law 2006 (Chapter VIII). A supplementary EHS guidelines was prepared to ensure that workers and employees are safe from Pandemic COVID-19 infection while working at the construction sites. This guideline should be used as a supplement to the project's Environmental Health and Safety (EHS) guidelines for the workers. Contractors are encouraged to prepare a site-specific Environmental Health and Safety (EHS) guidelines for reopening the sites and mobilizing labor and resources and get it approved by Executing Agency. The EHS guidelines and COVID-19 EHS guidelines should be available at worksite all the time with no exception.

Prerequisites for Reopening Worksite

1. Consider reopening at limited scale by identifying and engaging essential labor force
2. Avoid worker intensive works as much as possible; encourage use of equipment
3. Engage fulltime EHS professional to oversee the implementation of EHS guidelines
4. Engage a medical professional to prepare health record of the workers and daily health checkup
5. Ensure coverall Personal Protective Equipment (PPE) for medical professional
6. Prepare a list of equipment and vehicles to be used frequently and ensure routine disinfection
7. Make available thermometer, soap, hand sanitizer, disinfectant, and PPE (mask, gloves, boot) at worksite and camp
8. Place adequate number of washbasins, disinfectant tub, dispenser for sanitizer
9. Establish electronic payment system (e.g., BKash, Nagad, Rocket) to pay the daily wage
10. Follow the guidance as provided below.



Locate the closest medical facility equipped with COVID -19 and contact them.



Place washbasins and disinfectant tub for shoes.



Engage EHS professional. Engage Medical professional (fulltime/ part-time).



Place a few COVID-19 signed covered trash bin for disposal of used PPEs.



Supply soap and sanitizer to labor and staff for after office for disinfection.

Worksite Entrance Protocol



Everyone entering the worksite must wear a mask and gloves.



During worksite entry que, maintain physical distance of minimum 1m (3ft).



Every personnel should wash their hands with soap for 20 seconds. Display hand washing protocol at entrance.



Spray bottom of shoes of every personnel entering worksite/campsite with disinfectant. Disinfect all vehicles entering site.



use thermometer gun to check temperature. If body temperature found $> 37^{\circ}\text{C}$ send to the designated medical facility.

Worksite Management



Frequently clean and disinfect highly used tools, machineries and surfaces (e.g. tables, toilets) by workers.



Mandatory morning briefing on COVID awareness at site maintaining physical distance.



Use alcohol-based wipe to clean tools, equipment, vehicle before and after use.



Discourage gathering at site. Discourage unnecessary entrance and exit at site.

Camp Management

1. Provide soap, sanitizer, washing facility and safe water at the workers' dwelling. Encourage frequent hand washing.
2. Ensure separate covered bin for disposal of used PPEs.
3. Protect against heat, cold, damp, noise, fire, and disease-carrying animals.
4. Maintain good housekeeping and social distancing in kitchens, meal rooms, canteens.
5. Ensure personal distance at least 1 meter (3 feet), preferably 2m (6ft) during lunch, dinner and prayer.
6. Ensure ample ventilation at the camp.



Place covered waste bins at worksite
Do not forget to dispose your used PPEs in the bins!!

Work at Site Awareness



Inform the designated ESH/Medical personnel immediately if any person starts showing the symptoms of COVID-19.



Encourage respiratory etiquette, including covering coughs and sneezes. Don't touch nose/eye/mouth if not washed recently, do not spit.



Encourage the workers at camp to go out for supplies not more than once a week.



Shorten toolbox meetings. Initiate remote meeting protocol to avoid physical contact.



Stay informed. Get news from WHO and Government news outlets. Ask your EAs. Ask ADB.

Appendix 6 – Emergency response team

EMERGENCY/CRISIS RESPONSE TEAM (Roles and Responsibilities)

A. Overview

An integrated approach to emergency response involves a range of stakeholders, including the primary responder (i.e. the contractor), supervision consultants, the secondary responder (i.e. EA/IAs) and the tertiary responder (i.e. Donor agencies (e.g. ADB)) along with the local authorities, regulatory agencies and the general public. Such a system therefore requires robust processes regarding information dissemination, training, and designation of responsibility, management actions, monitoring, control, and corrective actions. The Emergency/Crisis Response Team therefore needs to be fully equipped and well communicated.

B. Organization chart of crisis response team

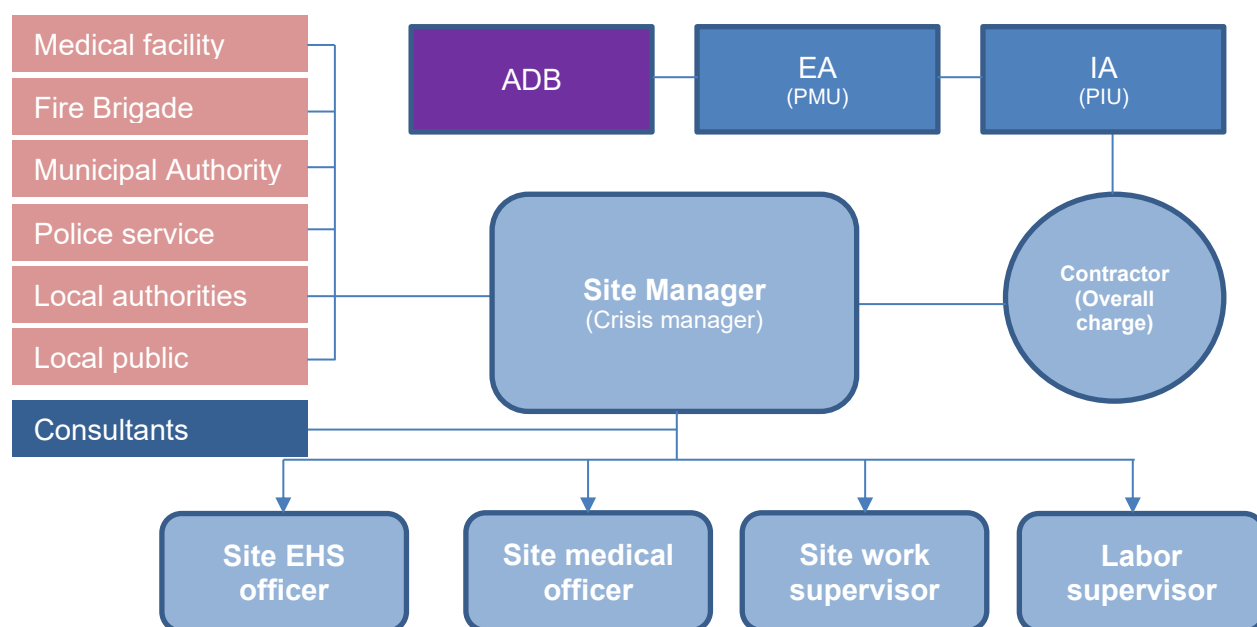


Figure: Organization chart of the crisis management team

Explanation of color code:

Work site body
Executive body
Donor body
External services team
Consultants

Table: Crisis response team

No.	Name	Designation	Mobile no.
1		Site Manager	
2		EHS officer	
3		Medical officer	
4		Worksite supervisor	
5		Labor supervisor	
6		Contractor	
7		Local hospital	
8		Local police station	
9		Local fire brigade	
..			

Appendix 7 – Sample EHS Monitoring and reporting template

Monitoring and Reporting Template

Environmental Health and Safety Monitoring

A. Environmental Health and Safety Checklist

Sl no.	Item	Exist in the worksite?		Recommendation And/ or Remarks	Time frame to comply
		Yes ☐	No ☐		
1	Site readiness (e.g. is worksite fenced and can be distinguished from general establishment? Is the an EHS professional at site? Has he/she been fulltime professional? Has he/she been present at site every day?)				
2	Site access (e.g., is site access road wide and easily accessible?)				
3	Signboard with safety warnings (e.g. with general EHS safety signboards, are COVID 19 response signboards visible at every corner of worksite?)				
4	Lighting (e.g. is every corner of the worksite is well lit?)				
5	Appropriate PPEs (Helmet, Safety Shoe, Vest, Ear plug, Musk etc.) e.g. Is every person in site is wearing appropriate PPEs?				
6	Fall protection measures (e.g. is the fall protection measures at worksite appropriate and adequate?)				
7	Fire extinguishers (e.g. are they at site? How many? Are they placed at vulnerable/most accessible places?)				
8	House keeping (e.g. are all workers health records kept? Is the EMP and EHS manual at site? Has the morning briefing on EHS conducted? Is there any vehicle record/material register/attendance register/complain register kept?)				
9	Garbage bins (e.g. are there garbage bins at site? Are the numbers adequate? Is waste thrown to bins? Are the bins well places?)				
10	Drinking water supply (e.g. safe drinking water for worksite been supplied? Is drinking water adequate?)				
11	Sanitation facilities (e.g. is there separate male and female toilets established? Are they adequate? Hand wash materials and water being provided at toilets? Are those toilets sanitary?)				
12	Dust protection measures (e.g. is mask provided for worksite personnel? Is water sprayed frequently as needed to suppress dust? Are sand class materials covered with plastic sheets?)				
13	Noise barrier and reduction equipment (e.g. how much noise is generated by site? Does it exceed maximum human exposure limit? Are workers provided with noise reduction gears such as ear mufflers?)				
14	Shelter (e.g. is there a site office or shelter good enough to take shelter during rain or storm event?)				
15	First aid box (e.g. is there a first aid box at site? Are the contents of the first aid box adequate for primary treatment? Is the first aid box handled by at EHS/medical professional)				

Sl no.	Item	Exist in the worksite?		Recommendation And/ or Remarks	Time frame to comply
		Yes ☐	No ☐		
16	Toolbox meetings (e.g. are toolbox meeting regularly arranged? Are records kept?)				
17	Others (many other checklists can be formulated by the EHS professional on board)				
COVID -19 protocols on top of usual EHS checklist (this applied to campsite also)					
18	COVID-19 posters/signboards (e.g. are COVID-19 awareness/protocol posters are showing all visible corners of the site?)				
19	Entrance protocol (e.g. Is the COVID-19 worksite entrance protocol been followed as stipulated in the COVID -19 response guidance? Are adequate soaps, water has been kept at site entry? Are workers at entrance que using mask, hand gloves and hard shoes? Are disinfectant spray kept at site entry to disinfect underneath the boots of entering persons?)				
20	Vehicle entry protocol (e.g. has the vehicle disinfection protocol has been initiated?)				
21	Social distancing (e.g. are the workers maintaining social distancing all the time?)				
22	Sharing tools/machineries (e.g. are the tools and machineries are wiped to disinfect before sharing/working?)				
23	Disinfecting work area (e.g. is the worksite/ common surfaces, toilets etc. are disinfected before worksite opened in the morning? Has record being kept? Has the worksite been disinfected yesterday after closing for the day?)				
24	Restriction on worksite entry and exit (e.g. has workers being discouraged to travel frequently out of worksite or entering? Has records being kept?)				
25	Stock of disinfectant (e.g. is the stock of disinfectants, soap, PPEs are adequate at worksite?)				

*Attach photos

**Enter additional criteria as required for site specific measures

Reported by (ESC)	Checked by (TL)	Approved by (EA/IA)
Name Designation Signature Date	Name Designation Signature Date	Name Designation Signature Date
Received and agreed to comply by the representative of the contractor	Name Designation Signature Date	

B. Accident/ Incident Investigation Report

Class of Incident		Reported	
☐ Injure	☐ Property/ Plant Damage	Yes ☐ No ☐ Details:	
☐ Near Miss	☐ Environmental	Further Action Required	
		☐ Report to Authorities ☐ Other	
Details of Incident			
Date of Incident		Time of Incident	am ☐ pm ☐
Witness Name		Witness Contact	
Nature of Incident			
Location of Incident			
Description of Incident			
Details of damage to equipment/property			
Injured Person/s (if applicable)			
Name			
Address			
Date of Birth			
Occupation		Employer	
Referred/transferred to			
Recommended Preventive Action			
Details			
Completed by			
Name		Position	
Signature		Date	

C. Safety patrol/inspection report form

SITE SAFETY PATROL REPORT AND INSTRUCTION						
Date						
Inspector						
No	Location	Comment/instruction	Photo	Corrective action	Deadline	Responsible person

Reported by (ESC)	Checked by (TL)	Approved by (EA/IA)
Name Designation Signature Date	Name Designation Signature Date	Name Designation Signature Date
Received and agreed to comply by the representative of the contractor	Name Designation Signature Date	

Appendix 8 – Sample Outline of Compensatory Tree Planting Plan

COMPENSATORY TREE PLANTING PLAN

Note: The purpose of the planting plan is to fully assess the existing tree resources on the development site and specify an implementable strategy for ensuring that the net medium-term effect of the site's development on local arboreal resources is at least neutral relative to existing conditions. The planting plan is to be developed by the design-build contractor and approved by the Forest Department and local Union Parishad authorities prior to issuance of the Site Clearance Certificate.

1. Plan Rationale and Requirements

- Objective of plan
- Brief description of planned development producing need for plan
- Forest Department requirements for compensatory planting plans
- Roles and responsibilities for plan development and implementation
- Required approvals

2. Baseline Profile of Tree Resources on the Development Site

A. General description of tree cover

- Proportion of site covered
- Historical trends of tree cover and surrounding areas
- Hydrological, soil and site use factors influencing distribution of tree cover on site
- Notable species assemblages
- Ecological functions of existing trees and groups of trees
- Micro-climatic functions of existing trees and groups of trees
- Existing uses of on-site trees
- Values associated with on-site trees by local people

B. Inventory of existing trees on site

- Full inventory of all trees over 2 m height, tabulated by species and size (height, crown width) and Native/introduced status
- List of identified significant specimens (trees that are highly valued for any reason, e.g., religious or spiritual; very large size; serve as a social meeting place; historically high yield of fruits, nuts or other products; medicinal importance; use by popular wildlife)

3. Trees Designated for Preservation, Removal and Planting

A. Inventory of trees to be preserved, based on site master plan

- List of trees by species and location
- Map of preserved trees
- Planned method of protecting trees during site clearing and construction

B. Inventory of trees to be removed, based on site master plan

- List of trees by species and location
- Map of clearance areas
- Planned method of removing trees and disbursing timber

C. Inventory of spaces for compensatory planting

- Number of trees to be planted, based on anticipated removals
- List and description of suitable on-site areas, including soil and moisture constraints
- List and description of possibly suitable off-site areas, including soil, moisture and land use constraints
- Map of potentially suitable on-site and off-site planting areas

4. Report on Consultation with Local Stakeholders

A. Stakeholders

- List of institutional stakeholders

- List of existing users of trees on site
- List of residents in the vicinity of the site

B. Summary of consultation events and formats

C. Findings of consultations

- Non-monetary values attached to site trees by stakeholders
- Monetary values of existing tree uses
- Location preferences for compensatory planting
- Species preferences for compensatory planting

5. Compensatory Planting Plan

A. Constraints and opportunities

- Survey of suitable sapling sources (saplings at least 2 m tall, in sufficient number to have at least two trees planted for each tree removed)
- Estimation of sapling costs by species
- Seasonal factors affecting planting
- Minimum and optimal spacing requirements for different species

B. Selected species and locations

- Identification of priority species based on site conditions and consultation findings
- Identification of priority planting locations based on site conditions and consultation findings
- Master planting plan map

C. Planting strategy

- Timing of planting activity
- Procurement of saplings, soil amendments and mulches
- Procurement of labor for planting
- Stakeholder participation in planting

D. Plantation maintenance strategy

- Identification of maintenance needs by species and location (watering, mulching, fertilization, trimming, weeding)
- Maintenance schedule
- Arrangement of labor and responsibility for on-site plantation maintenance
- Arrangement of labor and responsibility for off-site plantation maintenance
- Procurement of tools for plantation maintenance

6. Cost Estimates

- Estimated initial costs for planting
- Estimated recurring costs for plantation maintenance

7. Monitoring of Implementation

- monitoring parameters (e.g., tree survival rate, maintenance performance)
- method and frequency of monitoring
- public participation in monitoring plantations
- definition of feasible corrective actions in the case of poor performance

Appendix 9 – Sample Outline of Contractor Environmental Management Plan

CONTRACTOR ENVIRONMENTAL MANAGEMENT PLAN (CEMP)

1. Purpose of the Plan

- Objectives
- Relationship to subproject/component EMP
- Relationship to specialized mitigation plans
- Performance indicators

2. Roles and Responsibilities in Plan Implementation

- Contractor's Environment, Health and Safety Representative
- Site engineers
- Emergency response focal persons
- Skilled workers
- Laborers

3. Legal Requirements

- Laws and regulations pertinent to the works
- Licenses and permits required

4. Special Contextual Issues

- Environmental (if any)
- Social (if any)
- Cultural (if any)

5. Scope of Works

- Description of infrastructure plan
- List of work locations and sites
- Applicable standards

6. Work Plan

- Resources (facilities, equipment, human resources)
- Coordination and phasing
- Timetable

7. Environmental Method Statements

- Boundary establishment and site clearing
- Soil protection and erosion prevention
- Runoff management
- Sediment control
- Dust prevention and suppression
- Noise and vibration impact management
- Storage of fuels, lubricants, coolants and other fluids
 - maintenance yard
 - construction sites
- Refueling and servicing equipment at the job site
- Monitoring of equipment condition
- Construction site safety management
- Materials stockpiles at the job site
- Chance Find Procedure for physical cultural resources

8. Waste Management

- Classes of waste produced by type of site

- work sites
- maintenance yards
- construction camp
- Solid waste collection
 - collection methodology
 - collection frequency
 - responsibility for collection
- Solid waste recycling
 - recyclable materials
 - entities capable of accepting recyclable materials
 - recycling plan
- Solid waste disposal
 - composition of non-recyclable waste stream
 - legal and available disposal options in local area
 - disposal plan
- Waste oil and other hazardous wastes
 - types of hazardous liquids
 - methods of storage
 - collection methodology
 - collection frequency
 - legal and feasible treatment and disposal options
 - entities capable of accepting waste oil and other hazardous fluids and their containers
 - waste oil disposal plan

9. Emergency Response Plan

- Characterization of possible emergency situations for sites
 - spills and accidental releases
 - fires and explosions
 - serious accidents
 - other foreseeable situations
- Key actors (including names and contact information, to be updated regularly)
- Chain of command and process steps in emergency situations
- Documentation and reporting of incidents

10. Monitoring and Reporting Framework

- Purpose of monitoring
- Compliance monitoring parameters and methods
- Effects monitoring parameters and methods
- Responsibilities in monitoring
- Mechanism for corrective actions
- Monitoring schedule
- Reporting requirements

11. Training Needs and Plans

- Training needs assessment
- Training targets and content
- Training plan

Appendix 10 – Outline of Soil Erosion Prevention Plan

SOIL EROSION PREVENTION PLAN

1. Plan Rationale and Requirements

- Objective of plan
- Description of work sites and earthworks
- Roles and responsibilities for plan development, approval, implementation and supervision

2. Identification of Erosion Risks Specific to Site and Materials

- Erodibility of natural site soils
- Erodibility of fill materials
- Erodibility of stockpiled building materials
- Erosion by rainfall
- Erosion by running water (site runoff, flash floods, fluvial flooding)
- Erosion by wind
- Types of erosion (e.g., sheet, rill, gully, mass)

3. Method Statements

- Timing of earthworks to limit erosion risk (seasonal and weather-related)
- Mulching
- Temporary ground covers (e.g., jute mats)
- Permanent slope protection measures (e.g., terracing, geocells)
- Temporary drainage arrangements to avoid concentration of flow
- Check dams and sediment traps
- Temporary armored runoff channels
- Runoff infiltration swales
- Stockpile covers (tarpaulins)
- Stockpile containment dams

4. Monitoring and Correction

- Method of site monitoring for active erosion and erosion risk
- Frequency of site monitoring for active erosion and erosion risk
- Practices for correcting different types of erosion

Follow-up to corrective actions

Appendix 11 – Sample Outline of Construction Camp Management Plan

CONSTRUCTION CAMP MANAGEMENT PLAN

1. Purpose of the Plan

- Objectives
- Relationship to subproject EMP
- Performance indicators

2. Environmental and Social Context of Construction Camp

- Location
- Road access and distance to road sites
- Service infrastructure
- Local topography
- Prevailing wind
- Drainage
- Nearby water bodies
- Surrounding land use
- Local communities
 - proximity
 - population
 - ethnic makeup
 - employment and livelihoods

3. Camp Capacity and Resident Profile

- Projected number of resident workers during different phases of work
- Expected number of accompanying family members
- Expected number of support staff living on site
- Expected ethnic makeup of camp residents

4. Camp Infrastructure

- Kitchens
- Eating facilities
- Toilets and septic system(s)
- Wash-up facilities
- Accommodations
- Storage
- Water supply and water heating
- Electricity
- Cooking fuel
- Backup generators
- Firefighting equipment
- Parking
- Fencing
- Site layout
- Camp construction schedule

5. Cleaning and Maintenance Plan

- Cleaning and sanitation
 - responsibilities
 - methods
 - schedule
- Facility inspection and maintenance
 - responsibilities
 - inspection methodology
 - inspection schedule
 - maintenance schedule

6. Wastes and Waste Management

- Solid waste
 - expected composition of solid waste stream
 - collection and management of recyclables
 - collection and management of non-recyclables
 - collection and composting of organic waste
- Liquid waste
 - expected composition of liquid waste stream
 - management of gray water
 - management of sewage

7. Rules Governing Resident Behavior

- Rules for conduct when in camp
- Rules for conduct outside camp
- Family members policy
- Visitor policy
- Rules regarding alcohol and illegal drugs
- Procedure for adjudicating disputes among residents

8. Training

- good practices for disease prevention
- camp safety and fire suppression

9. Monitoring and Reporting

- Purpose of monitoring
- Monitoring responsibilities
- Monitoring methodology
- Monitoring frequency
- Reporting schedule

10. Camp decommissioning

- Responsibility for decommissioning
- Procedure for decommissioning
- Timing of decommissioning

Appendix 12 – Sample Outline of Site Reinstatement Plan

SITE REINSTATEMENT PLAN

1. Plan Rationale and Requirements

- Objective of plan
- Description of work sites and earthworks
- Roles and responsibilities for plan development, approval, implementation and supervision

2. Schedule of works

- Construction schedule by building and area
- 'Reinstatement-ready' schedule by site area
- Seasonal constraints on vegetation establishment
- Reinstatement and planting schedule by site area
- Post-planting monitoring and maintenance schedule (through end of defects period)

3. Vegetation specifications

- New tree plantings indicated in detailed design (landscaping plan)
 - number
 - preferred species
 - planting locations
- New tree plantings required under Compensatory Tree Planting Plan
 - number
 - preferred species
 - planting locations
- Ground cover specified for infiltration areas
 - total planting area
 - locations of infiltration areas
 - preferred species
- Ground cover specified for recreational use areas
 - total planting area
 - locations of recreational use areas
 - preferred species
- Ground cover specified for ornamental displays
 - total planting area
 - locations of ornamental displays
 - preferred species

4. Sourcing of key materials

- Saplings
- Root stock
- Seed
- Soil amendments
- Mulches and other protective materials (e.g., jute mats)

5. Method statements

- Removal, storage and replacement of topsoil
- Slopes (maximum slope and stabilizing measures)
- Pre-planting soil suitability assessment and soil amendment
- Tree planting
- Bare root planting
- Seeding
- Use of mulches and other protective materials
- Watering (by vegetation type)
- Fertilization (by vegetation type)
- Weeding, thinning and trimming (by vegetation type)

6. Monitoring and Follow-up

- Metrics and methods for measurement of vegetation establishment success (e.g., vigor, survival rate by time period, density, coverage)
- Frequency of site monitoring
- Documentation and reporting of vegetation monitoring results
- Criteria for replanting and infill planting

Appendix 13 – Sample Outline of Occupational Health and Safety Plan

OCCUPATIONAL HEALTH AND SAFETY PLAN

1. Plan Rationale and Requirements

- Objective of the plan: Prevent injuries/illness, protect workers and campus users (nursing/academic students, faculty, hospital patients/visitors, and residents of the adjacent dormitory building), and ensure compliance with Bangladesh OHS requirements and ADB good practice.
- Site description and work context: Active Kumudini Welfare Trust (KWT) institutional campus in Mirzapur, Tangail, with an operating nursing institute, hospital facilities, an existing dormitory building, an on-site pond, and ongoing campus activities in close proximity to the construction footprint; work includes construction of a six-storied academic building with excavation, foundation works, and material transport along internal campus roads.
- Major work activities: site preparation; excavation and foundation works; rebar/formwork/concreting; structural works (including 10-storey foundation for future vertical extension); scaffolding; MEP installation including substation and overhead water reservoir works; finishing works; waste handling; internal roads/utility tie-ins.

Roles and responsibilities:

- Contractor: Prepare and implement site OHS Plan; appoint full-time EHSO; ensure PPE, training, supervision, incident reporting.
- CSC / Supervision Consultant: Review/clear OHS Plan; conduct audits; issue corrective actions.
- PIU (KWT) / SDCMU/SOU: Oversight, reporting, and GRM linkage for worker/community complaints.

2. Identification of Health and Safety Risks Specific to Site and Activities

- Inventory of hazards inherent to the KWT work site, including proximity to the existing pond, boundary wall, substation, and active KWT campus roads
- Inventory of dangerous activities, including excavation near the underground water reservoir tank and works adjacent to the operating KWT hospital/nursing institute
- Inventory of hazardous materials used and stored on the KWT site
- Inventory of health risks for workers, including heat stress and vector-borne disease risk given the presence of the on-site pond within the KWT campus

3. Method Statements for Risk Reduction Practices

- PPE system: mandatory PPE matrix by task (helmet, safety shoes, gloves, goggles, reflective vest; harness for height; respirators for dust; ear protection for high noise).
- Heavy machinery operation: licensed operators only; daily equipment checklist; spotters; reversing alarms; speed limits; designated routes along the 6000mm-wide internal KWT campus roads.
- Working near mobile plant: exclusion zones, barriers, banksman/flagman, pedestrian segregation, particularly at points where construction traffic crosses routes used by KWT students, staff, and hospital visitors.
- Working at height: scaffold certification; guardrails/toeboards; fall-arrest systems; ladder control; edge protection; roof work permits for works at the six-storey roof and rooftop plant areas of the KWT academic building.

- Trenches/holes/excavations: shoring/benching, safe access/egress, dewatering (particularly given proximity to the on-site KWT pond and underground reservoir), barricades, no work under suspended loads, excavation permit.
- Confined/enclosed spaces (if any, e.g., substation room, lift machine rooms): testing, ventilation, standby person, rescue plan, permit system.
- Electrical safety: lockout/tagout; earthing; RCD/ELCB; insulated tools; qualified electricians only, especially around the KWT substation and electrical shaft works.
- Hazardous materials: SDS register; labeling; secondary containment; controlled decanting; spill kits.
- Flammable materials/gas cylinders: ventilated storage, segregation, flashback arrestors, hot-work permits.
- Cranes/hoists/lifting: lifting plan; certified slings; load charts; exclusion zones; competent rigger/signalman.
- Cutting/grinding/welding: spark control, screens, fire watch, eye/face protection, cylinder management.
- Dust suppression: water spraying, covered stockpiles, wheel washing if needed, enclosed cutting/grinding where practicable, given the sensitivity of the adjacent KWT hospital environment to dust.
- Spill prevention/response: bunded fuel storage, drip trays, emergency spill response procedure, with particular care to prevent spillage into the on-site KWT pond.
- Fire prevention/suppression: extinguishers at hot-work points and storage; no-smoking enforcement.
- Worksite hygiene: handwash stations, toilets, waste bins, drinking water; vector control to prevent mosquito breeding from ponding, particularly around the existing KWT pond and any temporary water storage on site..

4. Work Site Setup and Maintenance Specifications

- Provision and placement of fire suppression equipment
- Provision and placement of spill containment and cleanup supplies
- Safe storage spaces for hazardous, flammable and explosive materials
- Barriers and fencing
- Provision of adequate toilets based on worker population
- Provision of adequate wash-up facilities based on worker population
- Provision of unlimited drinking water meeting Nati standard for drinking water
- Provision of shaded break areas
- Food preparation and eating facilities

5. COVID-19 Containment and Prevention

- Practices as specified in ADB and GOB's Technical Guidance for Social and Institutional Containment and Prevention

6. Emergency Response Plan

- Designation of focal persons and 24/7 contact details
- Definition of chain of command
- Flowchart of response actions
- Identification, placement, labeling and upkeep of emergency response equipment
- Materials for use in training
- Emergency drill procedure and schedule

7. Training

- Induction training (content and timing)
- Refresher training (content and timing)

- Health and safety meetings
- Specialized tasks training (e.g., for heavy equipment operators and at-height workers)
- Emergency response training

8. Monitoring

- Site health and safety audits (methods, parameters, frequency, documentation)
- Spot check system
- Framework for follow-up and corrective action

Appendix 14 – Sample Outline of Asbestos-Containing Materials Removal and Disposal Plan

ASBESTOS-CONTAINING MATERIALS (ACM) REMOVAL AND DISPOSAL PLAN

(Note: ACM removal and disposal plan may not be applicable for Kumudini Nursing institute building construction, however a sample plan is presented here in case of hint of existence of ACMs during construction)

1. Plan Rationale and Requirements

- Objective of plan
- Description of demolition needs at site and reasons for suspecting presence of ACMs
- Bangladesh National Building Code specifications for ACM handling
- Roles and responsibilities for plan development, approval, implementation and supervision

2. Assessment of ACM Presence

- Inventory of suspected ACMs by structure
- Inventory of suspected ACMs by material type
- Engagement of accredited testing firm for sampling and analysis
- Estimated volume of non-friable ACMs
- Estimated volume of friable ACMs

3. ACM Removal Methodology

- Risk-reduction training for workers involved in removal and handling
- PPE provision (P100 respirators, full hazmat suits including hoods)
- Exclusion of non-essential workers from removal site
- Wetting and constant misting system for removal site
- Complete containment system for transportation
- Low-breakage removal and handling methods
- Temporary on-site containment and storage methods
- Post-removal inspection method

4. ACM Disposal Option Selection

- Assessment of on-site deep burial options (including identification of locations likely never to be disturbed by people or natural processes, either during construction or afterwards)
- Survey of locally available and legally sanctioned off-site disposal options (e.g., landfill equipped and accredited for ACM disposal)
- Rationale for chosen disposal solution

5. ACM Transport and Disposal Methodology

- Risk-reduction training for workers involved in handling and transport
- Complete containment system for transportation
- Deep burial specifications (on-site disposal)
- Low-breakage placement methods (on-site disposal)
- Misting system for disposal site (on-site disposal)

Appendix 15 – Sample Outline of Spill Prevention and Response Plan

SPILL PREVENTION AND RESPONSE PLAN

1. Plan Rationale and Requirements

- ☐ **Objective of plan:** Prevent and control small spills from construction activities; avoid contamination of soil, campus drains, and nearby surface water; ensure quick containment, cleanup, and proper disposal.
- ☐ **Description of storage spaces and transfer activities (site-specific):**
 - Temporary on-site storage of **diesel/petrol** for generators and machinery (if used), lubricating oils/grease, small containers of paints/solvents/adhesives, curing compounds, and cleaning chemicals.
 - **Transshipment/handling** mainly involves unloading by small trucks/pickups, refueling of equipment, oil changes/minor maintenance, and transfer of paint/chemical containers to storage.
- ☐ **Roles and responsibilities:**
 - **Contractor:** Prepare/implement plan; maintain spill kits; ensure bunding/secondary containment; keep SDS; report incidents.
 - **EHSO (Contractor):** Spill focal person, training, inspections, incident log.
 - **CSC / PIU (KWT) / ESFP:** Review, supervision, audit, and corrective actions; link to GRM where relevant.

2. Characterization of Hazardous and Noxious Cargo Risks

- ☐ **Fuels:** Diesel/petrol for generators, mixers, small equipment; risk during refueling and storage.
- ☐ **Oils/grease:** Hydraulic oil, engine oil, gear oil; risk during maintenance and leakage from machinery.
- ☐ **Paints/solvents/adhesives:** Thinners, epoxy, primers, sealants; risk from container damage and improper disposal.
- ☐ **Concrete additives (if used):** Plasticizers/curing agents; risk from container spills.
- ☐ **Flammable materials:** Solvents, fuels; ignition risk near hot works.
- ☐ **Explosive materials:** **Not applicable** (no explosives anticipated for this project).
- ☐ **Non-compatibility risks (site-specific):** Keep fuels/solvents segregated from oxidizers and from heat/hot-work zones; store acids/alkalis (if any cleaning agents) separately; maintain SDS-based segregation.

3. Scoping of Spill Scenarios

- ☐ **Minor vehicle incidents inside campus:** Low-speed collisions during delivery/unloading leading to small fuel/oil leaks.
- ☐ **Equipment leaks:** Hydraulic line failure; engine oil drip; generator fuel line leak.
- ☐ **Spills during refueling:** Overfilling, nozzle slip, poor housekeeping at refueling point.
- ☐ **Spills during container handling:** Dropped paint/solvent/chemical container; punctured container during stacking.
- ☐ **Spills from storage area:** Leaking container in store; rainwater entering storage causing overflow of contaminated water if not sheltered.
- ☐ **Fire risk associated with flammables:** Small fire from fuel/solvent near hot works (welding/cutting).
- ☐ **Monsoon rainfall interaction:** Runoff mobilizing spilled oil/chemicals toward campus drains; ponding spreading contamination (important due to local waterlogging tendencies).

3. Method Statements for Spill Prevention

- ☐ **Inventory and register:** Maintain a **Hazardous Materials Register** (type, quantity, storage location, SDS availability).
- ☐ **SDS and labeling:** SDS file on-site; all containers labeled; decanting only into labeled secondary containers.
- ☐ **Designated refueling area:**
 - Refuel only at a **designated, signed area** with **impervious base** (metal tray/HDPE sheet) and drip trays.
 - No refueling within **10 m of drains, low points, or ponded areas**; no refueling during heavy rain.
- ☐ **Secondary containment/bunding:**
 - Store fuel drums and oils on **bunded pallets/secondary containment trays** (110% of largest container capacity).
 - Store paints/solvents in a ventilated, shaded cabinet with spill tray.
- ☐ **Covered storage:** Keep hazardous materials under roof/canopy to prevent rainwater contact; elevate containers off ground.
- ☐ **Preventive maintenance:** Daily checks for leaks; immediate repair/removal of leaking equipment; absorbent pads under parked equipment if needed.
- ☐ **Housekeeping:** No oily rags left exposed; dedicated closed bins for oily waste; “no pouring to drains” rule.
- ☐ **Fire prevention controls:** Hot-work permit near flammables; extinguishers at storage and refueling points.

4. Spill Response and Cleanup Plan

- **Spill response team:** Name **Spill Focal Person (EHSO)** + alternates; include **24/7 contact**.
- **Chain of command:** Worker → Supervisor → EHSO → Site Manager → CSC/PIU notification (as per severity).
- **Response flow (simple):**
 1. Stop source (shut valve/right container/turn off engine)
 2. Isolate area (cordon, keep people away, remove ignition sources)
 3. Protect drains (block/cover nearest drain; use sandbags/absorbent booms)
 4. Contain and absorb (pads, granules)
 5. Collect waste (sealed bags/drums, label as hazardous waste)
 6. Clean surface (minimal water; no washing into drains)
 7. Dispose through approved channel (licensed handler where available / per Bangladesh rules)
 8. Record and report (incident log + corrective action)
- **Method statement: containment:** Drain covers, sandbags, absorbent socks/booms around spill perimeter; soil berm for bare ground.
- **Method statement: cleanup:** Absorbents first; remove contaminated soil (if any) to sealed container; wipe down; no detergent flushing to drains.
- **Treatment/disposal:** Store hazardous waste in dedicated labeled area; dispose via authorized pathway as agreed with PIU/CSC; maintain manifests/receipts.
- **Spill kits placement and upkeep:**
 - Spill kit at refueling point, chemical store, generator area, and maintenance area.
 - Minimum contents: absorbent pads/granules, booms/socks, drain covers, PPE (gloves, goggles), disposal bags, shovel, signage.
- **Notification protocols:**
 - Immediate internal notification to Site Manager/EHSO; notify CSC/PIU for any spill reaching drains/soil > minor threshold.
 - Notify DoE only if spill is significant, enters surface water, or requires off-site disposal guidance.

5. Training

- Training for spill response leaders (content, frequency, outside expertise needed)
- Training for other site personnel (content, frequency)
- Training for laborers involved in transshipment activity (content, frequency)

Appendix 16 – Consultation Records

Skills for Industry Competitiveness and Innovation Program (SICIP)

List of Participants for FGD

FGD. No. 21

Address: Kumbhari Welfare Trust

Date: 24/07/2025

Time:

[illegible]

Attendee list (SICIP)

1. F&D - 11 : Students.
Conducted by Kuchel Roy, Environmental
Specialist.
KUMUDINI WELFARE TRUST

S.NO.	NAME	OCCUPATION	CELL	SIGNATURE
01.	Abinash SHI	Student	01746990165	अबिनश
02.	रविशंकर शर्मा	Student	01999983163	रविशंकर
03.	AmantKishore	Student	01712574705	अमंत
04.	संजित राय	Student	01804022118	संजित
05.	Fareem Akter	Student	01751362451	Fareem
06.	संजय कुमार	Student	02029218822	संजय
07.	Thuma Paul	Student	01742512175	थुमा
08.	संजित राय	Student	01721521221	संजित
09.	Fareem Nazim	Student	01972350541	Fareem

Appendix 17 – Proposed Terms of Reference for Environment, Health and Safety Officers

The Environment, Health and Safety Officers (EHSOs) are critical to the timely and effective implementation of the EMP/EMoP, as they will be responsible for executing all compliance activities pertaining to the works and operations of the EA. The EHSOs will answer the Environmental Safeguards Focal Person (ESFP). The responsibilities of each EHSO are as follows:

- (i) Prepare site-specific monitoring checklists for assigned investment sites under the control of the EA, based on the contents of the EMP/EMoP, to assess site-level compliance with prescribed mitigation measures and effectiveness in meeting relevant National standards for key environmental parameters;
- (ii) Conduct compliance and effects monitoring on at least a monthly basis (including both regular inspections and spot checks) at all assigned investment sites under the control of the EA, and compile monitoring results in quarterly monitoring reports to the EA's ESFP;
- (iii) Support and collaborate with any outside entities contracted to conduct sampling, testing and analysis of environmental parameters, as identified in the EMP/EMoP, and incorporate their results into quarterly monitoring reports;
- (iv) Engage directly with site engineers to propose and ensure effective implementation of corrective actions needed to address emerging and recurrent problems, including both compliance issues and environmental effects that violate relevant National standards;
- (v) Design and orchestrate training for workers and site engineers as may be needed to forestall, correct or lessen emerging and recurrent problems with compliance and deleterious environmental effects derived from site activity;
- (vi) Facilitate and participate in any site visits conducted by officials of DOE, DIFE or other relevant regulatory agencies;
- (vii) Assist the ESFP with preparation of the EA's environmental reporting, including but not limited to its submissions to the PIU and/or SOU; and
- (viii) Prepare a Notification of Environmental Harm for immediate submission to DOE in the event of any serious release or other deleterious event occurring on any site under the EA's control, ensure rapid appropriate action by the Contractor, and coordinate follow-up with DOE as needed.

Appendix 18 – Outline of Semi-Annual Environmental Monitoring Report

The Program Steering Committee is required to submit semi-annual environmental monitoring reports to ADB, for review and public disclosure on the ADB website. The semi-annual reports will be produced by the Safeguards Oversight Unit. A sample report outline, which can be adapted as necessary, is provided below.

1. Introduction

- Report purpose
- Overview of subproject components and sites subject to monitoring
- Summary of project implementation progress

2. Review and Verification of Clearance History

- Clearances required and obtained
- Clearances due for renewal in upcoming monitoring period
- Clearance lapses and plans for reinstatement

3. Review of Contractor Environmental Monitoring Reports (CEMRs)

- Reports submitted/outstanding
- Quality of reports received and comments issued
- Issues of note from CEMRs, and contractor follow-up

4. Summary of Works and Prescribed Mitigation

- Major work activities by site
- Mitigation measures prescribed
- Ongoing corrective actions from previous monitoring period

5. Summary of Monitoring Activity

- number and dates of site visits
- monitoring methodology used

6. Monitoring Results

- instances of non-compliance
- violations of standards and observed negative environmental effects
- on-site communication with contractor personnel
- photographs

7. Corrective Action Required

- description and explanation of non-compliance or concerns noted
- required actions with timeframe and responsibility
- corrective actions undertaken in the current period
- corrective actions to continue into the next period

8. Attachments

- Notices of Non-Compliance issued
- Additional photographs

Appendix 19 – Sample Grievance Registration form

(Bangla translation to be available)

The **SICIP** welcomes complaints, suggestions, queries and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.

Should you choose to include your personal details but want the information to remain confidential, please inform us by writing/typing ***(CONFIDENTIAL)*** above your name.

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

FOR OFFICIAL USE ONLY

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

Appendix 20 – Outline of chance finds protocols

Scope of the chance find procedure

This procedure is applicable to all activities conducted by the personnel, including contractors, that have the potential to uncover a heritage item/site. The procedure details the actions to be taken when a previously unidentified and potential heritage item/site is found during construction activities. Procedure outlines the roles and responsibilities and the response times required from both project staff, and any relevant heritage authority.

Induction/Training

All personnel, especially those working on earth movements and excavations, are to be inducted on the identification of potential heritage items/sites and the relevant actions for them with regards to this procedure during the Project induction and regular toolbox talks.

Chance find procedure

If any person discovers a physical cultural resource, such as (but not limited to) archaeological sites, historical sites, remains and objects, or a cemetery and/or individual graves during excavation or construction, the following steps shall be taken:

1. Stop all works in the vicinity of the find, until a solution is found for the preservation of these artefacts, or advice from the relevant authorities is obtained;
2. Immediately notify a foreman. The foreman will then notify the Construction Manager and the Environment Officer (EO)/Environmental Manager (EM);
3. Record details in Incident Report and take photos of the find;
4. Delineate the discovered site or area; secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities take over;
5. Preliminary evaluation of the findings by archaeologists. The archaeologist must make a rapid assessment of the site or find to determine its importance. Based on this assessment the appropriate strategy can be implemented. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage such as aesthetic, historic, scientific or research, social and economic values of the find;
6. Sites of minor significance (such as isolated or unclear features, and isolated finds) should be recorded immediately by the archaeologist, thus causing a minimum disruption to the work schedule of the Contractor. The results of all archaeological work must be reported to the Ministry/Agency, once completed.
7. In case of significant find the Agency/Ministry should be informed immediately and in writing within 7 days from the find;
8. The onsite archaeologist provides the Heritage team with photos and other information as relevant for identification and assessment of the significance of heritage items.
9. The Ministry must investigate the fact within 2 weeks from the date of notification and provide response in writing.
10. Decisions on how to handle the finding shall be taken by the responsible authorities. This could include changes in the layout (such as when finding an irremovable remain of cultural or archaeological importance) conservation, preservation, restoration and salvage;
11. Construction works could resume only after permission is granted from the responsible authorities.
12. In case no response received within the 2 weeks period mentioned above, this is considered as authorization to proceed with suspended construction works.

One of the main requirements of the procedure is record keeping. All finds must be registered. Photolog, copies of communication with decision making authorities, conclusions and recommendations/guidance, implementation reports kept.

Appendix 21 – Sample Gender-Based Violence (GBV) and Sexual Exploitation, Abuse and Sexual Harassment (SEA-SH) Action Plan

1. Objectives

The GBV/SEA-SH Action Plan aims to:

- Prevent incidents of sexual exploitation, abuse, and harassment associated with construction and operation of academic facilities
- Establish clear standards of behavior for workers, staff, and service providers
- Ensure safe, confidential, and survivor-centered grievance handling
- Promote a respectful and secure learning and working environment

2. Key Risks Identified

Risk Area	Typical Risk
Construction workforce	Harassment of students, staff, visitors; abuse of authority
Campus public areas	Inappropriate behavior in corridors, stairwells, parking, toilets
Power imbalance	SEA risks involving workers/security/service staff
Weak reporting	Underreporting due to fear, stigma, lack of confidentiality

3. Prevention Measures

3.1 Code of Conduct (Mandatory)

All contractors, subcontractors, security staff, cleaners, and facility staff shall:

Sign a GBV/SEA-SH Code of Conduct prohibiting:

Sexual harassment

Exploitation or coercion

Any sexual activity with minors

Verbal/physical abuse

Receive induction training before starting work

- Sanctions: warning, suspension, termination, referral to authorities (as applicable)

3.2 Awareness & Training

Target Group	Frequency	Key Topics
Construction workers	At mobilization + quarterly	CoC, respectful conduct, sanctions
Security & facility staff	Twice yearly	Complaint handling, survivor sensitivity
Students & staff	Orientation + annual session	Rights, reporting channels, zero tolerance

4. Safe Campus Measures

- Adequate lighting in corridors, stairwells, entrances, parking areas
- CCTV in public/common areas (not private spaces)
- Controlled access during construction and after hours
- Regular security patrols

5. Grievance Redress for GBV/SEA-SH

5.1 Reporting Channels

- Dedicated phone number / hotline
- Email or online form
- Complaint box
- Direct contact with trained female focal person

5.2 Handling Principles

- Confidentiality
- No retaliation
- Informed consent
- Respect and dignity
- Rapid response

5.3 Response Steps

- Receive complaint safely
- Immediate protection if needed
- Referral to medical/legal/psychosocial services (if requested)
- Investigation & disciplinary action
- Documentation (anonymous coding)

6. Institutional Responsibilities

Role	Responsibility
Project/Institution Head	Overall enforcement
Environmental/Social Focal Person	Monitoring & reporting
Contractor	CoC enforcement & worker training
Security Unit	Safe access & response
GRM Committee	Case handling

7. Monitoring Indicators

- % of workers trained on CoC
- Number of awareness sessions held
- GRM functional with SEA-SH channel established
- Number of complaints addressed within timeframe
- Lighting/CCTV operational records

Appendix 22 – Standard Operating Procedures (SOPs) for Biomedical and Laboratory Waste Management

1. Purpose and Scope

This SOP establishes procedures for safe segregation, handling, storage, transport, treatment, and disposal of biomedical and laboratory wastes generated from nursing training laboratories, clinical practice rooms, simulation wards, and minor diagnostic activities within the Kumudini Nursing Institute.

The SOP applies to:

- Students, faculty, lab technicians, cleaning staff, waste handlers, and facility management
- All biomedical and laboratory waste generated during academic operations

The objective is to:

- Prevent infection, injury, and environmental contamination
- Ensure compliance with Government of Bangladesh biomedical waste regulations and good international practice
- Protect campus users and surrounding drainage and water bodies

2. Categories of Waste (Site-Specific)

A. Biomedical Waste

- Used gloves, masks, cotton, gauze, dressings
- Syringes and needles (sharps)
- Blood/body fluid-contaminated materials (from training simulations)
- Discarded medicines (small quantity for training)

B. Laboratory Waste

- Sample containers (non-infectious after disinfection)
- Chemical reagent residues (small teaching quantities)
- Broken glassware
- Culture plates/media (if used in microbiology demonstrations)

C. General Waste (non-hazardous)

- Paper, packaging, food waste, uncontaminated plastics

3. Waste Segregation at Source (Mandatory)

All waste must be segregated immediately at point of generation using **color-coded containers**:

Waste Type	Container Color	Examples
Infectious biomedical waste	Red	Soiled cotton, gloves, dressings
Sharps	Yellow puncture-proof box	Needles, blades, syringes
Chemical & lab waste	Blue	Reagent containers, broken glass
General waste	Black/Green	Paper, food, clean plastics

Key rules:

- No mixing of hazardous and general waste
- Sharps NEVER placed in plastic bags
- Containers kept covered and labeled

4. Collection Procedures

- Waste collected **at least once daily** (twice during peak practical sessions)
- Only trained waste handlers allowed to collect biomedical/lab waste

- Handlers must wear: gloves, mask, apron, closed shoes
- Sharps boxes sealed when $\frac{3}{4}$ full and replaced immediately

5. Temporary Storage (On-Site)

- Dedicated **Biomedical Waste Storage Room** within building or campus service zone
- Must be:
 - Covered, ventilated, lockable
 - Away from classrooms, drains, and food areas
- Storage time:
 - Not more than **24 hours** for infectious waste
 - Not more than **48 hours** for treated/disinfected waste

6. Disinfection and Pre-Treatment (Small-Scale)

Before off-site disposal or transfer:

- **A. Infectious Waste**
 - Spray or soak with **1% chlorine solution** for minimum 30 minutes
 - Drain excess liquid safely
- **B. Laboratory Cultures (if used)**
 - Autoclave or chemical disinfection before disposal
- **C. Liquid Waste**
 - Neutralize (if chemical) or disinfect (if biological) before discharge to sewer as per institutional approval

7. Off-Site Transport and Final Disposal

- Waste transferred only to:
 - Authorized biomedical waste treatment facility, OR
 - Approved hospital/KWT waste system (if integrated)

Prohibited:

- Open dumping
- Burning on campus
- Disposal into drains or open soil

Sharps must be incinerated or treated as per approved biomedical waste procedures.

8. Spill and Exposure Management

- **A. Waste Spills**
 1. Isolate area
 2. Wear PPE
 3. Absorb with disinfectant-soaked material
 4. Collect in red waste bag
 5. Clean surface with chlorine solution
- **B. Needle Stick Injury**
 - Wash immediately with soap and water
 - Report to supervisor
 - Seek medical evaluation
 - Record incident

9. Roles and Responsibilities

- **Nursing Institute Management**
 - Provide bins, PPE, storage room, and contracts with waste disposal service
 - Ensure compliance
- **Laboratory Instructors/Staff**

- Enforce segregation
- Supervise students
- **Waste Handlers**
- Safe collection, transport, disinfection
- **Safeguards/Facility Officer**
- Monitoring, training, record keeping

10. Training Requirements

- Induction training for all students and staff
- Annual refresher training
- Posters displayed in labs and waste rooms
- Demonstrations on segregation and sharps handling

11. Monitoring and Documentation

Maintain records of:

- Daily waste quantity by category
- Disinfection logs
- Disposal receipts
- Incident/accident register
- Training attendance

Monthly internal audits by facility management.

12. Emergency Contacts

- Waste focal person
- Campus medical unit
- Facility manager
- Local authorized waste disposal service

- **Compliance Statement**

All biomedical and laboratory waste management at Kumudini Nursing Institute shall comply with:

- Government of Bangladesh biomedical waste regulations
- Institutional environmental management procedures
- ADB good practice for health and educational facilities