

# Initial Environmental Examination

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December 2019

**BAN: Improving Computer and Software  
Engineering Tertiary Education Project –  
Bangladesh University of Engineering and  
Technology**

Prepared by the University Grants Commission of the Ministry of Education for the Asian  
Development Bank

## CURRENCY EQUIVALENTS

(as of 20 November 2019)

Currency unit	–	taka (Tk)
Tk1.00	=	\$0.012
\$1.00	=	Tk84.970

## ABBREVIATIONS

ADB	–	Asian Development Bank
CASE	–	Clean Air and Sustainable Environment
CSE/IT	–	computer science and engineering and information technology
DOE	–	Department of Environment
ECA	–	Environment Conservation Act
ECE	–	Electrical and Computer Engineering
ECC	–	environmental clearance certificate
ECR	–	Environment Conservation Rules
ECoP	–	Environmental Codes of Practice
EHS	–	Environmental, Health, and Safety
EIA	–	environmental impact assessment
EMP	–	environmental management plan
EMoP	–	environmental monitoring plan
GOB	–	Government of Bangladesh
GRC	–	grievance redress committee
GRM	–	grievance redress mechanism
IEE	–	initial environmental examination
MOE	–	Ministry of Education
MOEF	–	Ministry of Environment and Forests
NO <sub>2</sub>	–	nitrogen dioxide
PIU	–	project implementing unit
PMU	–	project management unit
PPE	–	personal protective equipment
SPS	–	Safeguard Policy Statement
UGC	–	University Grants Commission

## WEIGHTS AND MEASURES

°C	–	degrees Celsius
dB(A)	–	A-weighted decibel
ha	–	hectare
lac	–	100,000
m	–	meter
mm	–	millimeter
mg/L	–	milligram per liter
m <sup>2</sup>	–	square meter
µg/m <sup>3</sup>	–	microgram per cubic meter
PM <sub>2.5</sub>	–	particulate matter 2.5
PM <sub>10</sub>	–	particulate matter 10
ppm	–	parts per million

**NOTE**

In this report, "\$" refers to United States dollars.

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## EXECUTIVE SUMMARY

### Introduction

The Government of Bangladesh (GOB) through the Ministry of Education (MOE) requested the Asian Development Bank (ADB) for financing of about \$100M to cover the costs of the Improving Computer and Software Engineering Tertiary Education Project, which aims to improve the relevance and quality of computer science and engineering and information technology (CSE/IT) programs in selected universities. These universities are (i) Bangladesh University of Engineering and Technology (BUET), (ii) East West University (EWU), (iii) Jashore University of Science and Technology (JUST), and (iv) University of Dhaka (DU).

The project is expected to strengthen the preparation of graduates to take on jobs, improve the connection with industries to understand their requirements for human resources, and create the required environment in developing the skills for entrepreneurs relevant to CSE/IT.

### Project Description

The proposed project will help improve relevance and quality of CSE/IT programs in selected universities. It aims to increase job-ready graduates, increase research and development (R&D) capacity through industry collaboration and interdisciplinary research projects, and develop technology entrepreneurs. These objectives will be delivered through the following four outputs.

Output	Description
Output 1: Modern learning, research, and startup facilities established	<p>The Improving Computer and Software Engineering Tertiary Education Project will support the four universities in developing classrooms, laboratories, industry collaboration, start-up or incubation space, and auxiliary facilities.</p> <p>The project will establish the supporting environment, which will include adopting green building features such as energy efficiency and water-saving and climate- and disaster-resilient design; accessibility for persons with disabilities; female-friendly amenities such as students' study areas and staff lounges; and safety features like access control system, increased lighting at night, and video surveillance system.</p>
Output 2: Quality and industry-relevance of CSE/IT programs enhanced	<p>The project will assist the universities in updating and improving their CSE/IT degree programs through the use of new technologies, blended learning, and industry-demanded soft-skills; and in strengthening their existing digital libraries to ensure that they are aligned with international standards.</p> <p>JUST will set up an industry certification center for information and communication technology (ICT) professionals in the southwest region. JUST, DU, and BUET will provide undergraduate scholarships to attract more female students to CSE/IT. There will be support to enable the ICT industry to introduce flexible working hours, and telecommuting to boost women participation in the ICT industry.</p>
Output 3: R&D and technology entrepreneurship strengthened	<p>The University Grants Commission will provide grants on the following research initiatives: (i) industry collaboration for addressing industry problems or developing new products or services, (ii) interdisciplinary work on ICT solutions that</p>

Output	Description
	associate with other areas to develop new products or services, (iii) cutting-edge CSE/IT research, and (iv) ICT solutions to address disability issues. Research proposals can be developed together with foreign universities. There would also be support in introducing training programs on technology entrepreneurship as well as rules and incentives to encourage more university-based start-ups and spin-off firms using the facility in output 1.
Output 4: Tertiary education project design and management capacity strengthened	The project will support the Government of Bangladesh in carrying out background studies, feasibility studies, and project preparatory activities for new tertiary education initiatives in priority economic sectors. It will provide the required resources for effective project implementation and management.

BUET = Bangladesh University of Engineering and Technology, CSE/IT = computer science and engineering and information technology, DU = University of Dhaka, EWU = East West University, ICT = information and communication technology, JUST = Jashore University of Science and Technology, R&D = research and development.

Source: University Grants Commission.

From Output 1, the new building for BUET (Electrical and Computer Engineering Annex Building) will involve a new, fully-furnished and complete 11-storey building of about 11, 856 square meters (m<sup>2</sup>) to accommodate a maximum of 2,150 graduate and postgraduate students; 150 faculty members (or planned for 2,700 persons per year intake); computing and ICT Incubator (about four floors), which will accommodate 20 entrepreneurs for R&D; and other features. The new building will also incorporate green building features and be designed to be climate change resilient.

**Implementation Arrangements**

The MOE will be the executing agency acting through the University Grants Commission (UGC), while the key implementing agencies are BUET, DU, EWU, and JUST. A project management unit (PMU) will be set up at UGC, and project implementation units (PIUs) in the four universities will be responsible for the day-to-day management, monitoring, reporting, and coordination during implementation.

**Environmental Requirements**

The main environmental regulations in Bangladesh are the Environment Conservation Act (ECA) 1995 and the Environment Conservation Rules (ECR) 1997, which provide that no project or industrial unit can be undertaken without securing an environmental clearance certificate (ECC) from the Department of Environment (DOE). However, under President’s Order No. 10 of 1973, UGC has autonomy in university education; and among others, in examining development plans within the universities. In this case, UGC is not within the purview of ECA 1995 and ECR 1997. The universities have their own development planning, engineering, and maintenance units with adequate staff that oversee the projects needed to ensure the sustained provision of education in Bangladesh.

ADB’s Safeguard Policy Statement (SPS) 2009 sets out the requirements for environmental safeguard that applies to all ADB-financed projects and grants. Under SPS 2009, projects or grants are screened and categorized based on their potential environmental impacts.

Output 1 will involve construction of three new buildings in BUET, DU, and JUST; and renovation works at EWU. These interventions will have potential environmental impacts, and thus, following

SPS 2009, the project has been classified as category B on environment requiring the preparation of an initial environmental examination (IEE). Based on the requirements of SPS 2009, this IEE is prepared and will be publicly disclosed on the ADB website. Aside from SPS 2009, the disclosure of IEE is also required by the ADB's Access to Information Policy.

The IEE prepared for the project is presented in four volumes to cover the four implementing universities: (i) Volume 1: JUST; (ii) Volume 2: BUET, (ii) Volume 3: DU, and (iv) Volume 4: EWU. This Volume 2 of the IEE will discuss the due diligence of the new building for BUET.

## **Description of the Existing Environment**

The new Electrical and Computer Engineering Annex Building (ECE Annex Building) in BUET will be located in the West Palashi Campus. Based on the Köppen climate classification, the project area belongs to "Aw" category, which is characterized by tropical wet and dry climate (hot and humid summer and dry winter). According to Dhaka Station of the Bangladesh Meteorological Department, the maximum monthly temperature varies from 39.6°C to 30.1°C, while the minimum temperature ranges from 22.5°C to 6.5°C. Annual average rainfall is 2,066 millimeters (mm) and the highest rainfall recorded was 3,028 mm, which occurred in 1984.

The project site is in the urban area with no identified ecologically sensitive areas close or adjacent to the site. Dhaka falls under seismic zone II (moderate seismic risk) and is subject to normal flooding during the monsoon season (June to September).

DOE maintains three continuous air monitoring stations in Dhaka under the Clean Air and Sustainable Environment Project funded by the World Bank. The three stations are Sangshad Bhavan, Sher-e-Bangla Nagar, Farmgate, and Darus-salam. Based on their results from January to May 2019, particulate matter 10 micrometers (PM<sub>10</sub>), particulate matter 2.5 micrometers (PM<sub>2.5</sub>), and nitrogen dioxide (NO<sub>2</sub>) exceed the limits set by National Ambient Air Quality Standards (2005). Ambient air sampling was done on 4 April 2019 in three sampling stations within the 500meter (m) radius from the project site. Results suggest that the station across the project site (Polashi Bazar Market) has more air pollution sources than in the Eden Mohila College, and in front of the existing ECE Building in BUET (West Palashi Campus). Noise level was similarly measured on 4 April 2019 in the same stations, and results suggest that Polashi Bazar Market exceeded the daytime and nighttime levels set by the Noise Pollution Control Rules 2006. Source of drinking water at the project site was tested on 30 March 2019 for heavy metals (arsenic, cadmium, chromium, and lead); fecal coliform; and pH. Results show that it meets the standards set by Schedule 3(b), Rule 12 of ECR 1997 and the World Health Organization (WHO).

Vegetation in the project site is limited, with less than 10 mature trees and some patches of grass.

## **Anticipated Impacts and Mitigation Measures**

The new building will incorporate green building features that aim to reduce energy and water consumption, and thus is also expected to be a climate change-resilient building. These features are included in the budget with estimated cost of about \$3.1853 million which will cover construction materials, energy-efficient lighting systems and electric fans, and relevant Energy Star-certified products. The use of energy-efficient lighting and cooling equipment as a result of incorporating green building features will contribute to an estimate of about 167.03 tCO<sub>2</sub> emissions reduction per year.

Prior to construction works, the PMU in UGC and the PIU in BUET will ensure that the Contractor's responsibilities will include compensating for any temporary damage, loss, or inconvenience as a result of accident or failure to comply with regulations in implementing the project. PMU and PIU together with the environmental safeguard consultant will conduct an orientation for the Contractor and their workers about their responsibility to comply with environmental requirements, be aware of diseases such as HIV/AIDS and tuberculosis and adhere to best practices in construction on occupational health and safety.

Associated environmental impacts are mainly during construction such as increased noise and dust levels; occupational and community safety risks; generation of waste; movements of construction vehicles; presence of workers within the premises of BUET; and similar impacts due to civil, mechanical, and electrical works for the new building. The Contractor will be required to prepare a construction management plan describing the commitments to implement measures in managing these temporary impacts, and details on compliance with the environmental management plan. Waste that may be generated during project implementation will be disposed in designated disposal site approved by Dhaka South City Corporation (DSCC). After the separation of Dhaka City Corporation into north and south, BUET is under the jurisdiction of DSCC. There are four secondary transfer station (STS) in DSCC funded by ADB and it will likely be STS 12 for BUET which is located in front of Dhaka Medical College.<sup>1</sup> Final disposal for garbage generated from DSCC will be the Matuail landfill site about 6.5 km from BUET.

The construction site will be temporarily enclosed with clear and proper demarcation to separate access of university students, faculty, and administrative staff. The Contractor will designate security personnel to prevent unauthorized access to the construction site. The use of personal protective equipment and safety gear such as hard hats, working gloves, earmuffs, goggles, masks, and similar safety protection will be mandatory. The Contractor will provide sanitary facilities, safe drinking water, first aid kit, and fire-fighting system. Good housekeeping at the work site and temporary space during break time will be enforced at all times. Toolbox meetings will be conducted daily prior to start of work to reinforce the importance of safety in the workplace and compliance with construction site rules and regulations.

The PIU will ensure that ambient air quality limits set by the International Finance Corporation–World Bank Environmental, Health, and Safety General Guidelines 2007, or IFC–WB EHS General Guidelines 2007; the Bangladesh National Ambient Air Quality Standards (2005); and the Noise Pollution (Control) Rules 2006 will not be exceeded during construction. The PIU and the environmental safeguard consultant will monitor compliance of the Contractor.

### **Analysis of Alternatives**

No alternative site was considered for the new ECE Annex Building as this is the best option in terms of ownership, adequate area, and availability. The “no project” option will mean that the vacant space behind the ECE Building in West Palashi Campus of BUET will not have its best and highest usage of land. At the same time, the undergraduate and graduate students, faculty, and staff of CSE Department will not have the opportunity to benefit from innovative ICT learning environment that the new ECE Annex Building will provide.

“With project” option entails that the demand for ICT graduates to meet the requirements of the ICT industry will be met; temporary jobs for skilled and nonskilled workers during construction will

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<sup>1</sup> Loan 2554/Loan 2555-Bangladesh: *Urban Public and Environmental Health Sector Development Program* approved on 28 September 2009.

be created; and there will be more options for R&D, training, and links to the private sector that are expected to improve chances of graduates for employment.

### **Information Disclosure, Consultation, and Participation**

A total of 61 participants joined the consultation meeting on 3 April 2019 in the West Palashi Campus of BUET. Issues raised were participation of students not from CSE Department in the opportunities that will be provided by the project, behavior of Contractor and workers, alternate access of Contractor and workers to ensure separation from students, potential traffic during construction, emergency preparedness for the new ECE Annex Building, and temporary accommodation for students due to traffic. Participants were not extremely concerned about increased noise and dust level given that the West Palashi Campus is secluded, bounded by a high concrete fence, and existing academic buildings are insulated from noise. The PIU in BUET will ensure that these concerns are taken into consideration in the building design and during the construction phase.

Consultations will continue during project implementation. A project brief (a one-page flyer or a question-and-answer [Q&A] sheet) both in English and Bangla will be made available at the PIU, construction site office, PMU, and BUET administration office. The project brief will be posted to the BUET website. The IEE, which provides more information, will be posted to the ADB website following SPS 2009 and Access to Information Policy 2019.

### **Grievance Redress Mechanism**

The PMU at UGC will establish a grievance redress mechanism (GRM) to deal with potential complaints that may be lodged against the project. The GRM will include the creation of a grievance redress committee (GRC), which may consist of the PMU head, local government representative, representative of the Contractor, and witness of the complainant. The environmental safeguard consultant at the PMU will act as the secretary of the GRC. Complaints can be lodged either in person to the Site Engineer, in writing, or by phone. A complainant can seek redress in three tiers: (i) through the site engineer of the Contractor or PIU level, (ii) through the GRC, and (iii) or through the DOE under the Environment Court Act 2010. The complainant is not restricted to seek redress through the legal system at any point in the GRM process.

The PIU will disclose details on GRM through the project website of BUET as well as on billboards at the construction site. Details will include the contact person, a hotline phone number, and a simplified flowchart on how to file a complaint. If needed, the environmental safeguard consultant will provide assistance to the affected person in submitting a complaint.

### **Environmental Management Plan**

The environmental management plan (EMP) describes the measures to be implemented to ensure that the identified impacts during construction and post-construction are mitigated. The EMP includes an environmental monitoring plan (EMoP) that identifies the parameters to be monitored, frequency of monitoring, location, implementing responsibility, and supervision. The cost of implementing the EMP and the EMoP will be part of the Contractor's budget.

As soon as the project becomes effective, the PIU through the PMU will prepare environmental monitoring reports to be submitted to ADB semi-annually during construction and annually post-construction. These monitoring reports will be posted in the ADB website following the requirements of SPS 2009, and Access to Information Policy 2019. The PIU will designate a staff

to coordinate with the environmental safeguard consultant at the PMU in submitting environmental monitoring reports and other concerns on environmental safeguard compliance.

### **Conclusion and Recommendation**

While the project will have associated environmental impacts during the construction phase, overall, it will have significant contribution in advancing the goals of Vision 2021 through improving computer and software engineering tertiary education.

The project is environment category B based on SPS 2009 and an IEE was prepared. Stakeholders were consulted and a grievance redress mechanism will be set up consistent with the requirements of SPS 2009. Potential environmental impacts of the project are mainly during construction, which are considered temporary, of short duration, and can be easily mitigated through the implementation of the EMP and EMoP, compliance of the Contractor with the approved building design and relevant regulations, and compliance monitoring by the PIU. An environmental safeguard consultant will provide the required technical support to the PIU and the PMU in ensuring that the environmental requirements of ADB are complied with.

## I. INTRODUCTION

1. To celebrate its 50<sup>th</sup> year of independence, Bangladesh launched Vision 2021, which embodies measures to achieve eight identified goals. These goals reflect a future Bangladesh as an economically inclusive and politically accountable society.<sup>2</sup> These goals are (i) to become a participatory democracy; (ii) to have an efficient, accountable, transparent, and decentralized system of governance; (iii) to become a poverty-free middle-income country; (iv) to have a nation of healthy citizens; (v) to develop a skilled and creative human resource; (vi) to become a globally integrated regional economic and commercial hub; (vii) to be environmentally sustainable; and (viii) to be a more inclusive and equitable society.

2. Part of the goal to develop a skilled and creative human resource is to ensure that Bangladesh will be known as a country of educated people with skills in information technology. In addition, one of the outcomes visualized for education, training, and skills development in Vision 2021 is to have established an informed, knowledge-based, technology-oriented, and gender-equitable learning system.<sup>3</sup>

3. To achieve these goals, the Government of Bangladesh (GOB) through the Ministry of Education (MOE), requested the Asian Development Bank (ADB) for financing of about \$100M to cover the costs of the Improving Computer and Software Engineering Tertiary Education Project, which is expected to improve the relevance and quality of computer science and engineering and information technology (CSE/IT) programs in selected universities. These universities are (i) Bangladesh University of Engineering and Technology (BUET), (ii) East West University (EWU), (iii) Jashore University of Science and Technology (JUST), and (iv) University of Dhaka (DU).

4. Following requirements of ADB's Safeguard Policy Statement (SPS) 2009, the environmental assessment for the project is presented as follows:

Volume 1: Initial Environmental Examination (IEE) of JUST

Volume 2: IEE of BUET

Volume 3: IEE of DU

Volume 4: IEE of EWU

5. The IEE for each university is based on the environmental impact assessment (EIA) format given in the Annex to Appendix 1 of SPS 2009, pp. 41–43.

### A. Overview of the Project

6. The Improving Computer and Software Engineering Tertiary Education Project is expected to strengthen the preparation of graduates to take on jobs, improve the connection with industries to understand their requirements for human resource, and to create the required environment in developing the skills for entrepreneurs relevant to CSE/IT. Table 1.1 presents the four project outputs while Map 1.1 presents the project location.

**Table 1.1: Project Outputs**

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<sup>2</sup> Center for Policy Dialogue. 2007. *Bangladesh Vision 2021*. <http://cpd.org.bd/wp-content/uploads/2007/08/Bangladesh-Vision-2021-English.pdf>.

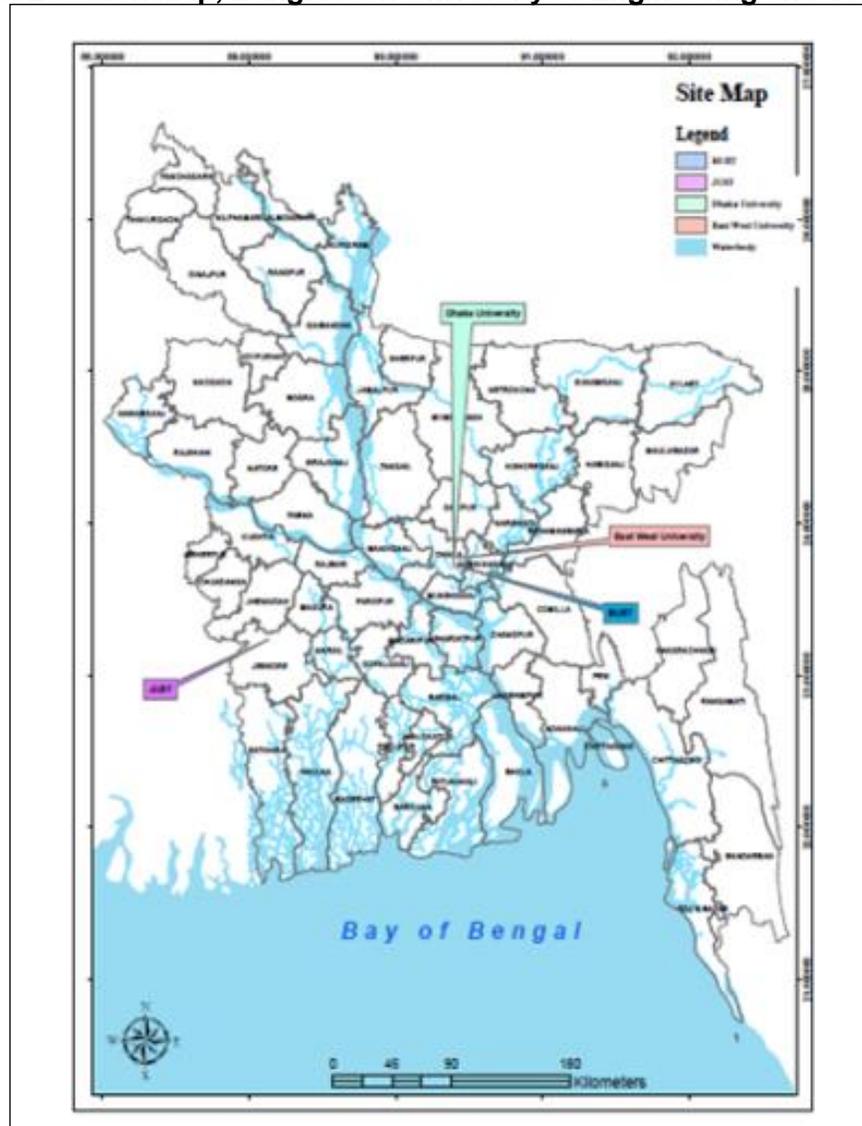
<sup>3</sup> Government of the People's Republic of Bangladesh, General Economics Division. 2010. *Outline Perspective Plan of Bangladesh 2010–2021, Making Vision 2021 A Reality*. [https://unctad.org/meetings/en/Contribution/dtl\\_eWeek2018c03-bangladesh\\_en.pdf](https://unctad.org/meetings/en/Contribution/dtl_eWeek2018c03-bangladesh_en.pdf).

Output	Description
Output 1: Modern learning, research, and startup facilities established	<p>The Improving Computer and Software Engineering Tertiary Education Project will support the four universities in developing classrooms, laboratories, industry collaboration, start-up or incubation space, and auxiliary facilities.</p> <p>The project will establish the supporting environment, which will include adopting green building features such as energy efficiency and water-saving and climate- and disaster-resilient design; accessibility for persons with disabilities; female-friendly amenities such as students' study areas and staff lounges; and safety features like access control system, increased lighting at night, and video surveillance system.</p>
Output 2: Quality and industry-relevance of CSE/IT programs enhanced	<p>The project will assist the universities in updating and improving their CSE/IT degree programs through the use of new technologies, blended learning, and industry-demanded soft-skills; and in strengthening their existing digital libraries to ensure that they are aligned with international standards.</p> <p>JUST will set up an industry certification center for information and communication technology (ICT) professionals in the southwest region. JUST, DU, and BUET will provide undergraduate scholarships to attract more female students to CSE/IT. There will be support to enable the ICT industry to introduce flexible working hours, and telecommuting to boost women participation in the ICT industry.</p>
Output 3: R&D and technology entrepreneurship strengthened	<p>The University Grants Commission will provide grants on the following research initiatives: (i) industry collaboration for addressing industry problems or developing new products or services, (ii) interdisciplinary work on ICT solutions that associate with other areas to develop new products or services, (iii) cutting-edge CSE/IT research, and (iv) ICT solutions to address disability issues. Research proposals can be developed together with foreign universities.</p> <p>There would also be support in introducing training programs on technology entrepreneurship as well as rules and incentives to encourage more university-based start-ups and spin-off firms using the facility in output 1.</p>
Output 4: Tertiary education project design and management capacity strengthened	<p>The project will support GOB in carrying out background studies, feasibility studies, and project preparatory activities for new tertiary education initiatives in priority economic sectors. It will provide the required resources for effective project implementation and management.</p>

BUET = Bangladesh University of Engineering and Technology, CSE/IT = computer science and engineering and information technology, DU = University of Dhaka, EWU = East West University, GOB = Government of Bangladesh, JUST = Jashore University of Science and Technology, R&D = research and development.

Source: University Grants Commission.

**Map 1.1: Project Location Map, Bangladesh University of Engineering and Technology**

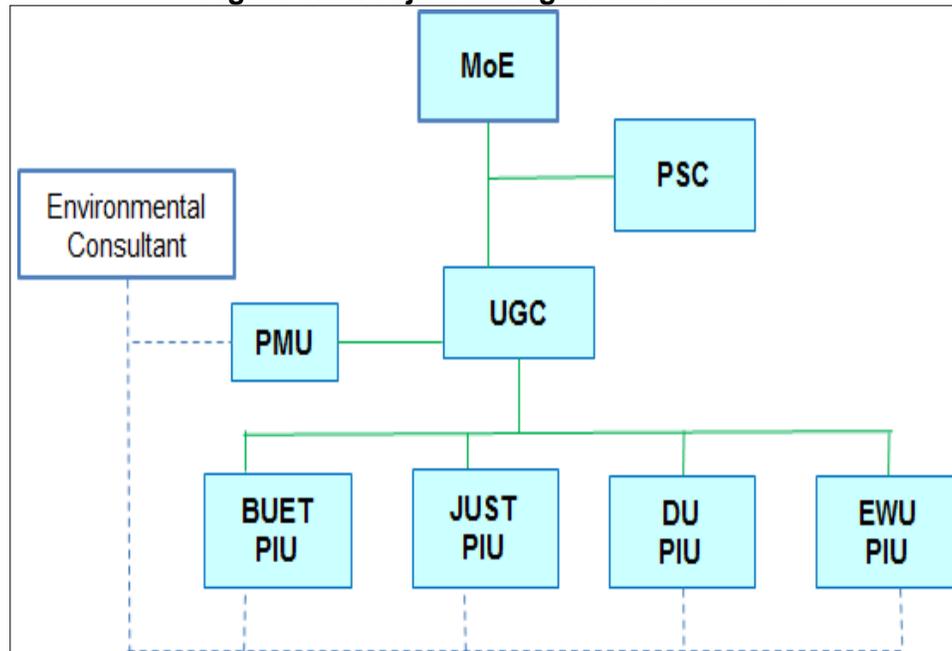


## **B. Project Implementation Arrangements**

7. The MOE will be the executing agency acting through the University Grants Commission (UGC), while the key implementing agencies are BUET, DU, EWU, and JUST. A project management unit (PMU) will be set up at UGC, and project implementation units (PIUs) in the four universities will be responsible for the day-to-day management, monitoring, reporting, and coordination during implementation. A project steering committee will be arranged at the MOE to provide guidance and direction, monitor, and review the overall progress and outputs of project implementation. The project steering committee will be chaired by the Secretary, MOE with representatives consisting of UGC chairperson, assigned UGC member, vice chancellors of the four universities, and representatives from other agencies. The project steering committee will ensure that the project achieves the targets and outcomes, and coordinate in resolving potential issues during implementation.

8. An environmental safeguard consultant will be engaged intermittently until the completion of construction phase (about 2 years) to provide technical support to the PMU and PIUs in compliance with environmental requirements of ADB, and the building construction requirements of the government. The project is expected to be implemented from January 2020 until June 2025. Figure 1.1 presents the project management structure.

**Figure 1.1: Project Management Structure**



BUET = Bangladesh University of Engineering and Technology, DU = University of Dhaka, EWU = East West University, JUST = Jashore University of Science and Technology, MOE = Ministry of Education, PIU = project implementation unit, PMU = project management unit, PSC = project steering committee, UGC = University Grants Commission.

### **C. Need for Environmental Assessment**

#### **(i) Requirements of the Government**

9. The Environment Conservation Act (ECA) 1995 and the Environment Conservation Rules (ECR) 1997 are the main environmental regulations in Bangladesh, which provide that no project or industrial unit can be undertaken without securing an environmental clearance certificate (ECC) from the Department of Environment (DOE). The DOE is the government agency authorized to regulate and enforce environmental management regulations to ensure that development projects are implemented sustainably, and to conserve and manage the environment in Bangladesh.

10. However, under President's Order No. 10 of 1973, UGC has autonomy in university education; and among others, in examining development plans within the universities. In this case, UGC is not within the purview of ECA 1995 and ECR 1997. The universities have their own development planning, engineering, and maintenance units with adequate staff that oversee the projects needed to ensure the sustained provision of education in Bangladesh.

## **(ii) Requirements of ADB**

11. The Safeguard Policy Statement (SPS) 2009 of ADB sets out the requirements for environmental safeguard that apply to all the projects and grants ADB finances.<sup>4</sup>

12. SPS 2009 requires that projects to be funded by ADB will be subject to screening and categorization based on their potential environmental impacts. The categorization determines the required environmental assessment.

13. Given the associated civil works that will be involved in the construction of the new buildings, the project is classified as category B on environment requiring an initial environmental examination (IEE). A category B project is considered likely to have adverse environmental impacts that are less adverse, site-specific, few if any of them irreversible, and in most cases mitigation measures can be more readily designed.

## **D. IEE Methodology**

### **(i) Objectives**

14. Preparation of an IEE aims to (i) describe the existing environment; (ii) assess the potential environmental impacts of the proposed project; (iii) identify the mitigation and/or enhancement measures corresponding to the potential environmental impacts identified; (iv) describe the environmental management and monitoring plan to be implemented and complied with; and, (v) ensure that all the statutory regulatory requirements relevant to the project have been identified and considered, to understand what requires compliance.

### **(ii) Scope**

15. This IEE was prepared following the requirements of SPS 2009 of ADB. The scope covers the general existing environmental profile of the project site, assessment of potential environmental impacts during design and/or pre-construction, construction, and operation (or post-construction) stages; and a description of the environmental management plan (EMP) and environmental monitoring plan (EMoP). The following steps were considered:

- (i) Undertake site visits to collect relevant secondary data to establish the baseline environmental condition.
- (ii) Assess the potential impacts due to location, design, construction and post-construction of the CSE/IT building.
- (iii) Examine opportunities for environmental enhancement and identify measures.
- (iv) Prepare an EMP outlining the measures to mitigate potential environmental impacts including the institutional arrangements.
- (v) Identify key environmental parameters required to be monitored during project implementation and prepare an EMoP.
- (vi) Carry out consultation with affected stakeholders and local administrative bodies to identify perceptions of the project and introduce project components and anticipated impacts.
- (vii) Disclose the draft IEE on the ADB website and prepare a project brief and/or frequently asked questions in Bangla that can be publicly available at the offices of UGC, JUST, BUET, DU, EWU, and the construction sites.

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<sup>4</sup> ADB. *Safeguard Policy Statement 2009*. <https://www.adb.org/documents/safeguard-policy-statement>.

16. Specifically, for BUET, site visits were conducted in January and March–April 2019 intermittently to collect secondary data, conduct consultations, and coordinate with relevant agencies of the government. Environmental sampling was done on 30 March and 4 April 2019.

## **II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK**

### **A. National Environmental Requirements**

17. The following presents the relevant regulatory agency, process, regulations, and international environmental agreements.

#### **(i) Environmental Agency**

18. The Ministry of Environment and Forests (MOEF) is the agency that plans, promotes, coordinates and oversees the implementation of programs and plans on environment and forestry. MOEF manages all national environmental matters and is responsible for activities such as prevention and control of pollution, forestation and regeneration of degraded areas and protection of the environment, and in the framework of legislations. MOEF also conducts surveys, impact assessment, control of pollution, research, collection and dissemination of environmental information, and creation of environmental awareness among all sectors in Bangladesh.

19. Created in 1989, the DOE performs the regulatory functions of the MOEF. DOE is the main agency entrusted with regulating and enforcing environmental management regulations in order to ensure sustainable development and to conserve and manage the environment. DOE ensures the consistent application of environmental rules and regulations; provides guidance and training; and conduct promotional campaigns on improving the awareness of environmental issues.

#### **(ii) Environmental Regulations**

20. The main environmental regulations in Bangladesh are the Environment Conservation Act (ECA) 1995 (amended 2000, 2002, 2007, and 2010) and the Environment Conservation Rules (ECR) 1997.

21. ECA 1995 provides the requirements on environmental protection, improvement of environmental standards, and control and abatement of environmental pollution. Through ECA 1995, the DOE is mandated to undertake any activity needed to conserve and enhance the quality of the environment and to control, prevent, and mitigate pollution.

22. ECR 1997 provides for the declaration of ecologically critical areas, categorization of industries and projects, and identification of types of environmental assessments needed for respective categories of industries or projects. Among other things, these rules set (i) the National Environmental Quality Standards for ambient air, various types of water, industrial effluent, emission, noise, vehicular exhaust etc.; (ii) the requirements for and procedures to obtain an ECC; and (iii) the requirements for the IEE based on categories of industrial and other development interventions.

23. The ECA 1995 and ECR 1997 outline the regulatory mechanism to protect the environment in Bangladesh. Aside from ECA 1995 and ECR 1997, Table 2.1 presents a summary of relevant environmental regulations.

**Table 2.1: Relevant Environmental Regulations**

<b>Regulation</b>	<b>Brief Description</b>
Bangladesh National Building Code 2006	Sets minimum standards for the design, construction, quality of materials, use and occupancy, location and maintenance of all buildings to safeguard, within achievable limits, life, limb, health, property and public welfare
Bangladesh Building Construction Rules 2008	These rules supersede the previous Building Construction Rules of 1984 and seek to control development plot-by-plot and case-by-case. It controls development by imposing conditions on setbacks, site coverage, construction of garages, access to plot, provision of lift, land use of that particular plot, and height of building. Restricting the height of a building in Building Construction Rules 1996 helps to control the density of an area and manage the growth of the city in some way.
Disaster Management Act 2012	Coordinates activities on disaster management, making them objective-oriented, and strengthens and formulates rules to build infrastructure for effective disaster management to face all types of disasters.
Environment Court Act 2000 (amended in 2002 and 2010)	This Act is under the Judiciary and Ministry of Environment and Forests to ensure the resolution of disputes on environmental and social damages resulting from any development activity. This Act also allows for the effective completion of environment-related legal proceedings.
Vehicle Act 1927, the Motor Vehicles Ordinance 1983, and Bengal Motor Vehicle Rules 1940	These are under the Bangladesh Road Transport Authority, which regulates vehicular emissions and noise, including road safety.
Bangladesh Factories Act 1995	Requires every workplace, including small- or large-scale construction where women are employed, to have an arrangement for childcare services. Based on this Act and Labor Laws, medical facilities, first aid, and accident and emergency arrangements are to be provided by the authorities to the workers at workplaces.
Bangladesh Labor Act 2006 (amended 2013), Bangladesh Labor Rules 2015	These regulations are under the Ministry of Labor, which provides for the occupational rights and safety of factory workers and the provision of a comfortable work environment and reasonable working conditions, including the prohibition of child and adolescent labor.
The Antiquities Act 1968 (amended 1976)	Regulation on the preservation and protection of antiquities
The Embankment and Drainage Act 1952	Consolidates the laws relating to embankments and drainage, providing provision for the construction, maintenance, management, removal, and control of embankments and water courses for the better drainage of lands and for their protection from floods, erosion or other damage by water.

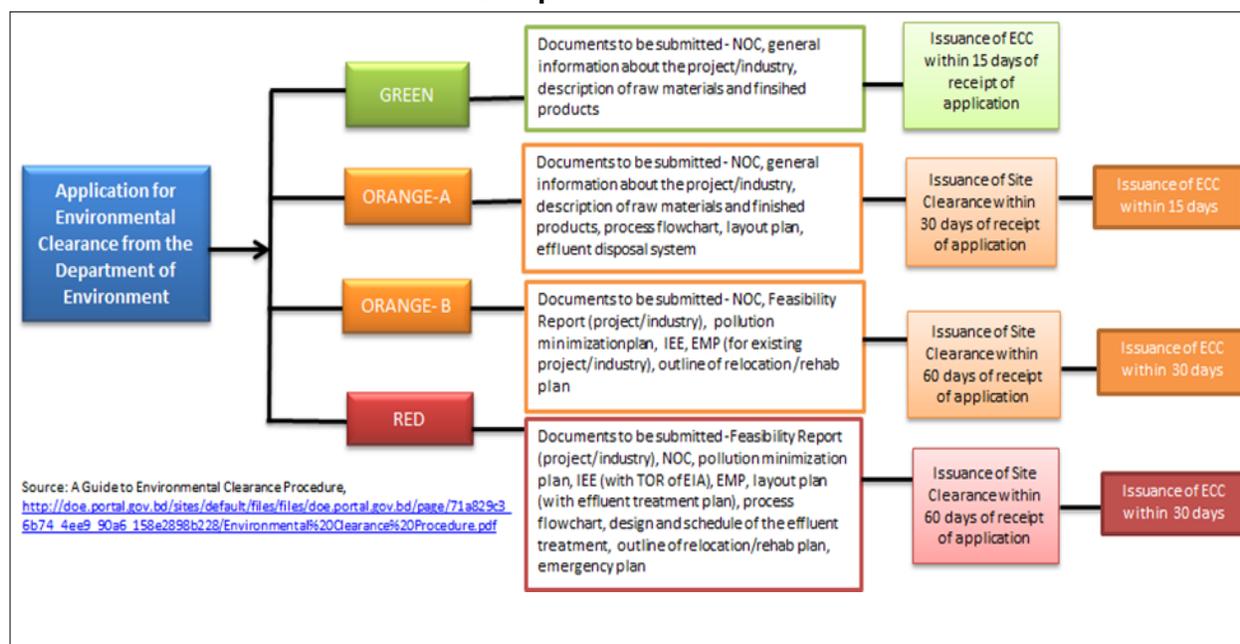
<b>Regulation</b>	<b>Brief Description</b>
Right to Information Act (RTI Act) 2009	<p>Came into force on 1 July 2009 primarily to increase transparency and accountability, decrease corruption and establish good governance.</p> <ul style="list-style-type: none"> <li>• Only citizens have the right to demand and receive access to information from public bodies.</li> <li>• Scope - extends to the executive, legislative branch and organisations that undertake public functions; private organisations with government or foreign funding are included, which applies to NGOs, international organisations and other private bodies.</li> </ul>

### (iii) Environmental Approval Process

24. Section 12 of ECA 1995 provides that no industrial unit or project can be established or undertaken without securing an ECC from the DOE. Following the requirements of ECR 1997, the DOE has classified various development interventions according to potential adverse environmental impacts for the purpose of issuing the ECC. This classification includes: (i) green, (ii) orange-A, (iii) orange-B, and (iv) red. The Green classification refers to industries or projects considered to be relatively pollution-free, thus, no environmental study will be required. The Orange-A, Orange-B, and Red category are projects and industrial units that may have potential adverse environmental impacts and therefore require an environmental impact assessment (EIA). Securing the ECC for these categories involves two steps: (i) issuance of site clearance certificate, and then (ii) the ECC.

25. The site clearance certificate will be issued by the DOE upon approval of the initial environmental examination (IEE) and the receipt of the "No Objection Certificate (NOC)." These documents serve as "proof of authorization" to initiate a project. The IEE includes the terms-of-reference (TOR) of the EIA, which requires the approval of the DOE. Once the EIA has been reviewed and approved by the DOE, the ECC will be issued. The project proponent cannot open a line of credit in favor of importable machineries and cannot start any physical activity for the project without the DOE-approved EIA. Figure 2.1 presents the overview of the approval process.

**Figure 2.1: Approval Process of the Department of Environment for an Environmental Compliance Certificate**



EIA = environmental impact assessment, ECC = environmental compliance certificate, EMP = environmental management plan, IEE = initial environmental examination, NOC = No Objection Certificate.

#### (iv) Applicable Environmental Standards

26. Table 2.2 lists the applicable standards to meet national regulations. SPS 2009 provides that during construction, the GOB will apply pollution prevention and practices that are in line with international good practice as set by international standards such as the International Finance Corporation–World Bank Environmental, Health, and Safety General Guidelines 2007 or IFC–WB EHS General Guidelines 2007. In addition, should the regulations of the government differ from the levels and measures set by the IFC–WB EHS General Guidelines 2007, the government will achieve whichever is more stringent. The relevant standards from IFC–WB EHS General Guidelines 2007 are given in Table 2.3.

**Table 2.2: Relevant National Environmental Standards**

AIR <sup>a</sup>			
	Pollutant	Standards	Averaging Period
	NO <sub>x</sub>	100 µg/m <sup>3</sup> (0.053 ppm)	Annual
	PM <sub>10</sub>	50 µg/m <sup>3</sup>	Annual
		150 µg/m <sup>3</sup>	24-hour
	PM <sub>2.5</sub>	15 µg/m <sup>3</sup>	1-hour
		65 µg/m <sup>3</sup>	24-hour
NOISE <sup>b</sup>			
		Limits in dB(A)	
		Daytime (6 am–9 pm)	Nighttime (9 pm–6 am)
	Zone Class		
	(i) A sensitive area where quietness is of primary importance such as schools, hospitals, mosques etc.	50	40

<b>AIR<sup>a</sup></b>		
Pollutant	Standards	Averaging Period
(ii) Residential zone	55	45
(iii) Mixed areas, which are used as residential areas as well as for commercial and industrial purposes	60	50
(iv) Commercial areas	70	60
(v) Industrial areas	75	70

dB(A) = decibel, NO<sub>x</sub> = Nitrogen Oxide, ppm = parts per million, µg/m<sup>3</sup> = micrograms per cubic meter of air.

Note: Day time shall mean from 6:00 a.m. to 9:00 p.m. Night time shall mean from 10:00 p.m. to 6:00 a.m. Leq means energy mean of the noise level over a specific period.

<sup>a</sup> Ambient Air Quality Standards 2005.

<sup>b</sup> Noise Pollution (Control) Rules 2006.

**Table 2.3: Relevant Environmental Standards from the International Finance Corporation–World Bank Environmental, Health, and Safety General Guidelines 2007**

<b>WHO Ambient Air Quality Guidance</b>		
	<b>Averaging Period</b>	<b>Guideline value in <math>\mu\text{g}/\text{m}^3</math></b>
SO <sub>2</sub>	24-hour	125 (Interim target 1) 50 (Interim target 2) 20 (guideline)
	10 minute	500 (guideline)
NO <sub>2</sub>	1-year	40 (guideline)
	1-hour	200 (guideline)
PM <sub>10</sub>	1-year	70 (Interim target 1) 50 (Interim target 2) 30 (Interim target 3) 20 (guideline)
	24-hour	150 (Interim target 1) 100 (Interim target 2) 75 (Interim target 3) 50 (guideline)
PM <sub>2.5</sub>	1-year	35 (Interim target 1) 25 (Interim target 2) 15 (Interim target 3) 10 (guideline)
	24-hour	75 (Interim target 1) 50 (Interim target 2) 37.5 (Interim target 3) 25 (guideline)
Ozone	8-hour daily maximum	160 (Interim Target 1) 100 (guideline)
<b>Noise Level Guidelines</b>		
Receptor	One Hour L (dBA)	
	Daytime (7am-10 pm)	Nighttime (10pm-7am)
Residential; Institutional; educational <sup>55</sup>	55	45
Industrial; commercial	70	70

SO<sub>x</sub> = sulfur dioxide, NO<sub>x</sub> = nitrogen dioxide, PM<sub>10</sub> = particulate matter 10 micrometers, PM<sub>2.5</sub> = particulate matter 2.5 micrometers.

Note: Day time shall mean from 7:00 a.m. to 10:00 p.m. Night time shall mean from 10:00 p.m. to 7:00 a.m.

Sources: World Bank Group-International Finance Corporation EHS General Guidelines 2007.

#### **(v) Relevant International Environmental Agreements**

27. Aside from the national environmental regulations, international environmental agreements where Bangladesh is a party will be referred to in the design and implementation of the project. Table 2.4 lists the applicable international environmental agreements that can provide guidance during project implementation.

**Table 2.4: Relevant International Environmental Agreements**

<b>International Environmental Agreement</b>	<b>Date Ratified</b>	<b>Description</b>
Convention Concerning the Protection of the World Cultural and Natural Heritage (Paris 1972)	3 November 1983	Entered into force on 23 November 1972, this convention defines and provides for the conservation of the world's heritage by listing the natural and cultural sites whose value should be preserved.
Vienna Convention for the Protection of the Ozone Layer 22 March 1985	2 August 1990	A framework for efforts to protect the globe's ozone layer by means of systematic observations, research and information exchange on the effects of human activities on the ozone layer and to adopt legislative or administrative measures against activities likely to have adverse effects on the ozone layer.
Montreal Protocol on Substances that Deplete the Ozone Layer (a protocol to the Vienna Convention for the Protection of the Ozone Layer)	2 August 1990	This international treaty entered into force on 1 January 1989. It is designed to protect the ozone layer by phasing out the production of numerous substances that are responsible for ozone depletion. This treaty also requires controlling emissions of substances that deplete ozone.
Kyoto Protocol (1997)	22 October 2001	An international agreement adopted on 11 December 1997 and entered into force on 16 February 2005, which commits its Parties to set internationally binding emission reduction targets. This agreement is linked to the United Nations Framework Convention on Climate Change.
United Nations Framework Convention on Climate Change (1992)	15 April 1994	This framework came into force on 21 March 1994 and aims to achieve stabilization of greenhouse gas concentrations in the atmosphere at a level low enough to prevent dangerous anthropogenic interference with the climate system.
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989)	1 April 1993	This convention came into force on 5 May 1992. It aims to reduce the amount of waste produced by signatories and regulates the international traffic in hazardous wastes.
UNESCO World Heritage Convention 1972	3 August 1983 (Accession)  Accession – the state accepts the offer or the opportunity to become a party to a treaty already negotiated and signed by other states	This convention describes the concepts of nature conservation and the preservation of cultural properties. Parties agree to identify and nominate properties on their national territory to be considered for inscription on the World Heritage List, gives details of how a property is protected, and provides a management plan for its upkeep.

## B. Environmental Requirements of the Asian Development Bank

28. The SPS 2009 sets the environmental requirements and review procedures that apply to all projects and grants that ADB finances. SPS 2009 comprises three key safeguard areas: environment, involuntary resettlement, and indigenous peoples. It aims to avoid adverse project impacts to both the environment and the affected people; minimize, mitigate, and/or compensate for adverse project impacts; and help Borrowers to strengthen their safeguard systems and to develop their capacity in managing the environmental and social risks.

29. SPS 2009 uses a categorization system to indicate the significance of potential environmental impacts, which is determined by the category of its most environmentally sensitive component, including direct, indirect, cumulative, and induced impacts within the project's area of influence. The project categorization system is described in Table 2.5.

**Table 2.5: Environmental Classification According to Safeguard Policy Statement 2009**

Category	Definition	Assessment Requirement
A	Likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented, and may affect an area larger than the sites or facilities subject to physical works.	Environmental impact assessment
B	Likely to have adverse environmental impacts that are less adverse than those of Category A. Impacts are site-specific, few if any of them irreversible, and in most cases mitigation measures can be designed more readily than Category A.	Initial Environmental Examination
C	Likely to have minimal or no adverse environmental impacts.	No environmental assessment is required but the environmental implications of the project will be reviewed.
FI	Project involves investment of ADB funds to or through a financial intermediary (FI).	FIs will be required to establish an environmental and social management commensurate with the nature and risks of the FI's likely future portfolio to be maintained as part of the FI's overall management system.

Source: ADB. 2009. *Safeguard Policy Statement*.

<http://www.adb.org/sites/default/files/institutionaldocument/32056/safeguard-policy-statement-june2009.pdf>

30. Disclosure Requirements. Aside from the SPS 2009 requirements, the Access to Information Policy 2019 provides for the requirements of disclosure for project information of projects and grants funded by ADB.<sup>5</sup> Consistent with SPS 2009, this requires the disclosure of documents submitted by the borrower and/or client as following:

- (i) a draft EIA report for category A project, at least 120 days before Board consideration;
- (ii) a draft environmental assessment review framework, where applicable, before appraisal;<sup>6</sup>

<sup>5</sup> The Access to Information Policy replaces Public Communication Policy 2011.

<sup>6</sup> If no further mission for appraisal is required, the document will be posted before the management review meeting or the first staff review meeting for sovereign projects, or before the final investment committee meeting for nonsovereign projects, as applicable (ADB procedures).

- (iii) the final EIA or IEE, upon receipt by ADB;
- (iv) a new or updated EIA or IEE, and a corrective action plan, if any, prepared during project implementation, upon receipt by ADB; and,
- (v) the environmental monitoring reports, upon receipt by ADB.

31. Table 2.6 presents a summary of the implications of SPS 2009 to the project.

**Table 2.6: Implications of the Safeguard Policy Statement 2009 to the Project**

No.	SPS 2009 Principles	Description
1	Use a screening process for each proposed project, as early as possible, to determine the appropriate extent and type of environmental assessment so that appropriate studies are undertaken commensurate with the significance of potential impacts and risks.	The components with environmental implications have been identified under output 1 of the Project: (a) construction of three new multi-storey buildings within the university premises of Bangladesh University of Engineering and Technology, University of Dhaka, and Jashore University of Science and Technology; and (b) renovation and upgrading of the existing Computer Science and Engineering structure of the East-West University.  A rapid environmental assessment checklist was completed for these components, and the environment category based on SPS 2009, is category B requiring an IEE.
2	Conduct an environmental assessment for each proposed project to identify potential direct, indirect, cumulative, and induced impacts and risks to physical; biological; socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues); and physical cultural resources in the context of the project's area of influence. Assess potential transboundary and global impacts, including climate change. Use strategic environmental assessment where appropriate.	An IEE following the requirements of SPS 2009 was conducted for the components with environmental implications.
3	Examine alternatives to the project's location, design, technology, and components and their potential environmental and social impacts and document the rationale for selecting the particular alternative proposed. Also consider the "no project" alternative.	Alternative sites, where appropriate, were considered and included in the IEE.
4	Avoid, and where avoidance is not possible, minimize, mitigate, and/or offset adverse impacts and enhance positive impacts by means of environmental planning and management. Prepare an EMP that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity development and training measures, implementation	An EMP is included in the IEE for each of the components with environmental implications under the four universities of the MOE. The EMPs will provide guidance to the construction contractor and their subcontractor (if any) who will be engaged during project implementation to ensure compliance with the relevant provisions in SPS 2009.

No.	SPS 2009 Principles	Description
	schedule, cost estimates, and performance indicators. Key considerations for EMP preparation include mitigation of potential adverse impacts to the level of no significant harm to third parties, and the polluter pays principle.	
5	Carry out meaningful consultation with affected people and facilitate their informed participation. Ensure women's participation in consultation. Involve stakeholders, including affected people and concerned nongovernment organizations, early in the project preparation process and ensure that their views and concerns are made known to and understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation as necessary to address issues related to environmental assessment. Establish a grievance redress mechanism to receive and facilitate resolution of the affected people's concerns and grievances regarding the project's environmental performance.	<p>Four consultation events were undertaken during the preparation of the IEE (one per university). Consultations will continue through the PIUs in each university (as appropriate) during project implementation.</p> <p>A three-tiered grievance redress mechanism (GRM) is included in the IEE including the proposed composition of the grievance redress committee (GRC). The implementation of the GRM will be monitored by the PMU established under the UGC.</p>
6	Disclose a draft environmental assessment (including the EMP) in a timely manner, before project appraisal, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders. Disclose the final environmental assessment, and its updates if any, to affected people and other stakeholders.	The IEE will be endorsed by the MOE for public disclosure through the ADB website.
7	Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring reports.	<p>At the construction phase, the contractor will be responsible for implementing the EMP and will be monitored by the PIU and PMU.</p> <p>Environmental monitoring reports and corrective actions (if needed) will be prepared by the PIUs and will be disclosed on the ADB website.</p>
8	Do not implement project activities in areas of critical habitats, unless (i) there are no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there is no reduction in the population of any recognized endangered or critically endangered species, and (iii) any lesser impacts are mitigated. If a project is located within a legally protected area, implement additional programs to promote and enhance the conservation aims of the protected area. In an area of natural	All the proposed interventions with environmental implications are not located in critical habitats as defined by SPS 2009.

No.	SPS 2009 Principles	Description
	habitats, there must be no significant conversion or degradation, unless (i) alternatives are not available, (ii) the overall benefits from the project substantially outweigh the environmental costs, and (iii) any conversion or degradation is appropriately mitigated. Use a precautionary approach to the use, development, and management of renewable natural resources.	
9	Apply pollution prevention and control technologies and practices consistent with international good practices as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines. Adopt cleaner production processes and good energy efficiency practices. Avoid pollution, or, when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gases emissions; waste generation; and release of hazardous materials from their production, transportation, handling, and storage. Avoid the use of hazardous materials subject to international bans or phaseouts. Purchase, use, and manage pesticides based on integrated pest management approaches and reduce reliance on synthetic chemical pesticides.	Construction activities will generate waste and may increase ambient dust and noise levels. Vegetation and land clearing will be done. No hazardous chemicals will be used in vegetation clearing. The new buildings will use Energy Star certified products and will incorporate green building features. (Refer to <a href="https://www.energystar.gov/about/energy-star-brand/energy-star-brand-book">https://www.energystar.gov/about/energy-star-brand/energy-star-brand-book</a> .)
10	Provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease. Establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities.	Construction works may cause accidents or injuries to workers. Contractors will be required to comply with the EMP and implement to the extent possible the Environmental Codes of Practice. Compliance will be monitored by the PIUs and PMU.
11	Conserve physical cultural resources and avoid destroying or damaging them by using field-based surveys that employ qualified and experienced experts during environmental assessment. Provide for the use of "chance find" procedures that include a pre-approved management and conservation approach for materials that may be discovered during project implementation.	The sites are within the existing premises of the universities and are not known to have physical cultural resources as defined by SPS 2009.

IEE = initial environmental examination, MOE = Ministry of Education, PIU = project implementation unit, PMU = project management unit, SPS = Safeguard Policy Statement.

### III. DESCRIPTION OF THE PROJECT

32. The project will have four outputs as summarized in Table 1.1. The component that will have environmental implications from Output 1 (see below) will be the construction of new buildings for BUET, DU, and JUST; and some renovations of classrooms and ICT laboratories at EWU.

<p>Output 1: An established modern learning, research, and startup supporting environment</p>	<p>The project will support the four universities in developing classrooms, laboratories, industry collaboration, start-up or incubation space, and auxiliary facilities.</p> <p>The project will establish the supporting environment, which will include adopting green building features such as energy efficiency and water-saving and climate- and disaster-resilient design; accessibility for persons with disabilities; female-friendly amenities such as students' study areas and staff lounges; and safety features like access control system, increased lighting at night, and video surveillance system.</p>
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33. BUET is the premiere technological and engineering university of Bangladesh, and CSE Department is the first department in Bangladesh providing ICT education. To realize the objectives and goals of the other outputs in the project, a high-rise building will be required given the limited space available for BUET within the premises of the university.

34. The new building will be constructed at the north-east corner of the West Palashi Campus of BUET as an extension of the existing ECE Building (ECE Annex) where the CSE department is hosted (Figure 3.1). The floor space of each floor of ECE Annex building is 912 square meters (m<sup>2</sup>) and based on this area, the new building needs to have a total of about 11,856 m<sup>2</sup>. Thus, a total of 13 floors (including basement and ground floor) will be required to accommodate 11,856 m<sup>2</sup> (Table 3.1). The new building includes the following specifications:

- (i) Fully furnished 12-storey building (total area – 11,856 m<sup>2</sup>)
- (ii) New building will be designed as one-storey basement and 20-storey foundation
- (iii) Will accommodate 2,150 graduate and post-graduate students, 150 faculty members (or 2,700 persons/year)
- (iv) Will have computing and ICT Incubator, a 4-storey structure to accommodate about 2,788 persons, of which 20 will be entrepreneurs for R&D
- (v) Big data R&D Center (24/7 infrastructure in standard data center, use of Spark and Hadoop<sup>7</sup> as big data analytics) and will incorporate big data analytics in curriculum
- (vi) Will include CSE BUET Open Course Ware (establish open access repository with online materials such as digital slides, audio-visual lectures, online ICT-based assignments, online discussion sessions, etc.)
- (vii) Separate stream of distance and online learning certification and/or diploma program

35. The total estimated cost for civil works for the new building is \$12.14 million.

<sup>7</sup> Apache Spark is lightning-fast unified analytics engine for big data and machine learning while Apache Hadoop is a framework that allows for the distributed processing of large data sets across clusters of computers using simple programming models. See <https://databricks.com/spark/about> and <https://hadoop.apache.org/>.

**Table 3.1: Tentative Plan for the ECE Annex Building**

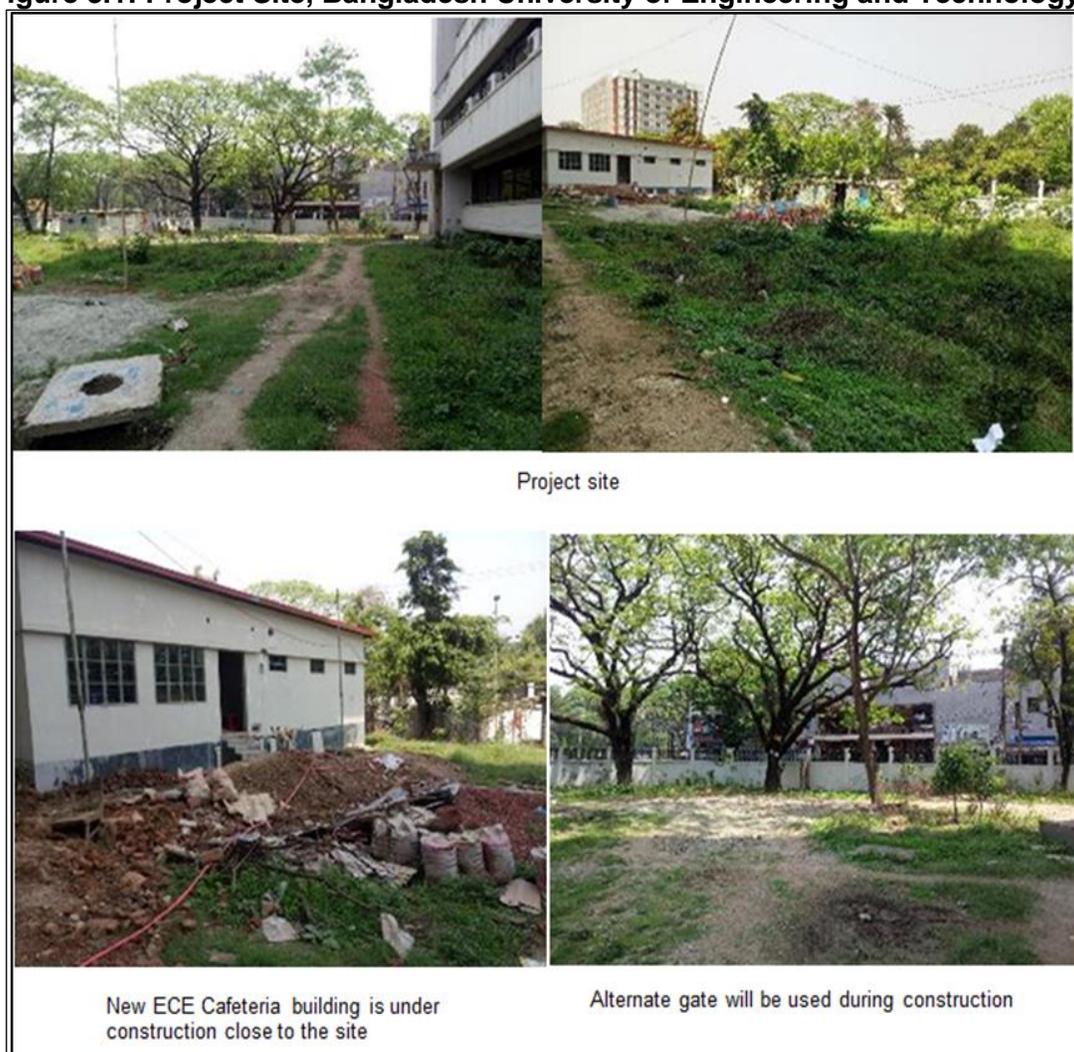
<b>Floor</b>	<b>Planned Usage</b>	<b>Total Floor Space (m<sup>2</sup>)</b>	<b>Remarks</b>
Basement	Parking	912	
Ground floor to 7 <sup>th</sup> floor	Infrastructure for increase in intake of students	912 x 8 = 7,296	Around 7,000 m <sup>2</sup> is required
8 <sup>th</sup> floor to 11 <sup>th</sup> floor	Computing and ICT incubation centre	912 x 4 = 3,648	Around 3,000 m <sup>2</sup> is required. Part of 8 <sup>th</sup> floor will be used for classrooms
Total floor space		11,866	

m<sup>2</sup> = square meter.

Source: Table 5.1 in BUET, 2019. *Revised Final Proposal*. Dhaka. p. 24.

36. The new building will incorporate green building features expected to reduce the use of energy and water resources. The estimated cost allocated for green building features is \$3.185 million. This estimated cost will cover construction materials, energy-efficient lighting system, electric fans, and relevant Energy Star-certified products available in Bangladesh.

**Figure 3.1: Project Site, Bangladesh University of Engineering and Technology**

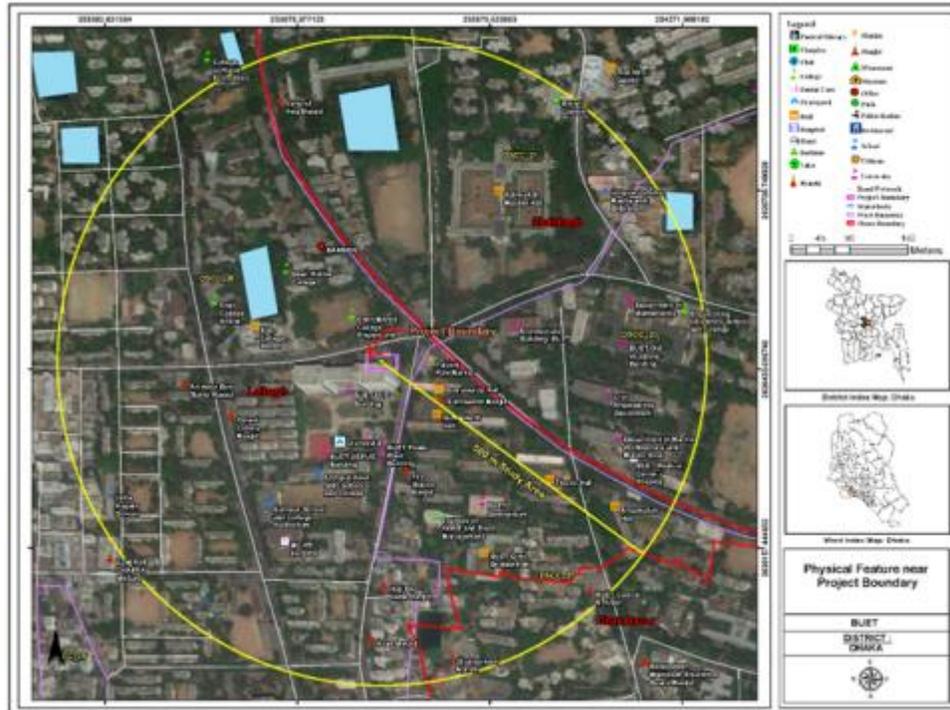


BUET project site. (*Top photo*) West Palashi Campus, site of the new high-rise ECE Annex Building; (*left photo*) new ECE cafeteria undergoing construction close to the site; (*right photo*) an alternate gate will be opened during construction.

#### **IV. DESCRIPTION OF THE ENVIRONMENT (BASELINE DATA)**

37. This chapter describes the existing environment within the study area and is based on baseline measurements, but relying heavily on secondary data from government sources, international organizations, and other research entities. Baseline measurements on ambient air quality, noise, and drinking water source in BUET were taken by EQMS Consulting Limited on 3 March 2019, and 4–8 April 2019. Measurements were done within a 500-meter radius from the project site (Map 4.1).

**Map 4.1: Project's Area of Influence**



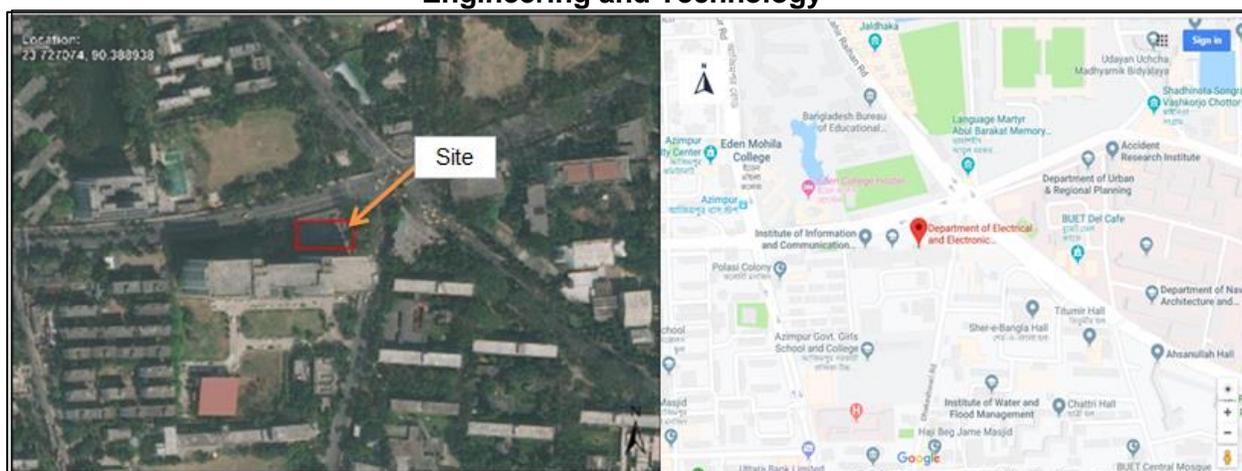
### **A. The Bangladesh University of Engineering and Technology**

38. Located in Dhaka City, the Bangladesh University of Engineering and Technology (BUET) is one of the most prestigious institutions for tertiary studies in Bangladesh. At present, BUET has 18 teaching departments under five faculties and six institutes. The yearly intake of undergraduate students is 1,060; and about 1,000 for graduate students (master's and doctor of philosophy). The total number of faculty members is about 640 while the total number of students is about 10,899.

39. BUET was established in 1962 and is now occupying a total area of 36.98 hectares. Aside from academic buildings, BUET has a medical center, eight residential halls, 285 teacher's quarters, 70 office quarters, and 596 staff quarters. The Department of Computer Science and Engineering (IIT/CSE) was established in 1984 and is under the Faculty of Electrical and Electronic Engineering.

40. The proposed site for the new building is located within the West Palashi Campus of BUET. Map 4.2 shows the location map, while Table 4.1 presents the summary of the environmental setting within the study area.

**Map 4.2: Project Location Map of West Palashi Campus, Bangladesh University of Engineering and Technology**



**Table 4.1: Summary of Environmental Setting in the Study Area**

Item	Details
Location	Within the West Palashi Campus of BUET in Dhaka district under the Dhaka South City Corporation Ward, Lalbagh Thana
Latitude	23.727074
Longitude	90.388938
General elevation	Average ground elevation 6.8 meters above mean sea level
Topography	Terrain in the site is generally flat
Major physiographic unit	The area is in the physiographic unit of Madhupur Tract. It comprises the central part of Dhaka along the course of Brahmaputra–Jamuna Flood Plain.
Major soil type	Soil belongs to a Pleistocene terrace consisting mainly of red colored and mottled clays. Soils in the valleys are dark gray heavy clays. They are strongly acidic in reaction with low status of organic matter, low moisture holding capacity, and low fertility level.
Climatic condition	Humid and subtropical, with a typical three season pattern. During the winter season (November–February), cool winds blow from the northeast. The average temperature is 26.1°C. The project area receives on average 2,066 millimeters of precipitation annually. The prevailing winds vary month to month in the project area, though predominantly in the northwest, south and northeast directions.
Flooding	Area is generally flooded by the ingress of floodwater from the north, west, and south side by the Bangsi, Dhaleswari, Tongi khal, Turag, and Buriganga rivers
Seismicity	Area falls within seismic zone II (medium intensity seismic zone)
Nearest water body	Eden Lake is on the northwest side and about 196 m from the project area; Ramna Lake is on the northeast side and about 1.57 kilometers from the project area. Buriganga river is on the west side and about 3.15 km from the project area.
Ecologically critical area	No identified ecologically critical areas
Reserves and/or protected	Site is within urban areas.

Item	Details
forests	
Archeologically important place	Curzon Hall is a British Raj-era building and home of the Faculty of Sciences at the University of Dhaka, about 1.25 km from the proposed site
Major settlements	Lalbagh Thana

## B. Physical Environment

### (i) Geology and Soil

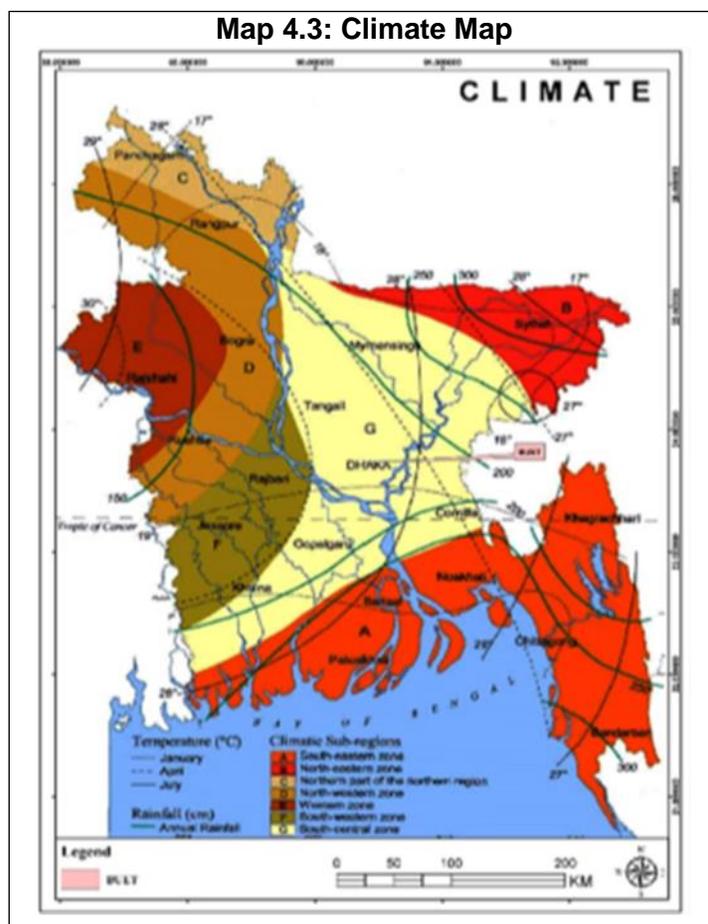
41. Dhaka is located in the central-eastern part of Bangladesh. The city is in the extreme south of the Madhupur Tract. The main area is covered by Pleistocene Madhupur clay, a yellowish brown to oxidized reddish brown silty clay. Madhupur Clay makes up most of the surface across the elevated Madhupur Tract. This particular unit is about 45 m in thickness (compared to the average 10 m thickness in Dhaka) and has a fine sandy layer at its base. The southern part of Dhaka is made of Holocene sediments. The drainage channels and shallow depressions on the Madhupur Tract are partially comprised of gray and yellow organic-rich sands and clays of the Holocene Bashabo Formation.

42. The major geomorphic units of the city are the high land or the Dhaka terrace, the lowlands or floodplains, depressions, and abandoned channels. Low-lying swamps and marshes located in and around the city are other major topographic features. Madhupur Clay of the Pleistocene age characterized by reddish plastic clay with silt and very fine sand particles. The soil is non-calcareous dark gray in color in and around the project area. Moreover, dark grey floodplain soil can be found adjacent to the area of Turag and Buriganga.

### (ii) Climate

43. According to the Köppen climate classification, Dhaka falls under the Aw category, which is characterized by tropical wet and dry climate. This type of climate experiences hot and humid summer and dry winter. According to climatic characteristics, Bangladesh is divided into seven different climatic subregions. The study area of the project falls under the south-central climatic zone of the country (Map 4.3).

44. Meteorological data recorded at Dhaka station of the Bangladesh Meteorological Department (BMD) from January 1980 to December 2013 were used to describe the climate within the study area. The average maximum temperature ranges between 39.6°C to 30.1°C. The monthly variation of the average minimum temperature is 22.5°C to 6.5°C. The maximum recorded temperature in Dhaka station was 39.6°C, which occurred in March 1999 and April 2009. In January 1995, the minimum temperature was recorded as 6.5°C. The warmest month is April while the coldest month is January.



45. The average monthly rainfall is 332 mm while the maximum rainfall is 836 mm. The minimum monthly rainfall is 59 mm. Annual average rainfall is 2,066 mm and the highest recorded annual rainfall was 3,028 mm, which occurred in 1984. The driest period of the year is winter when the average monthly rainfall varies from 21 mm to 7.21 mm. Relative humidity varies from 83.77% to 62.47%.

### (iii) Natural Hazards

#### Flooding

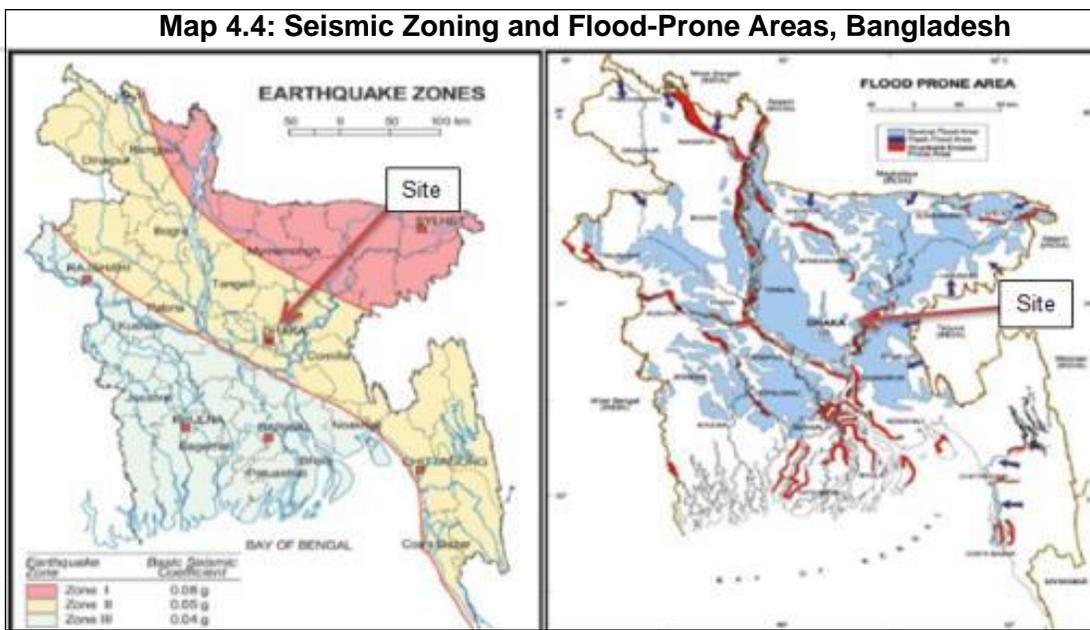
46. Dhaka city was particularly hit by severe floods in 1988 and 1998. During the 1998 flood, about 56% of the city was inundated, including most of the eastern part of the city, and 23% of the western part. Over 60% of the area of Dhaka can be demarcated as flood-risk zone considering its flood history. Floods in Dhaka are caused by high rainfall or by overflowing from the surrounding rivers and canals. The western and most densely settled part of Dhaka is protected from river flooding by raised roads and an encircling embankment built after the 1988 flood. The eastern part of the city where most of the expansion takes place consists of low-lying floodplains that are submerged during the monsoon season. Some issues on Dhaka's flood scenario are provided below.

- (i) All sides of Dhaka city are bounded by rivers and canals.
- (ii) Above 50% of Dhaka is low-lying and inundated during monsoons.
- (iii) Filling of water retention areas and drains increases the risk of seasonal flooding.

- (iv) Encroachment of rivers and canals can increase flood hazard susceptibility.
- (v) Internal drainage congestion can make the flood situation more complex.
- (vi) Poor and/or no enforcement of laws in protecting the low-lying areas in and around Dhaka.

### Seismic Effects

47. According to the National Seismic Zoning Map produced by the Geological Survey of Bangladesh, Dhaka lies at the end of the Dauki fault in an area of medium seismic risk. This means that shocks of moderate intensity are possible, with a probable maximum magnitude of 6.5–7 on the Richter scale. Seismic events in Bangladesh are relatively infrequent but historically have been severe, such as the earthquakes of 1930 and 1950, which caused widespread damage throughout the country; and the earthquake in 2004 that damaged large parts of Dhaka City. Map 4.4 shows the seismic zoning and flood-prone areas in Bangladesh.



### (iv) Ambient Air Quality and Noise

#### Ambient Air Quality

48. The DOE maintains three continuous air quality monitoring stations within the Dhaka district. This monitoring is under the Clean Air and Sustainable Environment (CASE) project funded by the World Bank.<sup>8</sup> Table 4.2 shows the summary of monitoring results from January to April 2019 collected through the CASE project, and Map 4.5 shows the location of the monitoring stations.

<sup>8</sup> Department of Environment. Clean Air and Sustainable Development. [http://case.doe.gov.bd/index.php?option=com\\_contact&view=contact&id=1](http://case.doe.gov.bd/index.php?option=com_contact&view=contact&id=1).

**Table 4.2: Summary of Monitoring Results under Clean Air and Sustainable Environment Project, January-May 2019**

Parameter	National Ambient Air Quality Standards (2005)	Unit of Measure	Station		
			CAMS -1 Sangshad Bhavan, Sher-e-Bangla Nagar	CAMS -2 BARC Farmgate	CAMS -3 Darus-Salam
<b>Average monthly air quality data (January 2019)</b>					
SO <sub>2</sub> – 24 hr	140	ppb	6.32	2.64	16.8
NO <sub>2</sub>	53 (Annual)	ppb	63.3	141	93.2
PM <sub>2.5</sub> – 24 hr	65	µg/m <sup>3</sup>	131	149	205
PM <sub>10</sub> – 24 hr	150	µg/m <sup>3</sup>	DNA	212	302
<b>Average monthly air quality data (February 2019)</b>					
SO <sub>2</sub> – 24 hr	140	ppb	7.79	2.77	12.4
NO <sub>2</sub>	53 (annual)	ppb	66.1	111	71.0
PM <sub>2.5</sub> – 24 hr	65	µg/m <sup>3</sup>	124	134	144
PM <sub>10</sub> – 24 hr	150	µg/m <sup>3</sup>	DNA	235	244
<b>Average monthly air quality data (March 2019)</b>					
SO <sub>2</sub> – 24 hr	140	ppb	DNA	2.41	5.99
NO <sub>2</sub>	53 (annual)	ppb	84.0	DNA	45.1
PM <sub>2.5</sub> – 24 hr	65	µg/m <sup>3</sup>	86.3	114	123
PM <sub>10</sub> – 24 hr	150	µg/m <sup>3</sup>	164	206	225
<b>Average monthly air quality data (April 2019)</b>					
SO <sub>2</sub> – 24 hr	140	ppb	3.16	2.60	DNA
NO <sub>2</sub>	53 (annual)	ppb	54.3	DNA	21.8
PM <sub>2.5</sub> – 24 hr	65	µg/m <sup>3</sup>	57.2	67.3	71.5
PM <sub>10</sub> – 24 hr	150	µg/m <sup>3</sup>	115	149	132
<b>Average monthly air quality data (May 2019)</b>					
SO <sub>2</sub> – 24 hr	140	ppb	DNA	15.8	DNA
NO <sub>2</sub>	53 (annual)	ppb	DNA	DNA	20.1
PM <sub>2.5</sub> – 24 hr	65	µg/m <sup>3</sup>	38.2	69.6	49.7
PM <sub>10</sub> – 24 hr	150	µg/m <sup>3</sup>	98.7	129	99.8

BARC = Bangladesh Agricultural Research Council, CAMS = Continuous Air Quality Monitoring Station, DNA = Data not available, µg/m<sup>3</sup> = micrograms per cubic meter of air, NO<sub>2</sub> = nitrogen dioxide, PM<sub>2.5</sub> = particulate matter 2.5, PM<sub>10</sub> = particulate matter 10, ppb = parts per billion, SO<sub>2</sub> = sulfur dioxide.

49. Results from the CASE air quality monitoring suggest that NO<sub>2</sub>, PM<sub>10</sub>, and PM<sub>2.5</sub> exceeded the limits set by the National Ambient Air Quality Standards (2005). Existing sources of air pollution are mainly vehicular emissions, ongoing construction of large infrastructure projects, and dust-generating activities of densely populated settlements.

### Map 4.5: Monitoring Stations under the Clean Air and Sustainable Environment Project



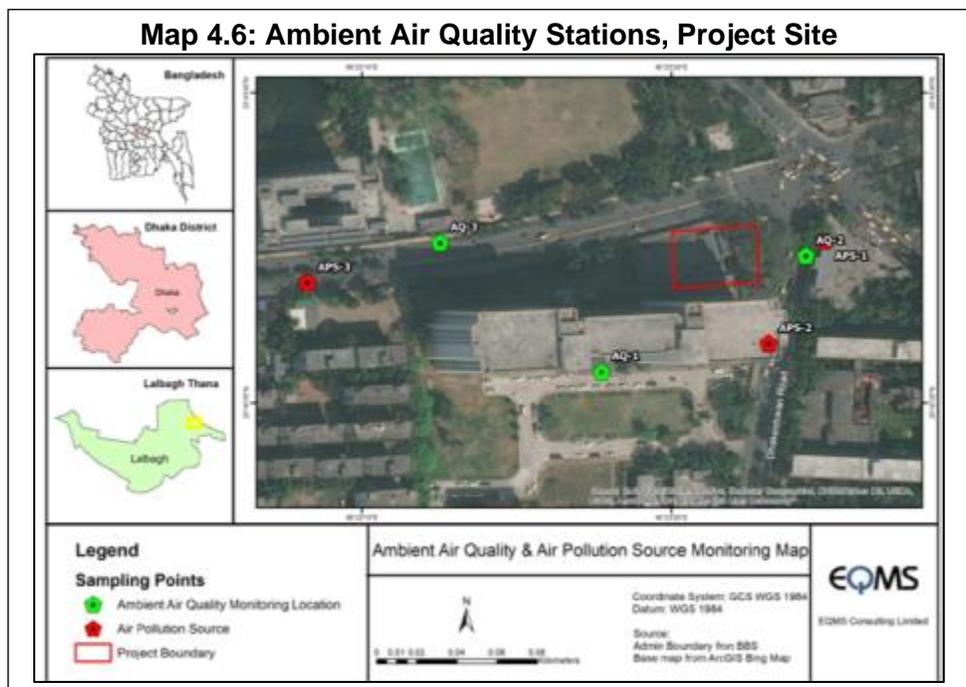
50. Ambient air quality measurements were conducted on 4 April 2019 at and around the project site by EQMS Consulting Limited. Three sampling stations were identified (Map 4.6) and results are given in Table 4.3.

**Table 4.3: Results of Ambient Air Quality Measurements, 4 April 2019**

Location	Concentration ( $\mu\text{g}/\text{m}^3$ )		
	PM <sub>10</sub>	PM <sub>2.5</sub>	NO <sub>2</sub>
AQ1 – In front of Electrical and Computer Engineering Building at West Polashi Campus, BUET	53.41	36.93	34.15
AQ2 – In front of Polashi Bazar Market	198.67	154.03	144.7
AQ3 – In front of Eden Mohila College	35.88	26.33	55.01
Duration (hour)	24	24	1
Standards Environment Conservation Rules 1997 and amendment in 2006 Standard (Schedule 2)	150 (24 hours)	65 (24 hours)	100 (annual)
World Bank–International Finance Corporation standard	50 (guideline)	25 (guideline)	200 (1 hour)

AQ = air quality, NO<sub>2</sub> = nitrogen dioxide, PM<sub>2.5</sub> = particulate matter 2.5, PM<sub>10</sub> = particulate matter 10

51. Results from the three stations suggest that there are more sources of air pollution in front of Polashi Bazar Market than in front of West Polashi Campus BUET or at Eden Mohila College.



## Noise

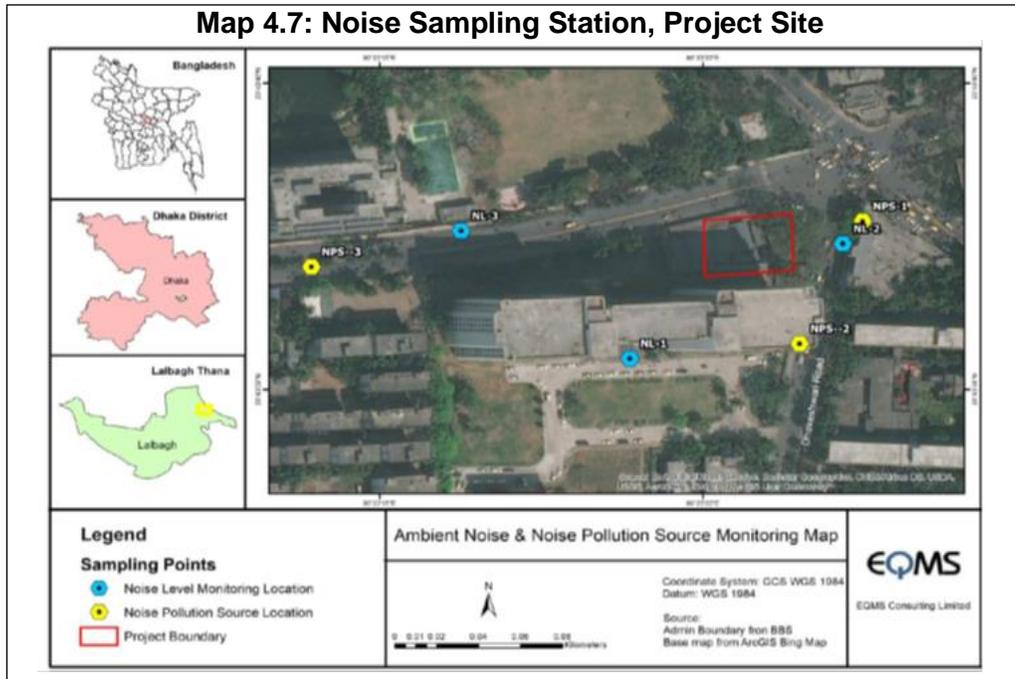
52. Main sources of increased noise level at and around the project site are vehicles and the use of construction equipment at the existing road construction. Three noise sampling stations were identified to establish baseline data. Results suggest that there are more noise-generating sources in front of Polashi Bazar Market as well as in Eden Mohila College. Measurements were done on 4 April 2019 and results are given in Table 4.4, while sampling stations are shown in Map 4.7.

**Table 4.4: Results of Ambient Noise Sampling**

Location	Coordinates	Leq day (dBA)	Leq night (dBA)
NL1 – Infront of ECE building	23°43'35.50" N 90°23'18.88" E	55.28	43.88
NL2 – In front of Polashi Bazar near Polashi West Campus, BUET	23°43'37.37" N 90°23'22.17" E	68.00	64.58
NL3 – In front of Eden Mohila College near Polashi West Campus, BUET	23°43'37.58" N 90°23'16.27" E	55.21	48.1
Noise Pollution Control Rules 2006	Mixed use	60	50
International Finance Corporation–World Bank Environmental, Health, and Safety General Guidelines 2007	Residential, institutional, educational	55	45

BUET = Bangladesh University of Engineering and Technology, dBA = decibel, NL = noise level.

Note: Leq means energy mean of the noise level over a specific period.



**(v) Groundwater Quality**

53. On 30 March 2019, drinking water sample was collected from the faucet within the project site (Figure 4.1) at West Polashi Campus for laboratory analysis of fecal coliform, pH, arsenic, lead, cadmium, and chromium (hexavalent). Table 4.5 shows the result of sampling.

**Figure 4.1: Water Sampling at the Project Site**



**Testing of drinking water.** Drinking water at DU meets standards of the World Health Organization and the Environment Conservation Rules 1997, Schedule 3(B) Rule 12.

**Table 4.5: Result of Drinking Water Analysis**

Water Quality Parameter	Unit of Measure	Allowable Limit		Sampling Station: Project Site, West Polashi Campus
		Bangladesh Environmental Quality Standards	World Health Organization	Result of Analysis
Fecal Coliform	n/100 ml	0	Must not be detectable in any 100 ml sample	0
pH	–	6.5–8.5	–	6.78
Arsenic	mg/l	0.05	0.01	<0.010
Lead	mg/l	0.05	0.01	0.002
Cadmium	mg/l	0.005	0.003	Below detectable limit
Chromium	mg/l	0.05	0.05	0.001

– = not applicable, BDL = below detectable limit, mg/l = milligrams per liter, ml = milliliter, n = number, WHO = World Health Organization.

Note: Date of sampling: 30 March 2019.

### C. Biological Environment

54. The project site has minimal vegetation (see Figure 3.1) with about less than 10 mature trees. No natural terrestrial flora of significance for protection remains at the project site. The composition of the plant community is low growing and herbaceous vegetation as well as other flora typical for urban sites. Some of the major types of trees found in the project area include mahogany, rain tree, kul, and sishu.

55. As to terrestrial fauna, no wild mammal species were observed during the visit to the site and ocular inspection.

56. No aquatic flora and fauna were observed, as there is no natural water source within the study area.

### D. Socioeconomic Environment

57. Dhaka is the most populated city in Bangladesh, and it is also one of the most populated cities in the world. According to the Population and Housing Census, 2011 the city itself has an estimated population of about 8 million.

58. BUET is located in Lalbagh Thana with a total land area of about 4.1 km<sup>2</sup>. According to Dhaka District Statistics (2013), the population was 7,650 consisting of 1,652 households. The average household size of 4.63 and the population density is 1,866 person/km<sup>2</sup>.

59. Based on the 2011 census, religion in the project area is dominated by Muslim community (94.66%) followed by Hindu (3.79%).

60. Lalbagh is mainly part of Old Dhaka city with narrow road networks and old houses of two- to four-storey building areas. The Old Dhaka City has developed freely with mixed land use showing less or no regard to any urban planning. It has typical land use pattern, a strip of land along the main roads generally used for commercial purpose, and inner areas used for manufacturing and residential purposes. Most of areas of the Old Dhaka City are densely built with low- to medium-rise structure of different forms and designs.

61. Within the 500-m radius from the project site, there are eight mosques, four schools, two colleges, one graveyard, and one temple. Table 4.6 presents a list of important historical sites close to BUET.

**Table 4.6: Important Historical Sites**

<b>Site Name</b>	<b>Importance</b>	<b>Distance (kilometers)</b>
Tin Netar Majar	Monument to three renowned political leaders of the subcontinent	0.95
Doyel Chattar	Monument of national symbolic importance, expressed by Doyel bird	0.98
Curzon Hall	British-era building; example of aesthetic architecture of that time	1.14
Old High Court Building	Historical building important for the history, culture, and heritage of country	1.0
Bangladesh National Museum	National museum representing the national history, culture, and heritage	0.26
Bangla Academy	Building of historical and cultural importance	0.65
Shourawardy Uddayan	Historical place with historical links with national independence	0.22

## **V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**

62. Associated potential environmental impacts will be mainly during the construction phase, which are temporary, of short duration, localized, and can be easily mitigated through the implementation of the environmental management plan (EMP). Aside from the EMP, the environmental monitoring plan (EMoP) will provide the key elements to be monitored to ensure compliance by the Contractor with the approved building design and relevant regulations on building construction, occupational and environmental health, and safety.

### **A. Pre-construction and Design Phase**

63. At this stage, activities include preparation of project proposal, design of the new building, desktop and ground surveys of the proposed site, preliminary consultations, and drafting of the development project proforma (or proposal). These activities are not expected to have significant environmental impacts as the activities will have minimal physical disturbances to the environment.

64. Green building features were incorporated in the design of the new building, which aims to be a climate change-resilient building with reduced energy and water consumption. These features are included in the budget with an estimated cost of about \$3.1853 million, which will cover cost of construction materials, use of energy-efficient lighting system and electric fans, and relevant Energy Star-certified products available in Bangladesh. The use of energy-efficient lighting and cooling equipment as a result of incorporating green building features will contribute to an estimate of about 167.03 tCO<sub>2</sub> emissions reduction per year.

65. Aside from incorporating green building features, relevant provisions set forth in BNBC 2006 and BNBC 2015 (draft) will be adhered to in the design and construction of the new building.

### **B. Construction Phase**

66. This phase will involve the recruitment of workers and staff; mobilization of contractors, equipment, and machinery; site preparation; delivery and storage of construction materials; civil, mechanical, and electrical works; landscaping and clean-up of construction debris; and occupancy of the new building.

67. Prior to construction works, the PMU in UGC and the PIU in BUET will ensure that the Contractor will include the responsibility of compensating for any temporary damage, loss, or inconvenience as a result of accident or failure to comply with regulations in implementing the project. The Contractor will be required to conduct baseline environmental quality measurements for air, noise, and source of drinking water to be provided to construction workers before start of construction.

68. Environmental Codes of Practice (ECoP) relevant during the construction phase are given in Appendix 1. ECoPs are general nonsite-specific guidance from best construction practices that will be implemented for this project to ensure that potential associated construction environmental impacts will be minimized. Contractors will be required to refer to these ECoPs as well as comply with the EMP.

#### **(i) Prepare Construction Management Plan**

69. Before any construction works, the Contractor will be required to prepare a construction management plan to guide the implementation of earth-moving works; and construction of the building, civil, mechanical, and electrical works, including restoration of the site and the existing access roads. The plan will cover work scheduling, occupational, and community health and safety; temporary pedestrian and traffic management; spoils disposal and construction waste; noise and dust control; drainage and stormwater management; materials storage and management; protocol in dealing with students, faculty, and staff of BUET particularly those in the West Palashi Campus; and emergency or disaster preparedness. Critical information to know during emergencies will be included in an emergency kit such as evacuation or assembly point, as well as do's and don'ts. Emergency contact details will be posted on easily visible billboards at the construction site.

#### **(i) Hiring of Staff and Workers**

70. There will be potential job opportunities for both skilled and unskilled workers during the construction phase. These opportunities, however, may cause conflict over lack of transparency in recruitment. Hiring of local labor will be given priority. The Contractor will be required to comply with the relevant provisions in the Bangladesh Labour Act 2006 (amended 2013) and Bangladesh Labor Rules 2015 on recruitment and working conditions.

71. Due to construction works, there will be workers present within the premises of BUET particularly in the construction site. The Contractor will be required to ensure that their workers will strictly observe the applicable rules and regulations of BUET including occupational health and safety rules that will be imposed on them by the Contractor.

#### **(ii) Orientation of Workers and Staff**

72. Before any construction works begin, the PIU in BUET and PMU together with the environmental safeguard consultant will conduct an orientation for the workers and staff of Contractor on occupational health and safety, applicable rules and regulations of BUET, as well as environmental requirements of GOB and ADB. The orientation aims to create awareness on

their responsibility for implementing and compliance to the EMP, effective record keeping, and environmental reporting. The orientation will also include awareness on communicable disease like tuberculosis and about HIV/AIDS to prevent potential incidence in the workplace.

73. The Contractor will be required to designate an Emergency and Disaster Coordinator to guide the workers in case of an emergency or disaster. Workers will be informed that mock drills will be conducted regularly, and participation will be mandatory. The Contractor will be required also to invite resource persons from relevant government agency or private sector to conduct training on proper emergency response at least once a year throughout construction phase.

### **(iii) Site Preparation and Construction Works**

74. The Contractor will coordinate with respective government agencies before any site preparation to determine the connections of utilities such as natural gas pipeline, water pipes, sewers, and other services that may be affected.

75. If the Contractor decides to operate quarry to meet the requirements of the construction works, the necessary permits and clearances from relevant agencies of the government should have been obtained prior start of operation. The Contractor needs to ensure that the quarry providing materials to the construction of the new ECE Annex Building is maintained in stable condition; appropriately and adequately landscaped; and when taken from the river, it should not disrupt the river flow or damage the river banks causing erosion. The stockyard and construction site will be temporarily and properly enclosed with designated security personnel to prevent entry of unauthorized persons.

76. The area within the premises of BUET (West Palashi Campus) is not known to have sites of archeological and historical value. Nonetheless, ECoP 1.0 provide measures in case of encounter with physical cultural resource.<sup>9</sup>

### **(iv) Impacts on Air Quality**

77. Site preparation will involve land and minimal vegetation clearing. Potential increase in dust level may be expected as a result of these activities. This impact may cause inconvenience to the occupants of the Vice Chancellor residence and may be experienced up to the staff housing or dormitory. To contain the potential increase in generation of dust, the Contractor will be required to do the following:

- (i) Provide temporary fencing and enclosures of the construction site (at least 2 m-high).
- (ii) Spray water to any opened area and work sites, as and when needed particularly during the summer season.
- (iii) All excavated soil and stockyard will be covered with tarpaulin or other appropriate cover material during nonworking hours, and excess soil will be removed from the worksite to the designated disposal site.
- (iv) Provide a space on-site to accommodate the required materials so that transport and delivery of construction materials and vehicular emissions will be minimized.

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<sup>9</sup> Physical Cultural Resources (PCR) as defined in SPS 2009 are movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings, may be above or below ground, or located under water. Their cultural interest may be at the local, provincial, national, or international level.

- (v) Alternate access routes to the site will be used (see Figure 5.1) to minimize safety risks to the university students, faculty members, and other people using the main roads of the university.
- (vi) Provide workers assigned to dusty areas with safety masks or goggles.
- (vii) Vehicles that will deliver construction materials to the site that generate dust will be covered with suitable material to contain the dust.
- (viii) Regularly maintain construction vehicles, generators (if required), and heavy equipment to avoid smoke belching.
- (ix) Prohibit burning of garbage, liquid waste and other combustible materials within the construction site.
- (x) Follow ECoP 2.0 measures on managing quality.



78. The PIU will ensure that ambient air quality limits set by the IFC–WB EHS General Guidelines 2007 and GOB will not be exceeded during the construction phase. GOB ambient air quality limits (2005) are less stringent compared to the IFC–WB EHS General Guidelines 2007. SPS 2009 requires that should host country regulations differ from the levels and measures set by the IFC–WB EHS General Guidelines 2007, the host country will achieve whichever is more stringent. In this case, the IFC–WB EHS General Guidelines 2007 will be the relevant limits that the Contractor needs to comply with.

#### (v) Impacts on Noise

79. The major sources of noise generation are movement of construction vehicles, associated land clearing, and construction of the new building. These activities, together with daily university activities, in some occasions, may exceed the limits provided for in the Noise (Pollution) Control Rules 2006. This intermittent increase in noise levels will be temporary, of short duration, and can be mitigated.

80. Exposure of workers to increased noise levels is an occupational as well as public health hazard. Table 5.1 presents the typical noise levels of tools and equipment. As a comparison, Table 5.2 presents the common sources of noise and decibel levels that people are generally exposed to. In order to mitigate the temporary negative impact on noise, the Contractor will be required to:

- (i) orient and inform workers, prior to construction works, about noise level requirements;

- (ii) provide workers assigned to high-level noise-generating activities with personal protective equipment such as earmuffs and earplugs, and rotated every 2 hours;
- (iii) undertake activities that generate noise during the daytime only (but will be adjusted depending on the weather and season);
- (iv) require drivers of construction vehicles to observe low speeds, and blowing of horns or whistles will not be allowed unless absolutely necessary;
- (v) assign staff to maintain the flow of traffic to avoid inconvenience to students, faculty members, and administrative staff;
- (vi) require regular tune-up of construction vehicles and proper maintenance of machinery; and
- (vii) observe ECoP 3.0 measures on managing noise and vibration.

**Table 5.1: Typical Noise Levels of Tools and Equipment**

Equipment	Noise Level, dB(A)
Cranes	78–103
Backhoes	85–104
Loaders	77–106
Dozers	86–106
Scrapers	97–112
Trenchers	95–99
Pile drivers	119–125
Compactors	90–112
Grinders	106–110
Chainsaws	100–115
Concrete saw	97–103
Sandblasting nozzle	111–117
Jackhammers	100–115
Compressors	85–104

dB(A) = decibel.

Note: These noise levels are measured at the operator's position.

Source: Chapter 14, Table 14-4 in Infrastructure Health & Safety Association.

<http://www.ihsa.ca/About.aspx>.

**Table 5.2: Common Sources of Noise and Decibel Levels**

Everyday Sounds and Noises	Average Sound Level (dBA)	Typical Response (after routine or repeated exposure)
Softest sound that can be heard	0	Sounds at these dB levels typically do not cause any hearing damage.
Normal breathing	10	
Ticking watch	20	
Soft whisper, quiet library	30	
Refrigerator hum	40	
Moderate rainfall	50	
Normal conversation, air conditioner	60	
Washing machine, dishwasher	70	You may feel annoyed by the noise
City traffic (inside the car)	80–85	You may feel very annoyed
Gas-powered lawnmowers and leaf blowers	80-85	Damage to hearing possible after 2 hours of exposure
Subway, passing motorcycle, gas mower	91	Dangerous to hearing; wear earplugs or earmuffs
Hair dryer, kitchen blender, food processor	94	Dangerous to hearing; wear earplugs or earmuffs

<b>Everyday Sounds and Noises</b>	<b>Average Sound Level (dBA)</b>	<b>Typical Response (after routine or repeated exposure)</b>
Motorcycle	95	Damage to hearing possible after about 50 minutes of exposure
Approaching subway train, car horn at 16 feet (5 meters), and sporting events (such as hockey playoffs and football games)	100	Hearing loss possible after 15 minutes
The maximum volume level for personal listening devices; a very loud radio, stereo, or television; and loud entertainment venues (such as nightclubs, bars, and rock concerts)	105–110	Hearing loss possible in less than 5 minutes
Shouting or barking in the ear	110	Hearing loss possible in less than 2 minutes
Standing beside or near sirens	120	Pain and ear injury
Jet plane takeoff, siren, pneumatic drill	120	Not safe for any period of time
Jackhammer	130	Not safe for any period of time
Firecrackers	140–150	Pain and ear injury

Sources: US Department of Health & Human Services, Centers for Disease Control and Prevention. Centers What Noises Cause Hearing Loss? [https://www.cdc.gov/nceh/hearing\\_loss/what\\_noises\\_cause\\_hearing\\_loss.html](https://www.cdc.gov/nceh/hearing_loss/what_noises_cause_hearing_loss.html); American Speech-Language-Hearing Association. Loud Noise Dangers. <https://www.asha.org/public/hearing/Loud-Noise-Dangers/#signs>.

#### **(vi) Generation of Waste**

81. Construction works are expected to generate waste such as spoils, construction materials, wood, cleared vegetation, waste food, cement container, and other similar debris. If not managed properly, this waste will be unsightly and may pose health and safety risks to workers and the community within BUET. To mitigate this impact, the Contractor will be expected to implement the following measures:

- (i) implement the waste management plan, which is part of the overall Construction Management Plan submitted to PIU before the start of construction;
- (ii) provide adequate garbage bins and require workers to separate waste for easier collection and management (i.e., residual oil and lubricants, paints, thinners will not be mixed with other waste);
- (iii) observe good housekeeping at the construction site at all times and monitor compliance;
- (iv) burning of solid waste at the construction site will not be allowed at any time; and,
- (v) observe ECoP 4.0 measures on waste management.

82. Waste that may be generated during project implementation will be disposed in designated disposal site approved by Dhaka South City Corporation (DSCC). After the separation of Dhaka City Corporation into north and south, BUET is under the jurisdiction of DSCC. There are four secondary transfer station (STS) in DSCC funded by ADB and it will likely be STS 12 for BUET which is located in front of Dhaka Medical College.<sup>10</sup> Final disposal for garbage generated from DSCC will be the Matuail landfill site about 6.5 km from BUET.

<sup>10</sup> Loan 2554/Loan 2555-Bangladesh: Urban Public and Environmental Health Sector Development Program approved on 28 September 2009.

### (vii) Impacts on People

83. Associated works during site preparation and construction of the new building may pose health and safety risks to workers and community. This could be from working on heights and constrained spaces. Noncompliance with relevant regulations on codes and standards on civil, mechanical, and electrical works may also trigger accidents to workers. Given the site, construction camps will not be located within BUET premises (West Palashi Campus). To minimize the occupational and community health and safety risks, the Contractor will be required to implement the following measures:

- (i) **Occupational health and safety risks.** To prevent accidents, provide workers and staff with appropriate personal protective equipment (PPE) and safety clothes such as hard hats, steel-toed boots, earmuffs or earplugs, etc.; and train and/or orient workers on safe building construction practices and other issues on safety. Wearing of safety gear will be mandatory and the statutory age requirements for employment as provided for in Bangladesh Labour Act 2013 will be strictly enforced. Consider providing group insurance to construction workers for accidents resulting to disabilities or death.

Sanitary facilities and safe drinking water will be provided to the workers and appropriate scaffoldings will be installed. Clear and visible warning signs and lighting will be installed. In case of medical emergency, first aid kits will be provided at the construction sites. Fire-fighting equipment will be provided on-site.

BUET has a Medical Centre at Fuller Road campus and is about 600 m from the West Palashi Campus (where the new building will be located). Students, teachers including their family members and all employees of BUET receive treatment, investigation and medical services at this Medical Centre. The Contractor can coordinate with BUET to ensure that there will be immediate medical assistance in the event of an emergency at the construction site.

At the start of each day, toolbox meetings that last for a few minutes will be held to remind workers of the importance of compliance to safety rules and procedures.

- (ii) **Community safety risks.** Prior to start of construction works, conduct awareness orientation and/or briefing about safety to key stakeholders in BUET (i.e., faculty staying in housing or dormitory, students, etc.). Inform PIU and key stakeholders (if required) on the schedule of construction activities that may pose risks to public safety. Proper fencing and enclosure (at least 2 m high) will be installed at the site to prevent unauthorized access. Security personnel will be posted to discourage pilferage and vandalism.

Set boundary line between construction site and areas accessible to BUET community. Provide proper identification of workers and staff at the construction site. Clear and visible warning and danger signs at and around the site will be installed. ECoP 5.0 gives additional measures on occupational health and community safety.

### C. Completion of Construction Works

84. Improper clean-up and disposal of construction debris may cause safety and health risks, and reduced aesthetic value. To ensure clean-up and restoration of construction sites, the Contractor will be required to restore and/or reinstate all areas potentially damaged during construction works. Workers who may be assigned to clean-up and restoration works will be provided with proper safety gear and equipment.

### D. Post-construction Phase

85. Upon completion of construction phase, the potential impacts will be mainly beneficial since the students, faculty members, and academic staff of the CSE Department will now have a new and fully furnished ECE Annex building. At this stage, they will enjoy the comfort of a new building.

#### (i) Occupancy of the New Building

86. Occupancy of the new building may give rise to improper use and inadequate maintenance. Absence of a proper building management plan may lead to premature wear and tear. The use of the new building may result to generation of waste from occupants.

87. To mitigate these potential impacts, BUET administration through the CSE Department will prepare a building maintenance and management plan that will include management of waste. The Chief Engineering Section will designate a waste management coordinator. The CSE Department can consult with other applicable institutes and/or departments in developing a building waste management program that will incorporate the 3R principles of reduce, reuse, and recycle.

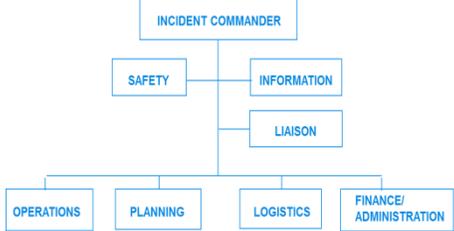
88. The CSE Department will conduct yearly orientation and briefing to staff, students, and other building users on the proper management and care of the new ECE Annex building.

#### (ii) Emergency Response Plan

89. Fire-fighting systems will be strategically located in the new building. There will be a security team to ensure safety and security of all building users. As part of emergency preparedness, a draft emergency response plan will be finalized in consultation with students, faculty, and administrative staff. Table 5.3 presents the key elements of the draft emergency response plan.

**Table 5.3: Key Elements of Draft Emergency Response Plan**

<b>Elements</b>	<b>Description</b>
Approach	The aim of this emergency response plan is to guide personnel during an accident or emergency situation to prevent or minimize injury, damage, and material loss; and also to prevent or mitigate environmental impact from the accident or emergency.
Types of emergency	<ul style="list-style-type: none"> <li>• Earthquakes</li> <li>• Cyclones</li> <li>• Energy or utility outages</li> <li>• Fire hazards</li> <li>• Hazardous materials releases</li> <li>• Terrorism</li> </ul>

Elements	Description
Planning	<ul style="list-style-type: none"> <li>• Identify hazards and assess risk</li> <li>• Assess capabilities and resources</li> <li>• Develop an emergency plan and procedures</li> <li>• Conduct training</li> <li>• Public relations</li> <li>• Conduct drills and exercises</li> <li>• Develop audit procedures</li> </ul>
Emergency preparedness requirements	<ul style="list-style-type: none"> <li>• Identify assembly points and/or evacuation points</li> <li>• Prepare well-defined escape routes</li> <li>• Install fire-fighting systems in strategic locations</li> <li>• Ensure that proper security arrangements are functioning at all times</li> <li>• Ensure efficient transport and communications system</li> <li>• Prohibit smoking within areas with flammable substances (if any)</li> <li>• Ensure water availability for fire-fighting</li> <li>• Ensure availability of sufficient number of trained staff to deal with any emergency situation</li> <li>• Supply clear and audible emergency alarms or whistles and public address system</li> <li>• Conduct drills to familiarize students, faculty, and administrative staff on evacuation routes and use of the fire-fighting system</li> <li>• Provide emergency contact number of the medical center (and nearest hospital), ambulance, and fire service and police stations</li> <li>• Switch off main electrical equipment when not in use</li> </ul>
Incident command system	 <pre> graph TD     IC[INCIDENT COMMANDER] --- S[SAFETY]     IC --- I[INFORMATION]     I --- L[LIAISON]     IC --- O[OPERATIONS]     IC --- P[PLANNING]     IC --- LOG[LOGISTICS]     IC --- FA[FINANCE/ADMINISTRATION] </pre>

### (iii) Effects of climate change

90. Based on the climate change assessment conducted for the project, with business as usual scenario, temperature will continue to rise and is expected to be around 1.8°C from baseline (1986–2005) by 2050. To address this likely temperature change in the future, the building envelope and windows will be designed to consider natural light, ventilation, and wind speed.

91. Extreme rainfall events may increase in the future that may lead to flooding. Bangladesh is a flood-prone country with about 80% of its surface forming a giant floodplain. Flooding types are flash flood (due to heavy or excessive rainfall), river/sea flooding (or monsoon flooding) and waterlogging (due to poor drainage). The western part of Dhaka will have a higher exposure to riverine and monsoonal floods. In Dhaka Metropolitan Area, where BUET is located, it is bounded by rivers namely, Turag River, Buriganga River, Dhaleshwari River, Balu River, and Sitalakhya River but they are far from BUET. The closest of which is Buriganga River, about 6 km from BUET, thus riverine flooding risk is considered very low.

92. Dhaka is situated in a Zone 2 earthquake-prone area (moderate risk). Design of the new building will comply with the Bangladesh National Building Code (2006), Chapter 2 (Loads on Buildings and Structures). Engineering and architectural design of the new building are considered sufficient to address disaster risks and the future effects of climate change. The national building codes incorporate relevant international standards from ASME, ASTM, ASHRAE, ASCE, IEC and the like.

## VI. ANALYSIS OF ALTERNATIVES

93. Given the limited space within the government-owned area in BUET, there were no alternatives considered that may require land acquisition. However, a “no project” option was considered and compared to the “with project” option.

94. The “no project” option will mean that the vacant space or piece of land behind the existing ECE Annex in the West Palashi Campus of BUET will not have its best and highest usage of land. In addition, the undergraduate and graduate students, faculty, and staff of CSE Department will not have the opportunity to benefit from the innovative ICT learning environment that the new building will provide. Table 6.1 presents a comparison of the “no project” and “with project” options.

**Table 6.1: Comparison of “With Project” and “No Project” Options**

Description	“With Project” Option	“No Project” Option
Producing students equipped with state-of-the-art training and education fit to the requirements of the ICT industry	There will be demand for ICT graduates to meet the requirements of the ICT industry	Limited or no possibility of producing better graduates due to poor ICT facilities
Inconvenience and disruption to daily activities during construction	There will be temporary disruption to the university community	Potential traffic congestion may also occur due to increased population and vehicle owners
Ecological impacts	Site has less than 10 mature trees with some patches of grass	Existing environmental condition will be the same
Creation of temporary employment	There will be temporary jobs for skilled and nonskilled workers during construction	No temporary jobs will be created
Opportunities for students to have more options for ICT training	There will be more options for R&D and training; links to the private sector are expected to improve chances of employability	No opportunities
Contribution to Vision 2021	Will contribute to the goals and objectives	No contribution

ICT = information and communication technology.

## VII. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

### A. Introduction

95. Consultations aim to engage key stakeholders throughout the project implementation and to know their concerns and perceptions, if any, about the project. These events give the opportunities for the public to share their views to BUET about the proposed construction of the new multi-storied ECE Annex building, and also for BUET to present to the stakeholders relevant

information on the project. Consultation will not be limited during the preparation of IEE but will be carried out during project implementation.

## B. Methodology

- (i) **Identification of stakeholders.** Stakeholders are considered to be primary if they will be directly affected during construction and post-construction, namely, students, faculty members, administrative staff, and support services staff. Secondary stakeholders are persons, organizations, or businesses that may not be directly affected but may have interests on the project, such as relevant government agencies, nongovernment organizations, transport cooperatives, and the general public. Stakeholders were invited by the BUET project team focal person through phone calls, letter, and personal visits.
- (ii) **Approach.** Participants were informed of the proposed project and the potential environmental impacts due to the project. After the presentations, participants were given the time for questions and answers to raise their concerns. Discussions were done in Bangla and English.
- (iii) **Record of the meeting.** General information of the participants such as name, gender, occupation, and signature were collected and shown in the attendance list.

## C. Results of Consultation

96. The consultation was held on 3 April 2019 at the Information Access Centre of the CSE Department, BUET. A total of 61 participants joined, consisting of faculty staff from the Eden Mohila College,<sup>11</sup> representative from the Bangladesh Bureau of Educational Information and Statistics, students and faculty from the Department of Electrical and Electronics, students and Faculty from CSE Department, Secretary of Polashai Bazar Market Association (located on the east side of the proposed building), and residents from the settlements along Dhakeshwari Road.

97. Faculty members of BUET CSE Department made a presentation about the CSE program in BUET and also about the proposed project (i.e., outputs 1–4), which includes the new building. The consultants briefly discussed the requirements for environmental due diligence and measures to be implemented to ensure that the temporary adverse impacts of construction will be mitigated including the grievance redress mechanism. Appendix 2 gives the list of participants and some photographs of the event. Table 7.1 presents the summary of consultations.

**Table 7.1: Summary of Consultations**

Issues Raised	Response from Project Team
Research and development opportunities may be limited to students from CSE Department only	Any student opportunity that the project will provide will be open to other students of BUET if applicable to their circumstances regardless of race or gender.
Impact on academic activities during construction may be minimal. The campus is secluded from the outside community and existing academic buildings are well insulated from noise levels.	To make sure that there will be minimal impacts on air quality and noise levels, mitigation measures will be required of the Contractor.
Access of Contractor and workers during construction works	Contractor will have two access options: (i) existing temporary gate behind the main ECE

<sup>11</sup> Eden Mohila College is a women's college in Azimpur, Lalbag first established in 1873 in the Farashganj area of Dhaka. It has about 35,000 students in an area of about 17 acres. See <http://www.emc.edu.bd/>.

Issues Raised	Response from Project Team
	Building used during the ongoing construction of Cafeteria, and (ii) another temporary gate can be used along the Dhakeshwari Road. Contractor will finalize the alternate access in consultation with PIU in BUET.
Emergency evacuation points and better alarm system in the new building to warn students of an emergency	The new building will be designed to withstand natural hazards to the extent possible and will be equipped with better emergency alarm and public address systems. An emergency response plan or program will be finalized that will include regular mock drills for students, faculty members, and staff.
Regular emergency training and awareness program to be provided by the Chief Engineer Office of the university	Training and awareness program will be included in the Emergency Response Plan not only for the new building but for BUET
Positive impact is anticipated through use of solar panel and LED as well as incorporation of automation or high-technology in design	New building will incorporate green building features and will be designed to be climate change-resilient
Proper road signage and speed control measures with traffic lights for pedestrian road crossing at the Polashi-Dhakeshwari Road	Clear and visible warning signs will be required from the Contractor to minimize safety risks to students and to community. If needed, the Contractor will be required to designate staff to manage traffic on the stretch of Polashi-Dhakeshwari Road close to the project site during construction.
Opportunity to create more graduates from CSE Department	It is the goal of the project to create opportunities for more quality graduates from CSE Department to meet the emerging requirements of the ICT industry not only in Bangladesh but also globally.
Accommodation facilities for graduate students due to traffic jam	Providing hostel or temporary student accommodations during traffic jams is not part of the building design but BUET can explore the possibility particularly for training participants.
Contractor's behavior and access to construction materials	Contractor and their workers will be required to comply with applicable rules and regulations of BUET including the Government of Bangladesh and ADB.  Project site will be temporarily enclosed and the Contractor will be required to assign security personnel to prohibit unauthorized access and to ensure separation of student access to workers.

BUET = Bangladesh University of Engineering and Technology, CSE = computer science and engineering, ICT = information and communication technology, LED = light-emitting diode, PIU = project implementation unit.

#### D. Consultations and Information during Implementation

98. Consultations with students, faculty, and administrative staff will continue. This could be on construction practices, building management, and emergency preparedness. To meet disclosure requirements of ADB, a project brief (both in Bangla and English) will be posted on the website of BUET. A one-page project brief (also both in English and Bangla) will be made available to interested individuals in BUET and UGC. The one-page flyer or Q&A will include

details on the grievance redress mechanism. Also, the IEE to be posted on the ADB website will provide more information on the project.

## VIII. GRIEVANCE REDRESS MECHANISM

99. To ensure that complaint(s) will be addressed properly during project implementation, the PMU, through the PIU, will establish a grievance redress mechanism (GRM) as soon as the ADB loan becomes effective. The GRM is a process of handling complaints from affected people on the environmental performance of the project, in reviewing, and in facilitating the resolution.

### A. Objectives of the Grievance Redress Mechanism

100. The GRM ensures a process of receiving and resolving complaint(s) promptly from persons that may be affected by the new ICT building. Following the requirements of SPS 2009, the GRM will involve a process that is understandable, transparent, gender-responsive, culturally appropriate, and easily accessible to affected persons without cost and retribution.

### B. Structure

101. A grievance redress committee (GRC) will be created and may consist of (i) PMU head, (ii) representative from the local government, (iii) representative of Contractor, and (iv) witness of the complainant. The environmental safeguard consultant at the PMU will act as the secretary of the GRC. Ideally, the GRC will continue to function from construction until post-construction. However, given the nature of the project, where environmental issues may be of concern during the construction phase, the GRC may be inactive post-construction. MOE and UGC will ensure the representation of women in the GRC.

102. The GRC will be responsible for resolving complaint(s) and will convene once a month to review the complaint(s) received, if any. GRC will resolve complaint(s) within 15 days from the date of receipt and will keep a record indicating the name of complainant and nature of complaint, status of resolving the complaint, decisions or actions undertaken, and the date the decision was effected.

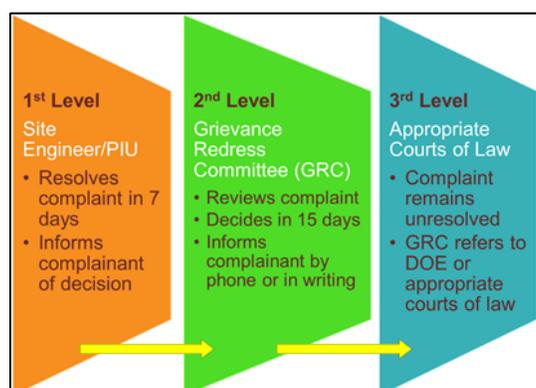
103. The PMU will review the implementation of the GRM regularly to assess the effectiveness of the process and to examine their ability to address grievances. The cost of implementing the GRM will be borne by the PMU as part of administration costs.

- (i) **Information disclosure.** PIU will disclose details on the GRM through the project website of BUET as well as post on the billboards at the construction site. Details will include the contact person, a hotline phone number, and a simplified flowchart on how to file a complaint.
- (ii) **Record-keeping.** The record will consist of all complaints received including contact details of the complainant, date the complaint was received, nature of grievance, decisions and date, and date the complainant was informed of the decision. Grievances filed and resolved will be summarized and included in the semiannual monitoring reports submitted to ADB during the construction stage, and annually during post-construction and/or operation stage.
- (iii) **Procedure.** Complaints can be lodged either by approaching the Site Engineer of the Contractor, in writing or by phone. A complaint form is given in Appendix 3. Transparency will be maintained on the grievances received and their resolution. The environmental safeguard consultant will provide support to the complainant in

filing the complaint. Affected persons can seek redress to their complaints in three levels: (i) through the PIU or through the Site Engineer of the Contractor, (ii) through the GRC, and (iii) the DOE under provisions set forth by the Environment Court Act 2000 (amended in 2002 and 2010) or the appropriate courts of law (see Figure 8.1). The complainant is not restricted to seek redress through the legal system at any point in the GRM process. The three-tier entry points include:

- (a) First level – Contractor Site Engineer or PIU Head: Complaint to be resolved at the PIU level within 7 days and advise the Complainant accordingly.
- (b) Second level – GRC: If complaint is not resolved at the first level, the Complainant can submit the complaint to the GRC chaired by the PMU Head. The GRC will review the submission and make a decision within 15 days. The Complainant will be informed of the decision in person, by mail, or by phone.
- (c) Third level – Appropriate Courts of Law: If the complaint remains unresolved, this will be referred by the GRC to the DOE or the appropriate courts of law.

**Figure 8.1: Three-Tier Grievance Redress Mechanism**



## IX. ENVIRONMENTAL MANAGEMENT PLAN

104. The summary of impacts and measures that will be conducted to mitigate the adverse impacts are presented in the environmental management plan (EMP). The EMP covers the monitoring plan and the institutional arrangements required. Table 9.1 presents the EMP.

### A. Monitoring

105. The environmental monitoring is a time-bound process to ensure that noncompliance of the Contractor will be avoided or will be immediately addressed. Environmental monitoring reports will be submitted to ADB twice a year during construction and annually post-construction. The environmental monitoring reports submitted to ADB will be publicly disclosed on the ADB website as required by SPS 2009 and Access to Information Policy 2019. Table 9.2 presents the environmental monitoring plan (EMoP).

## **B. Implementation Arrangements**

### **1. *Project management unit.***

106. The PMU will be set up at UGC, which will be responsible for the overall management of the project. Supported by an environmental safeguard consultant, the PMU will be also responsible for ensuring that the EMP and EMoP are properly implemented and complied with by the Contractor, submitting the environmental monitoring report to ADB, and handling complaints following the GRM. The terms of reference of the environmental safeguard consultant for the PMU is given in Appendix 4.

### **2. *Project implementation unit.***

107. The BUET will set up a PIU that will be responsible for managing the project. The PIU will ensure proper implementation of the EMP and EMoP, timely reporting to PMU of the environmental monitoring report required by ADB (see Appendix 5 and Appendix 6 for proposed format), scheduling of public consultations (as appropriate), and handling of complaints according to the GRM. Key responsibilities of the PIU are as follows:

- (a) Designate a staff to oversee implementation of EMP and EMoP.
- (b) Ensure compliance of Contractor to EMP and EMoP.
- (c) Engage stakeholders, as appropriate.
- (d) Conduct on-site spot checks to monitor compliance of Contractor (see Environmental Inspection and Monitoring Checklist in Appendix 7).
- (e) In the event of noncompliance by Contractor or any unanticipated environmental impacts, coordinate with the PMU environmental safeguard consultant in preparing a corrective action plan to address the issue with time-bound actions; this corrective action plan will be submitted to ADB for review and will be disclosed on the ADB website.
- (f) Ensure that any grievance or complaint received is addressed in a timely manner.
- (g) Maintain a record of grievances or complaints received, resolutions or actions taken, including details in the environmental monitoring report.
- (h) Keep a list of relevant permits issued by the GOB for the project, if any.
- (i) Prepare the respective environmental monitoring report and submit to the PMU for consolidation and finalization by the environmental safeguard consultant.

108. In the event there will be a change in the design of the new ECE Annex building, this IEE will be updated or revised and submitted to ADB prior to any construction works. The updated or revised IEE will be also disclosed on the ADB website.

### **3. *Contractor of civil works.***

109. The EMP, which includes the EMoP, will be an integral part of the Bid and Contract documents. This will be verified by the PIU and the PMU. The Contractor will designate its own environmental staff who will be responsible in overseeing the implementation and compliance with the EMP and EMoP during the construction phase. The Contractor will maintain a record of complaints and grievances submitted at the project level through the Contractor, including the action taken to address the issue.

110. The designated environmental staff will submit a monthly compliance and monitoring report to the PIU-designated environmental staff. The compliance and monitoring report will cover the EMP, EMoP, and the specific environmental clause(s) in their contract.

**Table 9.1: Environmental Management Plan**

<b>Project Activity</b>	<b>Potential Environmental Impacts</b>	<b>Mitigation/Enhancement Measures</b>	<b>Estimated Cost</b>	<b>Implementing Unit</b>	<b>Supervising and Monitoring Unit</b>
<b>Design and Pre-Construction Stage</b>					
Site survey and design of the new building	<ul style="list-style-type: none"> <li>Failure of the building to withstand climate change and natural hazards</li> <li>Potential safety and health risks to students and building users due to poor building design</li> </ul>	<ul style="list-style-type: none"> <li>Green building features were incorporated</li> <li>Design will comply with the requirements of BNBC 2006 and relevant provisions in the BNBC 2015 (draft)</li> </ul>	Included in project cost	PIU, Design Consultant	PMU and Environmental Safeguard Consultant
	<ul style="list-style-type: none"> <li>Lack of technical capacity on safeguards at BUET (CSE Department)</li> </ul>	<ul style="list-style-type: none"> <li>PIU will designate staff to coordinate with the Environmental Safeguard Consultant in PMU</li> <li>PIU team will undergo orientation training on the safeguards requirements and compliance under SPS 2009</li> <li>PIU may consider engaging intermittent consultant on safeguards</li> </ul>	PIU Budget	PIU, Environmental Safeguard Consultant	PMU and ADB
<b>Construction Stage</b>					
Complete construction management work plan	<ul style="list-style-type: none"> <li>Avoid impacts of Contractor unplanned activities</li> <li>Smooth work implementation</li> </ul>	<ul style="list-style-type: none"> <li>Temporary pedestrian and traffic management plan to minimize disturbance from vehicular traffic and workers</li> <li>Spoils disposal and construction waste management plan</li> <li>Noise and dust control plan</li> <li>Drainage and stormwater management plan</li> <li>Materials management plan</li> <li>Emergency or disaster preparedness plan</li> <li>Provide list of contact details during emergency to workers or post on billboards at the construction site</li> </ul>	Included in the project cost	Contractor, PIU	PMU, Environmental Safeguard Consultant

Project Activity	Potential Environmental Impacts	Mitigation/Enhancement Measures	Estimated Cost	Implementing Unit	Supervising and Monitoring Unit
Orientation of workers and staff	<ul style="list-style-type: none"> <li>Awareness to environmental requirements and their responsibility</li> <li>Understanding the responsibility of Contractor in implementing the EMP, compliance to ADB requirements and the government</li> <li>Provide HIV-AIDS education and disease prevention awareness talks to the workers and staff</li> </ul>	<ul style="list-style-type: none"> <li>Conduct briefing on EMP, records management, compliance, and reporting</li> <li>Identify areas to be monitored and the required mitigation measures</li> <li>Create awareness of sexually transmitted diseases such as HIV/AIDs</li> </ul>	Included in the Contractor cost	PIU, Environmental Safeguard Consultant	PMU
Prepare for emergency situation	<ul style="list-style-type: none"> <li>Create awareness of workers on emergency situation</li> </ul>	<ul style="list-style-type: none"> <li>Designate Disaster Coordinator to guide during an emergency</li> <li>Conduct mock drills regularly</li> <li>Provide information like emergency hotline, evacuation routes, etc.</li> <li>Provide training or orientation on proper response during emergency</li> </ul>	n/a	Contractor, PIU	PMU, Environmental Safeguard Consultant
Hiring of project staff and workers	<ul style="list-style-type: none"> <li>Dispute over transparency in hiring</li> </ul>	<ul style="list-style-type: none"> <li>Contractor will be required to give priority to local labor</li> </ul>	n/a	Contractor, PIU	PMU, Environmental Safeguard Consultant
Site preparation and construction works	<ul style="list-style-type: none"> <li>Disturbance and inconvenience to people due to traffic, increased noise and dust levels, and disposal of waste</li> <li>Emissions from heavy equipment machinery and construction vehicles</li> </ul>	<ul style="list-style-type: none"> <li>CMP will be strictly implemented</li> <li>Use of proper safety clothes/equipment</li> <li>Provide temporary enclosures (at least 2 meters high) to contain dust and minimize noise</li> </ul>	Included in the costs of Contractor	Contractor, PIU	PMU, Environmental Safeguard Consultant
	<ul style="list-style-type: none"> <li>Potential chance find during site excavation</li> </ul>	<ul style="list-style-type: none"> <li>Chance find procedures in ECoP 1.0 will be followed</li> </ul>			Environmental Safeguard Consultant
	<ul style="list-style-type: none"> <li>Potential safety risks to community</li> </ul>	<ul style="list-style-type: none"> <li>Provide fence or barricade, sufficient lights, clear warning signs and danger signals, and take all precautions identified in the community and safety plan of CMP</li> <li>Assign security staff prevent accidents, trespassing, and pilferage</li> </ul>			PMU, Environmental Safeguard Consultant

Project Activity	Potential Environmental Impacts	Mitigation/Enhancement Measures	Estimated Cost	Implementing Unit	Supervising and Monitoring Unit
		<ul style="list-style-type: none"> <li>Contractor to direct drivers to strictly follow road regulations</li> </ul>			
	<ul style="list-style-type: none"> <li>Potential occupational health and safety risks to workers</li> </ul>	<ul style="list-style-type: none"> <li>Provide workers with hard hat, safety shoes, and belts</li> <li>Set up first aid at construction site</li> <li>Comply with relevant safety measures required by law and best engineering practices</li> </ul>			PMU, Environmental Safeguard Consultant
	<ul style="list-style-type: none"> <li>Heavy equipment and construction vehicles may increase vehicular emissions</li> <li>Transport of materials to construction site may increase dust level</li> <li>Earthmoving works and opened land areas increase dust levels</li> <li>Increase in noise level and vibration from excavation and heavy equipment and construction vehicles</li> </ul>	<ul style="list-style-type: none"> <li>Construction vehicles will be maintained to minimize vehicular emissions</li> <li>Provision of temporary enclosures</li> <li>Provide space on-site for construction materials to reduce trips of material delivery</li> <li>Contractor will be required to maintain construction vehicles, equipment and machineries regularly to reduce emissions, avoid smoke belching, and reduce noise</li> <li>Spray water in opened land areas or in sources of dust</li> <li>Transport of dust-generating materials will be covered</li> <li>Observance of low speed by vehicles to reduce noise</li> <li>Noise-generating works will be done between 6 a.m. and 11 p.m. only.</li> <li>No blowing of horns will be allowed</li> <li>Comply with traffic management plan</li> </ul>			PMU, Environmental Safeguard Consultant
Construction of ICT building	<ul style="list-style-type: none"> <li>Noncompliance with relevant regulations</li> <li>Potential accidents due to working on heights</li> <li>Occupational and community safety risks</li> <li>Generation of waste</li> </ul>	<ul style="list-style-type: none"> <li>Monitor compliance with regulations</li> <li>Provide PPE to workers</li> <li>Provide first aid kits and fire-fighting system</li> <li>Conduct daily toolbox meeting prior to start of work</li> </ul>	Included in Contractor costs	Contractor, PIU	PMU, Environmental Safeguard Consultant

Project Activity	Potential Environmental Impacts	Mitigation/Enhancement Measures	Estimated Cost	Implementing Unit	Supervising and Monitoring Unit
		<ul style="list-style-type: none"> <li>• Conduct work only from 6 a.m. to 11 p.m.</li> <li>• Provide enclosures to noise-generating works and equipment, and areas generating dust</li> </ul>			
Clean up of construction sites after completion of construction works	<ul style="list-style-type: none"> <li>• Improper disposal of construction debris</li> </ul>	<ul style="list-style-type: none"> <li>• Restore or reinstate all the areas potentially damaged during construction works</li> <li>• Workers will be provided with proper safety gear and equipment</li> <li>• Dispose remaining waste and debris at designated sites</li> </ul>	Included in Contractor costs	Contractor, PIU	PMU, Environmental Safeguard Consultant
<b>Post-construction stage</b>					
Occupy new building	Improper use and lack of care to the new building	<ul style="list-style-type: none"> <li>• BUET to conduct orientation and awareness to staff and students on proper care of the facility</li> </ul>	Include in operation costs	PIU, CSE Department	PMU
	Generation of waste	<ul style="list-style-type: none"> <li>• Designate waste management coordinator</li> <li>• Prepare waste management plan with time-bound targets</li> <li>• Conduct yearly training or orientation for trainees on waste management, proper collection, and disposal</li> <li>• Explore measures to implement effectively the 3R principles of reduce, reuse, and recycle.</li> </ul>	Include in operation costs	PIU, CSE Department	PMU
	Potential incidence of emergency or natural disaster	<ul style="list-style-type: none"> <li>• Prepare emergency and disaster preparedness plan and procedures</li> <li>• Designate a Disaster Coordinator</li> <li>• Conduct trainings, orientations, and drills on safety and emergency awareness</li> <li>• Provide clear and visible emergency warning signs</li> </ul>	n/a		PMU

ADB = Asian Development Bank, BUET = Bangladesh University of Engineering and Technology, CMP = construction management plan, CSE = computer science and engineering, EMP = environmental management plan, EMoP = environmental monitoring plan, n/a = not applicable, PIU = project implementation unit, PMU = project management unit, PPE = personal protective equipment.

**Table 9.2: Environmental Monitoring Plan**

Project Stage	Parameter	Location	Method of Measurement	Frequency	Responsibility	
					Implementation	Supervision
Construction	Generation of waste and other construction debris	Construction site	Volume of waste or number of trips	Twice a month	Contractor	PIU
	Increase in dust level	Construction site	<ul style="list-style-type: none"> <li>• Frequency of water spraying</li> <li>• Ocular inspection</li> </ul>	Daily	Contractor	PIU, Environmental Safeguard Consultant
	Ambient air quality	Sampling stations in Table 4.3	<ul style="list-style-type: none"> <li>• PM<sub>10</sub> and PM<sub>2.5</sub></li> </ul>	Quarterly		
	Ambient noise level	Sampling stations in Table 4.4	Sound level meter (dBA)	Quarterly		
	Availability of project information	PIU and construction site	One-page flyer, project brief, or Project Q&A	Quarterly	Contractor, PIU	Environmental Safeguard Consultant, PMU
	Recruitment from local labor	PIU office	Number of local workers and staff recruited	Monthly	Contractor, PIU	PMU
	Orientation of workers on health and safety	Construction site	Number of participants	Semi-annually	Environmental safeguard consultant, Contractor, PIU	PMU
	Orientation of Contractor and workers on issues like HIV/AIDS, compliance with EMP and ADB requirements, etc.	Construction site	Number of participants	Once before construction	Environmental safeguard consultant, PIU	PMU
	Solid waste management	Construction site	Volume of waste disposed; ocular inspection or spot checks	Every week	Contractor	PIU, Environmental Safeguard Consultant
	Clear and visible warning signs for safety of workers and BUET community	Construction site and access roads	Ocular inspection or spot checks	Once a month	Contractor	PIU, Environmental Safeguard Consultant
	Announcement to the public of works schedule	BUET community	Work schedule log sheet	As needed	Contractor	PIU, Environmental Safeguard Consultant
	Smoke belching construction vehicles	Construction site and access roads	Ocular inspection or spot checks	Weekly	Contractor	PIU, Environmental Safeguard Consultant
	Proper storage and management of construction materials and wastes	Construction site	Number of vehicles Ocular inspection or spot checks	Weekly	Contractor	PIU, Environmental Safeguard Consultant
	Use of PPE and safety gear	Construction site	Ocular inspection or spot checks	Twice a week	Contractor	PIU, Environmental Safeguard Consultant

Project Stage	Parameter	Location	Method of Measurement	Frequency	Responsibility	
					Implementation	Supervision
	Condition of sanitary facilities and safe drinking water	Construction site	Ocular inspection or spot checks	Weekly	Contractor	PIU
	Good housekeeping	Construction site	Ocular inspection or spot checks	Twice a week	Contractor	PIU
Post-construction	Orientation of students, faculty, and administrative staff on care and maintenance of the building	BUET	Number of trainees	Annually (at start of each term)	<ul style="list-style-type: none"> <li>Office of Chief Engineer</li> <li>Office of Director of Planning, Development and Works</li> </ul>	PIU
	Good housekeeping (also garbage collection and disposal)	BUET	Ocular inspection or spot checks	Monthly	Office of Chief Engineer	PIU
	Condition and maintenance of fire extinguishers, fire-fighting units, and fire alarms	BUET	Ocular inspection or spot checks	Annual	Office of Chief Engineer	PIU
	Safety, emergency, disaster manual, and procedures	BUET	Check manuals	Annually	Office of Chief Engineer	PIU
	Emergency mock drills	BUET	Number of trainees	Semiannual	Office of Chief Engineer	PIU
	Greening program, grounds maintenance	BUET	Types of plants, area planted	Annually	Office of Chief Engineer	PIU
	Condition of safety gears and emergency equipment	BUET	Ocular inspection or spot checks	Annual	Office of Chief Engineer	PIU
	Building condition <ul style="list-style-type: none"> <li>Roof</li> <li>Electrical panel and wiring</li> <li>Door handles, windows, hinges, and closures</li> <li>Walls and ceilings</li> <li>Fume hoods</li> <li>Stairways and fire exits or escape</li> <li>Storm water drains</li> </ul>	BUET	Ocular inspection or spot checks for cracks, signs of water leaks, damage, fire hazards, etc.	Semiannual	Office of Chief Engineer	PIU

BUET = Bangladesh University of Engineering and Technology, PIU = project implementation units, PM<sub>2.5</sub> = particulate matter 2.5, PM<sub>10</sub> = Particulate matter 10, PPE = personal protective equipment, Q&A = question-and-answer.

## **X. CONCLUSION AND RECOMMENDATION**

111. The potential environmental impacts associated with the construction of the new ECE Annex Building within the premises of BUET (West Palashi Campus) are assessed as appearing mainly during the construction phase, are of short duration, temporary, reversible, and can be easily mitigated by good and best practices in engineering construction. The potential impacts can be mitigated also by adhering to the design provisions set forth in the BNBC 2006. The mitigation measures are outlined in the EMP and the parameters to be monitored are listed in the EMoP.

112. Stakeholders were consulted and a GRM to deal with potential complaints on the project was described. Public consultations will continue in varying degrees throughout project implementation. An environmental safeguard consultant will be engaged in the PMU throughout the construction phase to ensure capacity and technical support in complying with the requirements of ADB. Environmental monitoring reports will be submitted by the PMU to ADB semiannually during construction and annually post-construction. These monitoring reports will be similarly disclosed to ADB website.

113. Given this, UGC and BUET are committed to comply with the requirements of ADB.

## ENVIRONMENTAL CODES OF PRACTICE

1. The environmental codes of practice (ECoP) provide guidance in managing potential environmental impacts during the construction phase.

**ECoP 1.0** – “Chance find” of physical cultural resources

**ECoP 2.0** – Managing air quality

**ECoP 3.0** – Managing noise and vibration

**ECoP 4.0** – Waste Management

**ECoP 5.0** – Occupational health and community safety

Area of Concern		Project Activity	Management Measures
ECoP 1.0	“Chance find” of physical cultural resources	Excavation for building foundation and other earthmoving works	The Contractor will ensure that <ul style="list-style-type: none"> <li>• Excavation works within the area of “chance find” will be stopped</li> <li>• Identify and mark the area with a global positioning system (GPS) unit to determine the exact location and take photographs</li> <li>• Secure the area discovered to avoid potential damage, loss, or removal of any movable or transportable object</li> <li>• Inform the PIU of the “chance find” and designate a security personnel until a representative from the Ministry of Cultural Affairs arrives</li> </ul>
ECoP 2.0	Managing air quality	<ul style="list-style-type: none"> <li>• Use of construction vehicles and machinery</li> </ul>	Contractor will perform the following: <ul style="list-style-type: none"> <li>• Prepare air quality management plan as part of the overall construction management plan and consult PIU for concurrence</li> <li>• Keep construction vehicles in good working condition and limit idling time to not more than 2 minutes</li> <li>• Cover trucks and other vehicles transporting materials that generate dust</li> <li>• Implement speed limits on vehicular movement within the construction sites</li> <li>• Sprinkle water on crusher and orient workers to follow good practices while handling material in concrete-mix plant</li> </ul>

Area of Concern		Project Activity	Management Measures
		<ul style="list-style-type: none"> <li>• Construction activities</li> </ul>	<p>The Contractor will perform the following:</p> <ul style="list-style-type: none"> <li>• Spray water regularly (or as needed) to unpaved and opened land areas, material stockpiles, and access roads to contain dust</li> <li>• Dust-generating construction activities will be enclosed to contain dust dispersion</li> <li>• Workers assigned to activities generating high dust level will be provided with personal protective equipment (PPE) such as masks, goggles, etc.</li> <li>• Must ensure that there will be minimum generation of dust and waste while unloading the materials from delivery trucks or construction vehicles</li> <li>• Materials generating dust such as sand and gravel will be covered particularly during nonworking hours</li> <li>• Revegetate opened areas (if possible) to limit area of exposed land</li> <li>• Stock cement and other dust-generating materials in covered space</li> <li>• Provide area for mixing and loading of construction materials</li> <li>• Burning of solid waste within the construction site will not be allowed</li> <li>• Batching plant will be located upwind of the construction site</li> </ul>
ECOP 3.0	Managing noise and vibration	<ul style="list-style-type: none"> <li>• Vehicular traffic</li> </ul>	<p>The Contractor will ensure the following:</p> <ul style="list-style-type: none"> <li>• Regular upkeep and maintenance of construction vehicles to minimize generation of unwanted noise</li> <li>• Drivers of construction vehicles to comply with speed limits</li> <li>• Use of horns will be allowed only when necessary</li> <li>• Divert routes to minimize traffic, observe loading and unloading procedures, and minimize unnecessary noise at the construction site</li> </ul>

Area of Concern		Project Activity	Management Measures
		<ul style="list-style-type: none"> <li>• Use of construction machinery and equipment</li> </ul>	<p>The Contractor will ensure the following:</p> <ul style="list-style-type: none"> <li>• Enclosure and/or isolation of noise-generating machinery and equipment to contain noise levels</li> <li>• Identify and organize all noise-generating activities to minimize increase in ambient noise levels</li> <li>• Proper and regular maintenance of equipment and machinery to avoid unwanted generation of noise</li> <li>• Avoid the use of alerts, horns, or sirens unless absolutely necessary like during emergencies</li> </ul>
		<ul style="list-style-type: none"> <li>• Construction works</li> </ul>	<p>Contractor will ensure the following:</p> <ul style="list-style-type: none"> <li>• Nearby local residents are notified of noise-generating activities, time and duration</li> <li>• Operators of heavy equipment and machineries will be educated or oriented on construction techniques to reduce generation of noise</li> <li>• Temporary noise barriers or enclosures are installed, where needed</li> <li>• On-site deliveries will be planned to minimize noise from delivery trucks</li> <li>• Noise-generating activities will be conducted only during daytime (6 a.m. to 11 p.m.)</li> <li>• Schedule of noise-generating activities and deliveries of materials will be coordinated with the PIU to ensure minimal disruption to students and activities in BUET (West Palashi Campus)</li> </ul>
ECoP 4.0	Waste Management	<ul style="list-style-type: none"> <li>• Generation of waste at construction sites</li> </ul>	<p>Contractor will perform the following:</p> <ul style="list-style-type: none"> <li>• Identify the activities that will generate waste and identify location for disposal</li> <li>• Develop waste management plan for different waste streams prior to start of construction works</li> <li>• Orient workforce on disposal of waste, location of disposal site, and specific requirements for management of these sites</li> <li>• Wastes that cannot be reused will be disposed of safely at designated sites</li> <li>• Minimize generation of waste by implementing 3Rs (reduce, reuse,</li> </ul>

Area of Concern		Project Activity	Management Measures
			<p>recycle), and segregate waste at source</p> <ul style="list-style-type: none"> <li>• Waste will be transported in fully covered trucks to prevent spillage along the way</li> <li>• Provide appropriate bins or containers for waste at the construction site</li> <li>• Conduct orientation of the workforce on waste management practices</li> <li>• Require workers to observe good housekeeping at all times</li> </ul>
		<ul style="list-style-type: none"> <li>• Handling of hazardous waste</li> </ul>	<p>Contractor will ensure the following:</p> <ul style="list-style-type: none"> <li>• Chemical wastes are stored in sealed container and properly labeled</li> <li>• All chemical containers such as paints are labeled properly for easy identification</li> <li>• Material Safety Data Sheets of all chemicals on-site during construction are maintained and properly recorded</li> <li>• Chemical and other hazardous materials are stored in banded place, or in an area lined with impervious material and away from drainage system to prevent soil contamination</li> <li>• Store sufficient stock of absorbent materials for used chemicals or spent lubricants, lube oil, etc.</li> </ul>
ECoP 5.0	<p>Occupational health and community safety</p> <p>The Contractor will be responsible for including the protection of every person and nearby property from construction accidents. The Contractor will be responsible for complying with all safety requirements of GOB and any other measures necessary to avoid accidents, including the following:</p>	<ul style="list-style-type: none"> <li>• Construction works at the new ECE Annex building</li> </ul>	<p>The PIU and the Contractor shall inform the BUET (West Palashi Campus) community and adjacent settlements (Polashi Bazar Market Association) along the access roads of the following:</p> <ul style="list-style-type: none"> <li>• Schedule of construction works, routing of traffic (if needed), possible health concerns (exposure to dust, noise, and vibration)</li> </ul> <p>Contractor will perform the following:</p> <ul style="list-style-type: none"> <li>• Set up a health and safety committee and designate a Safety Officer</li> <li>• Provide workers with PPE such as footwear, gloves, eye protection devices, helmets, etc.</li> <li>• Prepare an emergency action plan</li> </ul>

Area of Concern	Project Activity	Management Measures
<ul style="list-style-type: none"> <li>• Notice or signboards shall be properly installed at the construction site</li> <li>• Conduct safety training or orientation to workers prior to start of work</li> <li>• Provide required PPE to workers whose use will be mandatory</li> <li>• In case of an emergency, suspend all work</li> </ul> <p>To maintain good community relations, the Contractor will:</p> <ul style="list-style-type: none"> <li>• Inform local authorities and community about construction and work schedules, interruption of services, and rerouting of traffic.</li> <li>• Restrict construction activities at night. If needed, ensure that night work is carefully scheduled and the community is properly informed so they can take necessary measures.</li> </ul>		<ul style="list-style-type: none"> <li>• Maintain PPE properly by cleaning dirty ones and replace damaged sets</li> <li>• Provide adequate lighting, drainage systems to prevent water stagnation, and adequate space to administer first aid</li> <li>• Implement appropriate standards of safety to all workers and site visitors to comply with the national requirements and the World Bank-IFC Environmental, Health and Safety Guidelines 2007</li> <li>• Conduct toolbox meetings prior to start of construction works. Record names of workers present during the meetings. Worker not joining toolbox meeting will not be allowed to work.</li> <li>• Enforce safety procedures and provide training on PPE to workers</li> <li>• Designate someone to deal with community and occupational health and safety</li> <li>• Clear and visible danger and warning signs shall be placed as soon as construction begins and will remain until works are completed.</li> <li>• Keep a record of workers and place assigned</li> </ul>
	<ul style="list-style-type: none"> <li>• Child labor</li> </ul>	<p>Contractor will not hire workers below 15 years old</p>
	<ul style="list-style-type: none"> <li>• Training and record keeping</li> </ul>	<p>The Contractor will perform the following:</p> <ul style="list-style-type: none"> <li>• Keep a record of occupational accidents, diseases, and injuries</li> <li>• Prevent work-related accidents or injury by minimizing workplace hazards consistent with international best practice</li> <li>• Ensure health care facilities and first aid kits are readily available</li> <li>• Train construction workers on general health and safety practices, and on specific hazards related to their work</li> </ul>

Area of Concern		Project Activity	Management Measures
		<ul style="list-style-type: none"> <li>• Security of construction site</li> </ul>	<p>Contractor will ensure the following:</p> <ul style="list-style-type: none"> <li>• Security personnel will be deployed to prevent unauthorized entry at the construction site</li> <li>• All the tools, equipment, and construction materials at the site are accounted for, identified, clearly labeled or /marked, and recorded</li> <li>• Maintain a record of tools' serial numbers and check inventory on a regular basis</li> <li>• Implement an inventory system where tools and equipment are checked in and out, and securely stored when not in use to prevent theft</li> <li>• Provide proper fencing of construction site perimeter with secured chain and lock</li> <li>• Construction site will have controlled access points to allow for close monitoring of entry and exit from the site</li> <li>• Workers will have proper identification while within the site</li> <li>• Staff or workers requiring access to the site after working hours will have to be notified with the PIU</li> <li>• Job site will be adequately lighted</li> <li>• Pre-employment investigations are conducted to verify previous employment, references (if needed), education, and criminal background</li> </ul>

## LIST OF PARTICIPANTS AND PHOTOGRAPHS DURING CONSULTATION

BAN: Innovations in Tertiary Education for Competitiveness in Information Technology Project

Public Consultation Meeting  
held on April 3, (Wednesday), Time: 3:00 pm  
Venue: Information Access Centre, CSE Department, BUET

List of Participants-1

Sl No	Name	Occupation	Male	Female	Cell No.	Signature
01	Dr. Md. Akbar Fird	Teaching	Male		01552980-212	<i>[Signature]</i>
02	Nadira Tasmin Rahman	Programmer, Register Office, BOST.		✓	0196653519 0155496127	<i>[Signature]</i>
03	MD. MIZANUR RAHMAN	Teaching	Male		0218530202	<i>[Signature]</i>
04	Khaza Masum Sumon	Teaching	✓		991837945	<i>[Signature]</i>
05	Dr. Md. Farhan Uddin	Teaching	✓	X	01678024389	<i>[Signature]</i>
06	Md. Osman Bhuiya	Govt. Serv	✓		0155237493	<i>[Signature]</i>
07	LISHKAWA RATTANAN	Programmer		✓	999035397	<i>[Signature]</i>
08	Dr. Md. Shukinor Islam	Teaching	✓		0175278222	<i>[Signature]</i>
09	Md Tariqul Islam	Teaching	✓		019812720	<i>[Signature]</i>
10	Souf Ahmed	Teaching	✓		0105404157	<i>[Signature]</i>
11	Md Saiful Islam	Teaching	✓		915156656	<i>[Signature]</i>
12	Sadman Saikat Eust	Teaching	✓		017003009	<i>[Signature]</i>
13	Md Farlay Rabb	Asst. Programmer		✓	017004668	<i>[Signature]</i>

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List of Participants-2

Sl No	Name	Occupation	Male	Female	Cell No.	Signature
14	MD. Kabil Hossen	Job		✓	017566376651	<i>[Signature]</i>
15	Dr. Md. Saqibul Islam	Professor & Head, EEE		✓	995200793	<i>[Signature]</i>
16	Able Tahid	National Asst. Lecturer		✓	0171644320	<i>[Signature]</i>
17	Dr. Shahmanuj Islam	Asst. Professor Dept. of Organi		✓	006180681	<i>[Signature]</i>
18	Laila Farvin Guha	Government Service		✓	01717935659	<i>[Signature]</i>
19	Dr. S. S. Chowdhury	Regisr. CSE and BUET		✓	01522521941	<i>[Signature]</i>
20	Dr. Mohammad Aminul Islam	Professor BUET		✓	01912174463	<i>[Signature]</i>
21	MD. Mahabubul Haq	Asst. Prof. BUET		✓	017160522	<i>[Signature]</i>
22	Mubandur Rezaul Karim	Lecturer, CSE, BUET		✓	917965328	<i>[Signature]</i>
23	Nafis Jahan Tripta	Lecturer, C.A., BUET		✓	016214074	<i>[Signature]</i>
24	Prof. Dr. H. H. Khan	Professor, BUET		✓	-	<i>[Signature]</i>
25	Dr. A.K.M. Ashkur Rahman	Professor, CSE, BUET		✓	915211118	<i>[Signature]</i>
26	md. Mostafizur Rahman	STO, CSE BUET		✓	0187073975	<i>[Signature]</i>



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List of Participants-3

Sl No	Name	Occupation	Male	Female	Cell No.	Signature
27	Shahid Rafiqul Islam	Service	✓		0171265985	[Signature]
28	Md Saleh Ahmed	Service	✓		01715853626	[Signature]
29	Dr. M. Houruzzaman	Teaching	✓		0172220775	[Signature]
30	Richard Bano	Services	✓		0167221003	[Signature]
31	Md. Lockman Hossain	Services	✓		01715785304	[Signature]
32	Md. Raza Shahbazul Hossain	Service	✓		01871991609	[Signature]
33	Kamuk Das	Student	✓		0894525448	[Signature]
34	Saidur Anwar	Student	✓		01718911201	[Signature]
35	M. Saifur Rahman	Professor	✓		01554589480	[Signature]
36	Md. Akbar Moinas	Service	✓		01726771509	[Signature]
37	Dr. Mahbuba Nazrin	Professor, CSE, BUET		✓	0172693799	[Signature]
38	Helen Begum	Service		✓	01922202400	[Signature]
39	Md. Bakawud in Min	Services	✓		01652015635	[Signature]

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List of Participants-4

Sl No	Name	Occupation	Male	Female	Cell No.	Signature
40	Md. Nazmul Goni	Job	✓		0130309-3413	[Signature]
41	Masud Alam	Service	✓		0171173-0487	[Signature]
42	Md. Amrullah Haq	Service	✓		014953793-45	[Signature]
43	Md. Tanvir Islam	Service	✓		01569158-142	[Signature]
44	Mohamed Wahiduzzaman	S.T.O	✓		01759423-449	[Signature]
45	Aziz Ahmed	Job	✓		01552015-712	[Signature]
46	Dr. Muhammad Masrur Ali	BUET	✓		01819-269263	[Signature]
47	Dr. Md. Saifur Rahman	BUET	✓		0155234-7884	[Signature]
48	Md. Jafar Mia	BUET Job	✓		0195586-826	[Signature]
49	Md. Abu Nazim	Job	✓		0181620-8223	[Signature]
50	Samuel Shafiq	IAC Assistant CSE, BUET	M		015520596	[Signature]
51	Dr. Md. Moinul Islam	CSE, BUET Professor	M		0155785-44	[Signature]
52	Dr. Md. Moinul Islam	CSE, BUET Professor	M		0123166-931	[Signature]

List of Participants-5

Sl No	Name	Occupation	Male	Female	Cell No.	Signature
52	Osman Gony	Officer At BUET	✓		0182227-8836	[Signature]
53	Md Rezaul Karim	Service	✓		0174088992	[Signature]
54	Md. Rafiqul Islam	Service	✓		0161020100	[Signature]
55	Dr. Aminul Lyal	Associate Prof.	✓		0185746-847	[Signature]
56	Md. Habibul-Kawser	Assistant	✓		019200-48154	[Signature]
57	Md. Shahin Pramanik	Service	✓		015583731-24	[Signature]
58	Dr. Md. Shohab Hossain	Associate Prof.	✓		01819-25096	[Signature]
59	Pachunon Basak	Assistant Professor	✓		01710-58910	[Signature]
60	Md. Hekherul Islam Sikib	Assistant Professor	✓		01711-370911	[Signature]
61	Md. Behul	Service	✓		0168098599	[Signature]

### SAMPLE COMPLAINT FORM FOR GRIEVANCE REDRESS MECHANISM

<b>Complaint/Suggestion/Comment Form</b>		
<b>Loan No.:</b> _____ <b>BAN: Improving Computer and Software Engineering Tertiary Education Project</b>		
Please provide the following information:		
	<b>Date of Filing:</b>	
<b>Name of Person/Organization:</b>		
<b>Contact Details:</b>		
Address		
Telephone/Mobile Phone		
Email (if available)		
<b>Signature of Person Filing Complaint</b>		
<b>Representative in filing this complaint?</b>		
Yes		
Please provide details	Name	
	Address	
	Telephone	
No		
Not applicable		
<b>Complaint/Suggestion/Comment</b> <i>(Please provide details as appropriate: what happened, how and why it happened, when and where, how many times it occurred)</i>		
<b>Please describe any inconvenience/harm caused or may have been caused</b>		
<b>Please provide suggestion to resolution of your complaint (if any)</b>		
<b>Please let us know how you prefer to be contacted</b>		
	Mail or email	
	Phone	
	Meeting	
<b>Contractor/PIU/PMU Use only</b>		
Recorded by (Name of designation of Contractor/PIU staff)		
Reviewed by (Name and designation of Contractor/PIU staff)		
Action(s) taken to resolve the complaint/comment/suggestion		
No action needed		
Action/decision disclosed to Complainant	Yes	No
	Not required	
	Date	
Manner of disclosure	Mail	
	Phone	
	Meeting	
	Not required	

## TERMS OF REFERENCE FOR ENVIRONMENTAL SAFEGUARD CONSULTANT

1. The Environmental Safeguard Consultant for the Project Management Unit (PMU) will be sourced through national selection and render 4 person-months of inputs within 24 months on an intermittent basis.
2. He or she should preferably have a post-graduate degree in environmental engineering, environmental sciences, or equivalent discipline, with a minimum of 7 years in environmental management and monitoring and in oversight of project implementation and compliance. A strong knowledge of the applicable environmental regulations and other construction requirements in Bangladesh as well as the environmental requirements of the Asian Development Bank (ADB) following the Safeguard Policy Statement (SPS) 2009 will be mandatory. The candidate should have good communication skills (oral and written) and be a good team player with strong organizational and problem solving skills.
3. Duties and tasks of the Environmental Safeguard Consultant include but are not limited to the following:
  - (i) Provide technical support to the PMU to ensure that all environmental requirements of ADB including occupational health and safety requirements of the Government of Bangladesh (GOB) are complied with by the project.
  - (ii) Ensure that the environmental management plan (EMP) and environmental monitoring plan (EMoP) are included in the bid documents and civil works contracts.
  - (iii) Implement a system for monitoring environmental safeguards.
  - (iv) In coordination with staff designated by the project implementation unit (PIU), conduct regular site visits at the construction sites to verify or check compliance with the EMP and EMoP, including adherence to occupational health and safety provisions and core labor standards.
  - (v) Together with the PIU-designated staff and the representative of the Contractor, conduct stakeholder consultations, as appropriate, to determine if there is any concern during construction.
  - (vi) Assist in obtaining associated government permits (if any) prior to start of construction works.
  - (vii) Take immediate action in the event of unexpected adverse impact or ineffective mitigation measures identified during implementation and in preparing the corrective action plan.
  - (viii) Provide technical support to the PIU-designated staff in drafting the environmental monitoring reports required by ADB, and in monitoring compliance of the Contractor with environmental, health, and safety requirements;
  - (ix) Address any grievances through the Grievance Redress Mechanism (GRM) in a timely manner, prepare record of such grievances for inclusion in the environmental monitoring report.
  - (x) Prepare the semiannual environmental monitoring reports to be submitted to ADB, and upon ADB review, address any comments raised (if any).
  - (xi) Assist in any relevant works that may be assigned by PMU or PIU.

**PROPOSED FORMAT OF ENVIRONMENTAL MONITORING REPORT DURING  
CONSTRUCTION PHASE**

# Environmental Monitoring Report

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Reporting Period      {From Month, Year to Month, Year}  
Date                      {Month, Year}

## BAN: Improving Computer and Software Engineering Tertiary Education Project

Prepared by the University Grants Commission of the Ministry of Education for the Asian  
Development Bank

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<ul style="list-style-type: none"> <li>• Brief status of environmental compliance during the coverage period</li> </ul>	
<b>1.0 Introduction</b>	
<ul style="list-style-type: none"> <li>1.1 Brief Project Description</li> <li>1.2 Project Progress Status and Implementation Schedule</li> </ul>	
<b>2.0 Compliance to National Regulations</b>	
{These are just sample environmental regulations}	
<ul style="list-style-type: none"> <li>2.1 Environmental Conservation Rules 1997</li> <li>2.2 Bangladesh Labour 2013</li> </ul>	
<b>3.0 Compliance to Relevant Environmental Requirements from the ADB Loan Agreement</b>	
<ul style="list-style-type: none"> <li>3.1 Schedule 5 {prepare a matrix to show how compliance was achieved}</li> </ul>	
<b>4.0 Compliance to Environmental Management Plan</b>	
{Refer to the EMP of the Project}	
<b>5.0 Safeguards Monitoring Results and Unanticipated Impacts</b>	
{Refer to the Environmental Monitoring Plan and document any exceedence to environmental standards (if any), or any unanticipated impact not included in the EMP and any correction action/measures taken}	
<b>6.0 Implementation of Grievance Redress Mechanism and Complaints Received from Stakeholders</b>	
{Summary of any complaint/grievance and the status of action taken}	
<b>7.0 Conclusion and Recommendations</b>	
{Any follow-up action required to be monitored for the next submission}	

**PROPOSED FORMAT OF ENVIRONMENTAL MONITORING REPORT POST-  
CONSTRUCTION**

## Environmental Monitoring Report

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Reporting Period      {From Month, Year to Month, Year}  
Date                      {Month, Year}

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<b>1.0 Introduction</b>	
1.1 Brief Project Description	
1.2 Status/condition of the new buildings	
{i.e., a checklist can be provided to indicate condition of the interior and exterior of the building}	
<b>2.0 Compliance to National Regulations</b>	
{These are just sample regulations}	
2.1 Disaster Management Act 2012 (relevant requirements for safety of school/university buildings)	
<b>3.0 Compliance to Environmental Management Plan</b>	
{Refer to the EMP during post construction}	
<b>4.0 Results of Environmental Monitoring Plan</b>	
{Refer to the EMoP during post construction}	
<b>5.0 Conclusion and Recommendations</b>	
{Any follow-up action required to be monitored for the next submission}	

### SAMPLE ENVIRONMENTAL SITE INSPECTION AND MONITORING CHECKLIST

**Loan No.:**

Name of University	Location
Inspection Date	Inspection Time
Inspector	Weather at time of inspection:

Items for Inspection	Y	N	NA	Remarks (i.e., problem observed, possible cause of noncompliance and/or proposed corrective action)
<b>Site Office</b>				
Site office established				
Contractor appointed an EHS supervisor				
EHS supervisor or designated person on-site				
Copies of EMP, contract document, and environmental clauses on-site				
Details of construction (i.e., name of contractor, duration of construction, emergency hotline, safety, etc.) disclosed on-site				
Details of grievance redress mechanism (i.e., contact person, complaints hotline, etc.) disclosed on-site				
Complete first aid kits on-site				
Photographs of before and after completion of work on board				
Incident register book on-site				
Complaint or visitor's comment book available				
Record of regular consultation of Contractor to university management and/or nearby residents to check if there are environmental concerns				
Any complaint filed with the Contractor by staff and settlements				
Disturbed areas properly revegetated after completion of work				
<b>Emergency Preparedness and Response</b>				
Fire extinguishers and/or fire-fighting equipment properly maintained and not expired				
Fire escapes properly marked, clear, and not obstructed				
Emergency contacts available in case of any incident				

<b>Items for Inspection</b>	<b>Y</b>	<b>N</b>	<b>NA</b>	<b>Remarks</b> (i.e., problem observed, possible cause of noncompliance and/or proposed corrective action)
Accidents and incidents reported, reviewed, and corrective or preventive actions recorded				
<b>Occupational Health and Safety</b>				
Provision of labor and equipment shed				
Provision of sanitation facilities and safe drinking water				
Use of personal protective equipment (PPEs)				
Installation materials and equipment storage				
Separate storage of fuel and lubricant				
Training on occupational health and safety, use of PPE, etc. done before construction works				
Clear danger and warning signs on-site for students, faculty, and community				
Fencing of construction site and designation of security personnel				
Good housekeeping: site kept clean and tidy				
Containers properly labelled for easy recycling or waste segregation				
Special facilities for female workers				
Bin for collecting garbage and food waste				
<b>Air Quality</b>				
Opened land and construction sites sprayed with water to minimize generation of dust				
Any evidence of excessive dust generation				
Stockpiles of dusty materials and dust-generation activities like handling of cement done in enclosed areas or sprayed with water				
Vehicles carrying dusty loads or materials covered or watered over before leaving the site				
Construction equipment well maintained (any black smoke or smoke belching observed)				
Demolition work areas watered				
Speed control measures applied (e.g., speed limit sign)				
<b>Noise</b>				
Evidence of excessive noise				

<b>Items for Inspection</b>	<b>Y</b>	<b>N</b>	<b>NA</b>	<b>Remarks</b> (i.e., problem observed, possible cause of noncompliance and/or proposed corrective action)
Any noise mitigation measure adopted (e.g., use noise barrier or enclosure)?				
Prohibition of using megaphone or whistle on-site				
Use of well-maintained equipment and vehicles				
<b>Water Quality</b>				
Sanitary facilities for workers equipped with on-site treatment system				
Wastewater discharged to soil				
Evidence of oil spill				
Chemicals properly stored and labelled				
Spill kits, sand, sawdust used for absorbing chemical spillage readily accessible				
Special facilities for female labor				
Construction waste, recyclable materials, and general refuse removed off-site regularly				
Water pipe leakage and wastage prevented				

**Reviewed by:**

Name and signature \_\_\_\_\_  
 Designation in PIU \_\_\_\_\_

Date \_\_\_\_\_