Initial Environmental Examination (Draft)

July 2019

BAN: Improving Computer and Software Engineering Tertiary Education Project

Volume 4 – East West University

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

CURRENCY EQUIVALENTS
(as of 1 July 2019)

Currency unit	–	Taka (Tk)
Tk1.00	=	$0.012
$1.00	=	Tk84.255

ABBREVIATIONS

ADB	–	Asian Development Bank
DOE	–	Department of Environment
ECA	–	Environment Conservation Act
ECC	–	environmental clearance certificate
ECR	–	Environment Conservation Rules
EIA	–	environmental impact assessment
EMP	–	environmental management plan
EMoP	–	environmental monitoring plan
IEE	–	initial environmental examination
MOE	-	Ministry of Education
MOEF	–	Ministry of Environment and Forests
PIU	–	project implementing unit
PMU	–	project management unit
SPS	–	Safeguard Policy Statement
UGC	-	University Grants Commission

WEIGHTS AND MEASURES

^{o}C	–	degree Celsius
dB(A)	–	A-weighted decibel
ha	–	hectare
mg/L	–	milligram per liter
m^2	–	square meter
$\mu g/m^3$	–	microgram per cubic meter
ppb	–	parts per billion

NOTE

(i) 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 project 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) University of Dhaka (DU), (ii) Bangladesh University of Science and Technology (BUET), (iii) Jessore University of Science and Technology (JUST), and the (iv) East West University (EWU).

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 resource, and to create the required environment in developing the skills for entrepreneurships 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 R&D capacity through industry collaboration and interdisciplinary research projects, and develop technology entrepreneurships. These objectives will be delivered through four outputs elaborated below:

Output	Description
Output 1: An established modern learning, research and startup supporting environment	Supports the four universities in developing classrooms, laboratories, industry collaboration and startup or incubation space, and auxiliary facilities. Establishment of the support environment will adopt green building features for energy efficiency, water saving, climate and disaster resilient design, access of persons with disabilities, and female-friendly amenities such as students' study areas and staff lounges, safety features like access control system, increased lighting at night, and video surveillance system.
Output 2: Quality and industry-relevant CSE/IT programs	Assists the universities in updating and improving their CSE/IT degree programs through the use of new technologies, blended learning, industry-demanded soft-skills, and strengthen the existing digital library to ensure that they are aligned with international standards. JUST will set up an industry certification center for IT 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 IT industry introduce flexible working hours and telecommuting to boost women participation in the IT industry.
Output 3: Strengthened R&D and technology entrepreneurship	University Grants Commission (UGC) to provide grants on the following research initiatives: (i) industry collaboration addressing industry problems or in developing new products or services; (ii) interdisciplinary work on IT solutions that associate with other areas to develop new products or services; (iii) cutting edge CSE/IT research; and (iv) IT solutions to address disability issues. Research proposals can be developed together with foreign universities.

Output	Description
	There will be support also in introducing training programs on technology entrepreneurships as well as rules and incentives that would be instrumental to have more university-based startups and spinoff firms using the facility in Output 1.
Output 4: Strengthened tertiary education project design and management capacity	Supports GOB to carry out background studies, feasibility studies, and project preparatory activities for new tertiary education initiatives in priority economic sectors. Provides the required resources for effective project implementation and management.

From Output 1, the interventions for EWU will include the following:

A. Interior works of existing facilities

- Four IT laboratories in Rooms 630, 634, 637, and 638
- Establish state-of-the-art classrooms in Rooms: 223, 224, (225 + 226), 227; Room 225 and Room 226 will be merged to have a larger classroom
- Internet connectivity to support 16 computing laboratories

B. New IT computing laboratories

- 12 computing laboratories teaching and research – this will involve interior decoration, purchase of furniture, equipment & computers, electrical wiring for computers and equipment, computer networking, and connection to the computer network backbone

C. New and energy-efficient heating, ventilation, and air conditioning (HVAC) system to accommodate the interior works for the classrooms and computing laboratories

The following inputs will provide high quality human resources to the IT/ITES university:

- Information Systems and Software Dev with Millennium Info Solutions
- Parallel and Distributed Computing with Business Accelerate BD
- Artificial Intelligence and Machine Learning with MIS
- Internet of Things with DataSoft
- Big Data Analytics and Data Mining with DataSoft
- Cyber Security and Advanced Networks with BDCOM Online Ltd

Implementation arrangements

MOE will be the executing agency (EA) acting through UGC while the key implementing agencies (IAs) are JUST, DU, BUET, and EWU. A project management unit (PMU) will be set up at UCG and project implementation unit (PIU) at the four universities who will be responsible for the day-to-day management, monitoring, reporting, and coordination during implementation. A project steering committee (PSC) will be arranged at the MOE to provide guidance and direction, monitor and review the overall progress and outputs of project implementation. The PSC 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 to ensure that the project achieves the targets and outcomes as well as coordination in resolving potential issues during implementation. An environmental safeguard consultant will be engaged at the PMU to provide technical support on compliance to ADB requirements.

Environmental Requirements

The Environment Conservation Act (ECA) 1995 and the Environment Conservation Rules (ECR) 1997 are the main environmental regulations in Bangladesh which provides 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 the autonomy in the university education, and among others, in examining development plans within the universities. In which case, they are 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.

The 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 JUST, DU, and BUET; and interior 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 to ADB website. Aside from SPS 2009, the disclosure of IEE is also required by the Access to Information Policy 2018.

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 4 of the IEE will discuss the due diligence for the interior works, classroom upgrade in EWU, and installation of the new heating, ventilation, and air conditioning (HVAC) system.

Description of the Existing Environment

The project is located in Badda Thana in Dhaka City. The area belongs to Aw category based on the Köppen climate classification 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 minimum temperature ranges from 22.5°C to 6.5°C. Annual average rainfall is 2,066 mm and the highest rainfall recorded was 3,028 mm which occurred in 1984.

Project site is in the urban area and 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, PM_{10}, $PM_{2.5}$, and NO_2 exceed the limits set by National Ambient Air Quality Standards (2005). Ambient air quality sampling was done on 6 April 2019 in three sampling stations within the 500-m radius from the project site. Results of this one-time sampling suggest

that it meets NAAQS (2005) but exceed IFC-WB EHS Guidelines 2007 on PM_{10} in one station and $PM_{2.5}$ in all the three stations.

Noise level was similarly measured on 6 April 2019 in the same stations as ambient air quality. Results suggest that the settlements on the eastern side of EWU (NL1) exceed the limits set by the Noise Pollution Control Rules 2006 and IFC-EHS Guidelines 2007 both daytime and nighttime. Water sample was collected on 30 March 2019 from one of the sources in EWU and tested for heavy metals (As, Cd, Cr^{+6} and Pb), fecal coliform, and pH. Results show that it meets the standards set by Schedule 3(b), Rule 12 of ECR 1997 and WHO.

Anticipated Impacts and Mitigation Measures

Some temporary jobs may be created by the interior works which may result to disputes if there is no transparency in recruitment and giving priority to local labour. The Contractor will be required to consider available local labour. Prior to the start of work, the PIU together with the environmental safeguard consultant will conduct an orientation to the Contractor and workers on their responsibility to comply with applicable regulations of EWU, implementing the EMP, and compliance to ADB requirements and the government. This will create awareness on safety and emergency.

Setting-up of 12 new laboratories, undertake interior works in four classrooms, convert five rooms into four state-of-the art computing laboratories, and installation of the new HVAC system may cause conflict of schedule with other room users resulting to disruptions and inconvenience. This will also cause potential increase in dust and noise levels, generation of waste, and safety risks to students, faculty and staff, and also workers, and presence of workers within the premises. To minimize these impacts, the Contractor will be required to do the following:

- Proper coordination with CSE, and scheduling of work
- Notify students or CSE one day in advance about the work schedule
- CSE to ensure minimal disruption to other room users
- Provide temporary enclosure or isolate the area to contain noise and dust
- Conduct noise-generating works at night or on days when students are gone
- Require the mandatory use masks/earmuffs and other appropriate safety gear
- Provide bins to collect waste generated
- Separate wastes to check for recyclables and designate collection points
- Collect and dispose waste generated progressively to avoid accumulation of waste
- Provide appropriate cover of waste to prevent spilling during hauling
- Dispose waste in designated disposal site approved by Dhaka North City Corporation
- Identify and provide space for workers to stay during break-time
- Keep fire extinguishers ready and provide first-aid kit at the work areas
- Require workers to have proper identification
- Wearing of workers' uniform (if any) will be mandatory
- Provide appropriate personal protective equipment (PPE) to workers
- Install clear and visible warning/danger signs within work areas
- Assign security personnel in the work areas to prevent unauthorized access by students or staff
- Provide demarcation to separate students from workers
- Label products/materials like paints, lubricants, etc.

Upon completion of interior works and rooms upgrade, the Contractor will restore all areas potentially damaged or affected during interior works, and to dispose the remaining waste and debris at designated sites.

Analysis of Alternatives

There were no alternatives in terms of location, design or technology. The interior works and upgrades will be within the existing building of the CSE Department. However, a "no project" option will mean that IT students in EWU will not have the opportunity for innovative learning, and keeping abreast with emerging approaches and solutions that the interior works and upgrades can provide. The faculty and staff will also lose the chance to upgrade their skills which is one of the key elements in producing competent IT graduates for the job market.

The "with project" option entails there will be opportunities to train faculty members in improving outcome-based education teaching-learning pedagogy, update IT curriculum to meet industry needs, and establish state-of-the-art classrooms and computing laboratories including incubation and StartUp Center. These interventions will increase R&D initiatives and is expected to produce more IT graduates to meet the continuing demand of the industry for IT professionals.

Information Disclosure, Consultation and Participation

A total of 51 participants (14 females) joined the consultations on 4 April 2019 at the CSE Faculty Lounge of EWU. Stakeholders invited were residents from the settlements within United Commercial Bank Ltd. and Jahurul Islam Avenue in front of EWU, undergraduate and graduate students, representatives from the Student Council, and CSE faculty members.

Issues raised include potential increase in noise and dust levels, conflict in the use of rooms to be upgraded as these also serve other departments, disclosure of more information about the project and the process to submit complaints. Female teaching assistants (TA) request that they be given space in the upgraded rooms since one of the outcomes of the project is increased student intake it is very likely that the number of TAs will also increase.

Consultations will continue during project implementation. A project brief (a one-page flyer or a Q&A) both in English and Bangla will be made available at the PIU and will be posted in EWU website after DPP approval. The IEE, which provides more information, will be posted to the ADB website following SPS 2009 and Access to Information Policy 2018.

Grievance Redress Mechanism

The PMU at UGC will establish grievance redress mechanism (GRM) to deal with potential complaints that may be lodged on the project. Part of the GRM will be to create a grievance redress committee (GRC) that may consist of: PMU Head, representative from the local government, representative of Contractor, and witness of the complainant. The environmental safeguard consultant at the PMU will act as the secretary of the GRC. Complaint can be lodged either in person to the engineer in-charge, in writing or by phone. A complainant can seek redress in three-tiers: (i) through the engineer in-charge 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 EWU. 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) identifying the parameters to be monitored, frequency of monitoring, location, implementing responsibility, and supervision (see Table 9.1 and Table 9.2, respectively)**.** 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 and will 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 2018. 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

The potential impacts of the interventions in EWU will be minimal, temporary and of short duration given that they will only involve interior works and room upgrades. These interventions will contribute to advance 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 interior works stage. An EMP and EMoP are included which outline the measures to minimize impacts and the parameters to be monitored. The PIU will monitor compliance of the Contractor. An environmental safeguard consultant will provide the required technical support to the PIU and the PMU to ensure that ADB requirements will be met.

1.0 INTRODUCTION

To celebrate the 50th year of independence, Bangladesh launched the Vision 2021 which embodies measures to achieve the eight goals identified. The goals identified in Vision 2021 reflect a future Bangladesh as an economically inclusive and politically accountable society.[1] These goals are: (i) to become a participatory democracy; (ii) to have an efficient, accountable, transparent and decentralised 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.

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, technologically-oriented, and gender equitable learning system.[2]

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 project 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) University of Dhaka (DU), (ii) Bangladesh University of Science and Technology (BUET), (iii) Jessore University of Science and Technology (JUST), and the (iv) East West University (EWU).

1.1 Overview of the Project

Specifically, 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 resource, and to create the required environment in developing the skills for entrepreneurships relevant to CSE/IT. Table 1.1 presents the four project outputs while Figure 1.1 presents the project location.

Table 1.1 Project Outputs

Output	Description
Output 1: An established modern learning, research and startup supporting environment	Supports the four universities in developing classrooms, laboratories, industry collaboration and startup or incubation space, and auxiliary facilities. Establishment of the support environment will adopt green building features for energy efficiency, water saving, climate and disaster resilient design, access of persons with disabilities, and female-friendly amenities such as students' study areas and staff lounges, safety features like access control system, increased lighting at night, and video surveillance system.
Output 2: Quality and industry-relevant CSE/IT programs	Assists the universities in updating and improving their CSE/IT degree programs through the use of new technologies, blended learning, industry-demanded soft-skills, and

[1] Center for Policy Dialogue, *Bangladesh Vision 2021*, August 2007. http://cpd.org.bd/wp-content/uploads/2007/08/Bangladesh-Vision-2021-English.pdf.

[2] Government of the People's Republic of Bangladesh, General Economics Division, *Outline Perspective Plan of Bangladesh 2010-2021, Making Vision 2021 A Reality*, June 2010. https://unctad.org/meetings/en/Contribution/dtl_eWeek2018c03-bangladesh_en.pdf.

Output	Description
	strengthen the existing digital library to ensure that they are aligned with international standards. JUST will set up an industry certification center for IT 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 IT industry introduce flexible working hours and telecommuting to boost women participation in the IT industry.
Output 3: Strengthened R&D and technology entrepreneurship	University Grants Commission (UGC) to provide grants on the following research initiatives: (i) industry collaboration addressing industry problems or in developing new products or services; (ii) interdisciplinary work on IT solutions that associate with other areas to develop new products or services; (iii) cutting edge CSE/IT research; and (iv) IT solutions to address disability issues. Research proposals can be developed together with foreign universities. There will be support also in introducing training programs on technology entrepreneurships as well as rules and incentives that would be instrumental to have more university-based startups and spinoff firms using the facility in Output 1.
Output 4: Strengthened tertiary education project design and management capacity	Supports GOB to carry out background studies, feasibility studies, and project preparatory activities for new tertiary education initiatives in priority economic sectors. Provides the required resources for effective project implementation and management.

Source: Development Project Proposal, MOE

1.2 Project Implementation Arrangements

MOE will be the executing agency (EA) acting through UGC while the key implementing agencies (IAs) are JUST, DU, BUET, and EWU. A project management unit (PMU) will be set up at UCG and project implementation unit (PIU) at the four universities who will be responsible for the day-to-day management, monitoring, reporting, and coordination during implementation. A project steering committee (PSC) will be arranged at the MOE to provide guidance and direction, monitor and review the overall progress and outputs of project implementation. The PSC 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 to ensure that the project achieves the targets and outcomes as well as coordination in resolving potential issues during implementation.

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 on compliance to 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 1.2 presents the project management structure.

Figure 1.1 Project Location Map

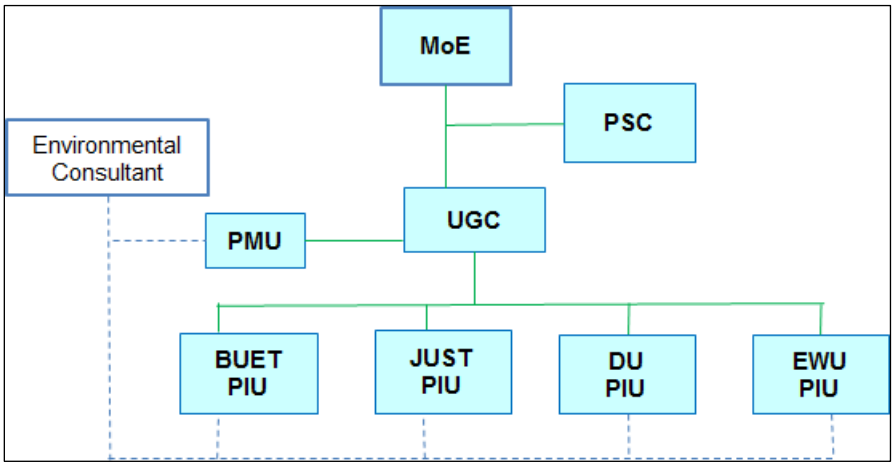


Figure 1.2 Project Management Structure

1.3 Need for Environmental Assessment

1.3.1 Requirements of the Government

The Environment Conservation Act (ECA) 1995 and the Environment Conservation Rules (ECR) 1997 are the main environmental regulations in Bangladesh which provides 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.

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

1.3.2 Requirements of ADB

The Safeguard Policy Statement (SPS) 2009 of ADB sets out the requirements for environmental safeguard which applies to all the projects and grants they finance.[3]

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.

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.

1.4 IEE Methodology

Objectives 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; and, (v) ensure that all the statutory regulatory requirements relevant to the project have been identified and considered to ensure an understanding of what needs to be complied.

Scope 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;

[3] ADB. Safeguard Policy Statement 2009. https://www.adb.org/documents/safeguard-policy-statement

(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, local administrative bodies to identify perceptions of the project, introduce project components and anticipated impacts; and,
(vii) Disclose the draft IEE in ADB website and prepare project brief and/or FAQs in Bangla that can be publicly available at the offices of UGC, JUST, BUET, DU, EWU, and the construction sites.

Specifically for EWU, 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 while environmental sampling was done on 30 March and 6 April 2019.

1.5 Structure of the Report

Following the requirements of SPS 2009, the environmental assessment for the project is presented as follows:

Volume 1 – IEE of JUST
Volume 2 – IEE of BUET
Volume 3 – IEE of DU
Volume 4 – IEE of EWU

The IEE for each university is based on the EIA format given in Annex to Appendix 1 of SPS 2009, pp41-43.

2.0 POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

2.1 National environmental requirements

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

2.1.1 Environmental agency

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, and collection and dissemination of environmental information and creation of environmental awareness among all sectors in Bangladesh.

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, and provides guidance, training and promotional campaign on improving the awareness of environmental issues.

2.1.2 Environmental regulations

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.

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

ECR 1997 provides for the declaration of ecologically-critical areas, categorization of industries and projects and identified types of environmental assessments needed against 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 requirement for and procedures to obtain ECC; and (iii) the requirement for the IEE and their based on categories of industrial and other development interventions.

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 Regulations

Regulation	Brief Description
Bangladesh National Building Code 2006	Sets minimum standards for 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 superseded the previous Building Construction (BC) rules of 1984. These rules seek to control development plot-by-plot and case-by-case. It controls development by imposing conditions on set backs, 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 BC 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, object-oriented and strengthened and to formulate rules to build up infrastructure of effective disaster management to fight all types of disaster
Environment Court Act 2000 (amended in 2002 and 2010)	This Act is under the Judiciary and MOEF to ensure the resolution of disputes on environmental and social damages resulting from any development activities. This Act also allows for the completion of environment-related legal proceedings effectively.
Vehicle Act 1927, the Motor Vehicles Ordinance 1983, and Bengal Motor Vehicle Rules 1940	These are under the Bangladesh Road Transport Authority (BRTA) 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 of childcare services. Based on this Act and Labor Laws - medical facilities, first aid and accident and emergency arrangements are to be provided by the authority to the workers at workplaces.
Bangladesh Labour Act 2006 (amended 2013), Bangladesh Labor Rules 2015	These regulations are under the Ministry of Labour which provides for the occupational rights and safety of factory workers and the provision of comfortable work environment and reasonable working conditions including the prohibition of child labor and adolescent
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.
Right to Information Act (RTI Act) 2009	Came into force on 1 July 2009 primarily to increase transparency and accountability, decrease corruption and establish good governance.

Regulation	Brief Description
	• Only citizens have the right to demand and receive access to information from public bodies. • 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.

2.1.3 Environmental Approval Process

Section 12 of ECA 1995 provides that no industrial unit or project can be established or undertaken without securing an environmental clearance certificate (ECC) from the DOE. Following the requirements of ECR 1997, the DOE has classified various development interventions according to the 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 those projects and industrial units that may have potential adverse environmental impacts and therefore requires an environmental impact assessment (EIA). Securing the ECC for these categories involves two steps: (i) issuance of site clearance certificate (SCC), and then (ii) the ECC.

The SCC 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 line of credit in favor of importable machineries and cannot start any physical activities for the project without the DoE-approved EIA. Figure 2.1 presents the overview of the approval process.

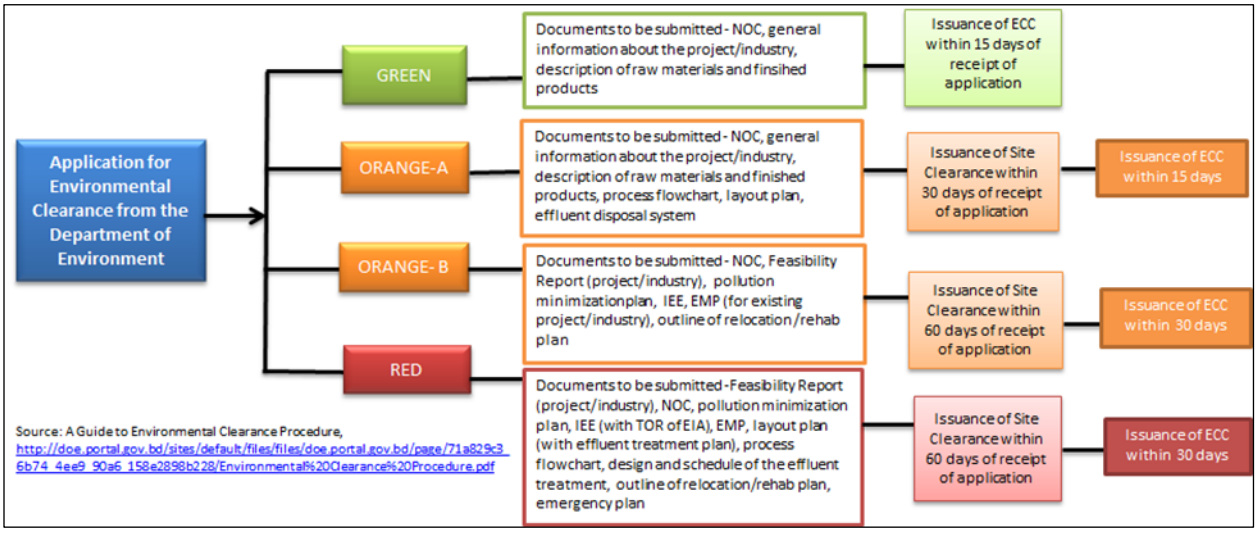


Figure 2.1 Approval Process of DOE for ECC

2.1.4 Applicable environmental standards

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 given by international standards such as the 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[a]		
Pollutant	Standards	Averaging Period
NO_x	100 µg/m^3 (0.053 ppm)	Annual
PM_{10}	50 µg/m^3	Annual
	150 µg/m^3	24-hour
$PM_{2.5}$	15 µg/m^3	1-hour
	65 µg/m^3	24-hour
NOISE[b]		
Zone Class	Limits in dB(A)	
	Daytime	Nighttime
	(6 am – 9 pm)	(9 pm-6 am)
i) A sensitive area where quietness is of primary importance such as schools, hospitals, mosques etc.	50	40
ii) Residential zone	55	45
iii) Mixed areas, which are, used as residential areas as well as commercial and industrial purposes	60	50
iv) Commercial areas	70	60
v) Industrial areas	75	70
Day time shall mean from 6:00 am to 9:00 pm Night time shall mean from 10pm to 6:00 am Leq - energy mean of the noise level over a specific period [a] Ambient Air Quality Standards 2005 [b] Noise Pollution (Control) Rules 2006		

Table 2.3 Relevant Environmental Standards from IFC-WB EHS Guidelines 2007

Table 1.1.1: WHO Ambient Air Quality Guidelines[7,8]		
	Averaging Period	Guideline value in µg/m³
Sulfur dioxide (SO_2)	24-hour	125 (Interim target-1) 50 (Interim target-2) 20 (guideline)
	10 minute	500 (guideline)
Nitrogen dioxide (NO_2)	1-year	40 (guideline)
	1-hour	200 (guideline)
Particulate Matter PM_{10}	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)
Particulate Matter $PM_{2.5}$	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)

Table 1.7.1- Noise Level Guidelines[54]		
	One Hour L_{Aeq} (dBA)	
Receptor	Daytime 07:00 - 22:00	Nighttime 22:00 - 07:00
Residential; institutional; educational[55]	55	45
Industrial; commercial	70	70

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

2.1.5 Relevant International Environmental Agreements

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 Bangladesh Relevant International Environmental Agreements

International Environmental Agreement	Date Ratified	Description
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 was entered into force on 1 January 1989 and 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

International Environmental Agreement	Date Ratified	Description
		emission reduction targets. This agreement is linked to the United Nations Framework Convention on Climate Change (UNFCCC).
UNFCCC (1992)	15 April 1994	This framework came into force on 21 March 1994 and aims to achieve stabilization of greenhouse gas (GHG) 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 which 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.

2.2 Environmental Requirements of Asian Development Bank

SPS 2009 sets the environmental requirements and review procedures that apply to all projects and grants that ADB finance. SPS 2009 comprises three key safeguard areas: environment, involuntary resettlement, and indigenous peoples; and 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.

SPS 2009 uses a categorization system to indicate the significance of potential environmental impacts and 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 SPS 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 (EIA)
B	Likely to have adverse environmental impacts that are less adverse than	Initial Environmental Examination (IEE)

Category	Definition	Assessment Requirement
	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.	
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. Safeguard Policy Statement 2009, p. 19. http://www.adb.org/sites/default/files/institutional-document/32056/safeguard-policy-statement-june2009.pdf.

2.2.1 Disclosure requirements

Aside from the SPS 2009 requirements, the Access to Information Policy 2018 provides for the requirements of disclosure for project information of projects and grants funded by ADB.[4] Consistent with SPS 2009, this requires the disclosure of documents submitted by the borrower and/or client:

(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;[5]
(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.

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

Table 2.6 Implications of SPS 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	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 JUST, BUET, and DU; and (b)

[4] Access to Information Policy 2018 replaces Public Communication Policy 2011
[5] 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).

No.	SPS 2009 Principles	Description
	undertaken commensurate with the significance of potential impacts and risks.	interior works, new and energy-efficient HVAC system and upgrading of the existing Computer Science and Engineering structure of the East-West University (EWU). A Rapid Environmental Assessment (REA) checklist was completed for these components, and the environment category based on SPS 2009, is 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 environmental management plan (EMP) that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity development and training measures, implementation 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.	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 to the relevant provisions in SPS 2009.
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.	Four consultations events were undertaken during the preparation of the IEE (i.e., one per university). Consultations will continue through the PIUs in each university (as appropriate) during project implementation. 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.
6	Disclose a draft environmental assessment (including the EMP) in a timely manner, before project appraisal, in an accessible place and in	The IEE will be endorsed by the MOE for public disclosure through the ADB website.

No.	SPS 2009 Principles	Description
	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.	
7	Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring reports.	At the construction phase, the contractor will be responsible for implementing the EMP and will be monitored by the PIU and PMU. Environmental monitoring reports and corrective actions (if needed) will be prepared by the PIUs and will be disclosed to ADB website.
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 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.	All the proposed interventions with environmental implications are not located in critical habitats as defined by SPS 2009.
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. https://www.energystar.gov/about/energy-star-brand/energy-star-brand-book
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.

No.	SPS 2009 Principles	Description
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.

3.0 DESCRIPTION OF THE PROJECT

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 IT buildings for JUST, BUET, DU, and some interior works of selected classrooms and new IT laboratories at EWU.

Output 1: An established modern learning, research and startup supporting environment	Supports the four universities in developing classrooms, laboratories, industry collaboration and startup or incubation space, and auxiliary facilities. Establishment of the support environment will adopt green building features for energy efficiency, water saving, climate and disaster resilient design, access of persons with disabilities, and female-friendly amenities such as students' study areas and staff lounges, safety features like access control system, increased lighting at night, and video surveillance system.

From Output 1, the interventions in EWU include the following:

A. Interior works of existing facilities

- Four IT laboratories in Rooms 630, 634, 637, and 638
- Establish state-of-the-art classrooms in Rooms: 223, 224, (225 + 226), 227; Room 225 and Room 226 will be merged to have a larger classroom
- Internet connectivity to support 16 computing laboratories

B. New IT computing laboratories

- 12 computing laboratories teaching and research – this will involve interior decoration, purchase of furniture, equipment & computers, electrical wiring for computers and equipment, computer networking, and connection to the computer network backbone

C. New and energy-efficient heating, ventilation, and air conditioning (HVAC) system to accommodate the interior works for the classrooms and computing laboratories

The following inputs will provide high quality human resources to the IT/ITES university:

- Information Systems and Software Dev with Millennium Info Solutions
- Parallel and Distributed Computing with Business Accelerate BD
- Artificial Intelligence and Machine Learning with MIS
- Internet of Things with DataSoft
- Big Data Analytics and Data Mining with DataSoft
- Cyber Security and Advanced Networks with BDCOM Online Ltd

The interior works and upgrading of these rooms will incorporate the use of energy-efficient lighting system and relevant Energy Star-certified products. The estimated cost of the interior works and equipment upgrade is estimated at $5.6 million. With the use of energy-efficient lighting system, the minimum contribution to carbon dioxide emissions reduction is estimated at 56 tons per year.[6]

[6] https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references.

4.0 DESCRIPTION OF THE ENVIRONMENT (BASELINE DATA)

This chapter describes the existing environment within the study area and is based on baseline measurements but relied 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 EWU were conducted on 30 March 2019, and 3 April 2019. Measurements were done within 500-meter radius from the project site (Figure 4.1).

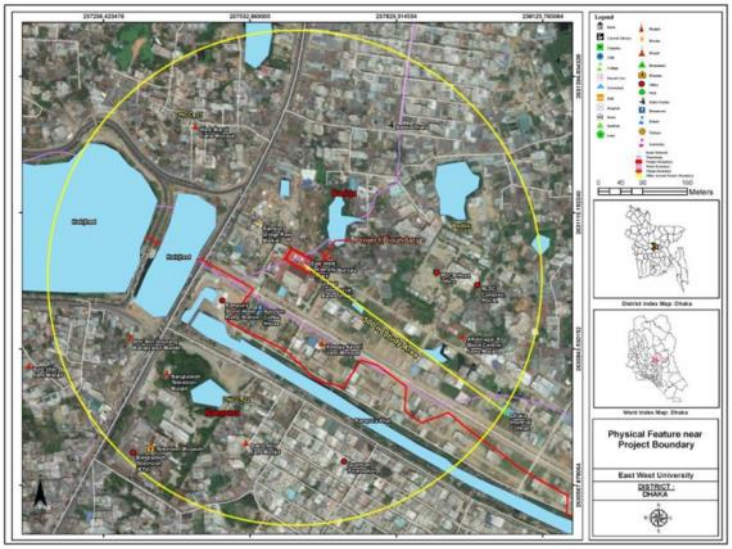


Figure 4.1 Project's Area of Influence

4.1 The East West University

The East West University (EWU) was established in 1996 to provide quality tertiary education at an affordable cost in Bangladesh. As an institution of higher learning, EWU is one of the leading private universities in Bangladesh and continues to inculcate ethical standards, values and norms, and upholds the ideals of opportunity, transparency and non-discrimination.

The EWU campus spreads within an area of 2.43 acres (less than one hectare) and is located at Aftabnagar, Dhaka City. There are three academic faculties in EWU: (i) Faculty of Liberal Arts and Social Sciences, (ii) Faculty of Business and Economics, and (iii) Faculty of Science and Engineering; and as of end 2017, they offer 14 graduate and 14 undergraduate degrees and diploma with about 8,914 students managed by 364 faculty members.[7]

The Department of Computer Science and Engineering (CSE) was founded in 1996 the same time as the university. In 2017, the annual intake is 420 undergraduate students and 11 graduate students. EWU is planning to increase the undergraduate intake to 750 students by 2025 and 40 graduate students.

EWU is bounded to the north by the Bottola Restaurant, to the south by the Aftab Nagar Road, to the east by Aftab Nagar residential area, and to the west by Rampura DIT Road and Hatirjheel

[7] East West University Annual Report 2017, 4th ed., January 2018.

Road (Figure 4.2). Table 4.1 presents a summary of the environmental setting.

Figure 4.2 Location Map, EWU

Table 4.1 Summary of Environmental Setting in the Study Area

Item	Details
Location	Dhaka district under – Dhaka North City Corporation 21 and Badda Ward, Badda Thana
Latitude	23.768815
Longitude	90.425729
Topography	Flat terrain and land is relatively plain
Major physiographic unit	Madhupur Tract which comprises central part of Dhaka, the course of Brahmaputra – Jamuna Flood Plain
Major soil type	Belongs to a Pleistocene terrace consisting mainly of red and mottled clays. They are strongly acidic with low organic matter, low moisture holding capacity, and low fertility level.
Climatic condition	Humid and sub-tropical climate. During the winter season, cool winds blow from the NE. Prevailing winds are NW, S, and NE.
Flooding	Generally flooded by the ingress of flood water from north, west and south sides by the Bangsi, Tongikhal, and Turag rivers
Seismicity	Falls under seismic zone II (medium intensity seismic effects)
Nearest water body	Hatirhjeel passes about 200 m from the EWU in West direction; Rampura Khal in South side and 100m from EWU
Ecologically-critical area	None
Reserve/protected forest	None
Archeologically-important site	None
Sensitive receptors	There are five mosques, one school, and one temple within the 500 m radius from EWU
Major settlement	Badda Thana

Source: Site reconnaissance in January 2019 and secondary information

4.2 Physical Environment

4.2.1 Geology and Soil

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 the Pleistocene Madhupur clay, a yellowish brown to oxidized reddish brown silty clay. The Madhupur Clay makes up most of the surface across the elevated Madhupur Tract. This particular unit is about 45 m in thickness (an average of 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 grey and yellow organic-rich sands and clays of the Holocene Bashabo Formation.

The major geomorphic units of the city are the high land or the Dhaka terrace, the low lands 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 grey in color in and around the project area. Moreover, dark grey floodplain soil can be found adjacent to the area of Turag and Buriganga.

4.2.2 Climate

According to Köppen climate classification, it falls under 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 the climatic characteristics, Bangladesh is divided into 7 different climatic sub-regions. The study area of the project falls under the south-central climatic zone of the country (Figure 4.3).

Meteorological data recorded at Dhaka station of the Bangladesh Meteorological Department (BMD) from January 1980 to December 2013 were used to describe climate within the study area. Average maximum temperature ranges from 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 in Dhaka. The warmest month is April while the coldest month is January.

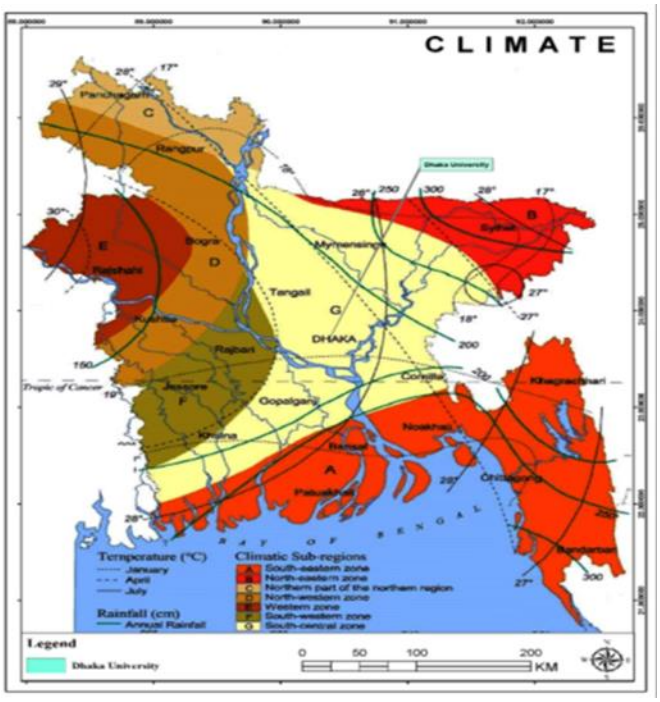


Figure 4.3 Climate Map

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%.

4.2.3 Natural Hazards

Flooding

Dhaka city was particularly hit by severe floods in 1988 and 1998. During the 1998 flood about 56 percent of the city was inundated, including most of the eastern and 23% of the western part of the city. Over 60% of the area of Dhaka can be demarcated as flood risk zone considering its flood history. Flood in Dhaka is caused by high rainfall or by flooding 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. The issues for Dhaka's flood scenario are-

- All sides of Dhaka city are bounded by rivers and canals.
- Above 50% of Dhaka is low-lying and inundated during monsoon.
- Filling of water retention areas and drains increases the risk of seasonal flooding.
- Encroachment of rivers and canals can increase flood hazard susceptibility.
- Internal drainage congestion can make the flood situation more complex.
- Poor/no enforcement of laws in protecting the low-lying areas in and around Dhaka

Seismic Effects

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 that caused widespread damage throughout the country, and the earthquake in 2004 that damaged large parts of Dhaka City. Figure 4.4 shows the seismic zoning and flood prone areas in Bangladesh.

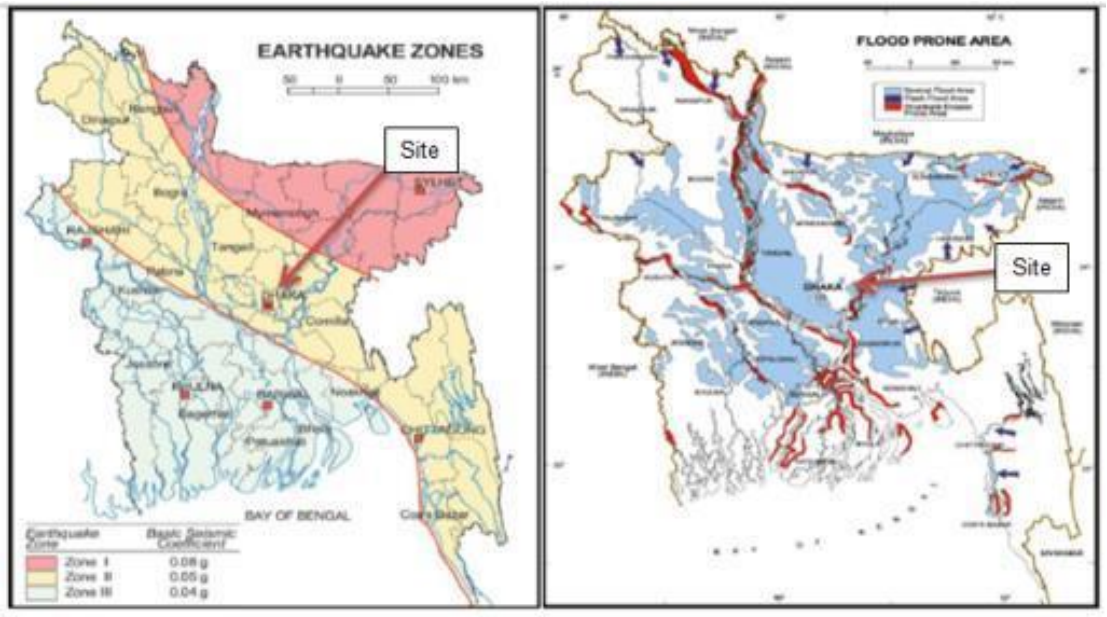


Figure 4.4 Seismic Zoning and Floodprone Areas, Bangladesh

4.2.4 Ambient air quality and noise

Ambient air quality

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.[8] Table 4.2 shows the summary of monitoring results from January to April 2019 collected through the CASE project.

[8] Department of Environment. Clean Air and Sustainable Development. http://case.doe.gov.bd/index.php?option=com_contact&view=contact&id=1.

Table 4.2 Summary of CASE Monitoring Results, 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
Average monthly air quality data - January 2019					
SO_2- 24 hr	140	ppb	6.32	2.64	16.8
NO_2	53 (Annual)	ppb	63.3	141	93.2
$PM_{2.5}$-24 hr	65	µg/m^3	131	149	205
PM_{10}-24 hr	150	µg/m^3	DNA	212	302
Average monthly air quality data- February 2019					
SO_2- 24 hr	140	ppb	7.79	2.77	12.4
NO_2	53 (Annual)	ppb	66.1	111	71.0
$PM_{2.5}$-24 hr	65	µg/m^3	124	134	144
PM_{10}-24 hr	150	µg/m^3	DNA	235	244
Average monthly air quality data- March 2019					
SO_2- 24 hr	140	ppb	DNA	2.41	5.99
NO_2	53 (Annual)	ppb	84.0	DNA	45.1
$PM_{2.5}$-24 hr	65	µg/m^3	86.3	114	123
PM_{10}-24 hr	150	µg/m^3	164	206	225
Average monthly air quality data- April 2019					
SO_2- 24 hr	140	ppb	3.16	2.60	DNA
NO_2	53 (Annual)	ppb	54.3	DNA	21.8
$PM_{2.5}$-24 hr	65	µg/m^3	57.2	67.3	71.5
PM_{10}-24 hr	150	µg/m^3	115	149	132
Average monthly air quality data - May 2019					
SO_2- 24 hr	140	ppb	DNA	15.8	DNA
NO_2	53 (Annual)	ppb	DNA	DNA	20.1
$PM_{2.5}$-24 hr	65	µg/m^3	38.2	69.6	49.7
PM_{10}-24 hr	150	µg/m^3	98.7	129	99.8

Results from the CASE air quality monitoring suggest that NO_2, PM_{10} and $PM_{2.5}$ 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.

Ambient air quality measurements were conducted on 6 April 2019 at and around the project site by EQMS Consulting Limited. Three sampling stations were identified (Figure 4.5) and results are given in Table 4.3. Results of this one-time sampling suggest that it meets NAAQS (2005) but exceed IFC-WB EHS Guidelines 2007 on PM_{10} in one station and $PM_{2.5}$ in all the three stations.

Table 4.3 Results of Ambient Air Quality Measurements, 6 April 2019

Location	Concentration (µg/m^3)		
	PM_{10}	$PM_{2.5}$	NO_x
AQ1- In front of Bot Tola	42.19	38.02	64.94
AQ2- In front of United Commercial Bank Ltd.	37.56	30.98	46.88
AQ3- In front of Aponjon Coffee House	85.38	53.42	172.55
Duration (hour)	24	24	1
Standards ECR 1997 and amendment in 2006 Standard (Schedule 2)	150	65	100 (Annual)
IFC-WB EHS Guidelines 2007	50 (guideline)	25 (guideline)	200 (guideline)

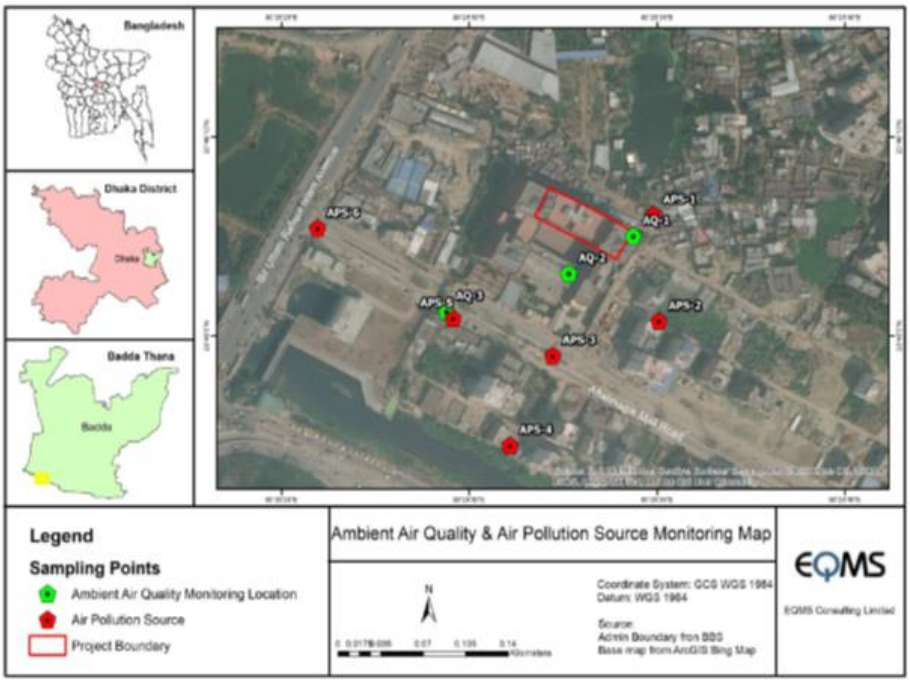


Figure 4.5 Ambient Air Quality Stations, Project Site

Noise

Main sources of increased noise level at and around the project site are due to the movements of vehicles, students' activities, and the settlements in front and side of the EWU campus. Three noise sampling stations were identified to do measurements as baseline data. Results suggest that the settlements on the eastern side of EWU (NL1) exceed the limits set by national requirements (2006) and IFC-EHS Guidelines 2007 both daytime and nighttime. Measurements were done on 6 April 2019 and results are given in Table 4.4 while sampling stations are shown

in Figure 4.6.

Table 4.4 Results of Ambient Noise Sampling

Location	Leq Day (dBA)	Leq Night (dBA)
NL1-Bot Tola of EWU	63.59	57.28
NL2-UCB ATM Booth at EWU Campus	52.26	46.21
NL3-Aponjon Coffee house beside EWU campus gate	60.75	54.4
(Mixed use) Noise Pollution Control Rules 2006	60	50
(Residential, institutional, educational) IFC-EHS Guidelines 2007	55	45

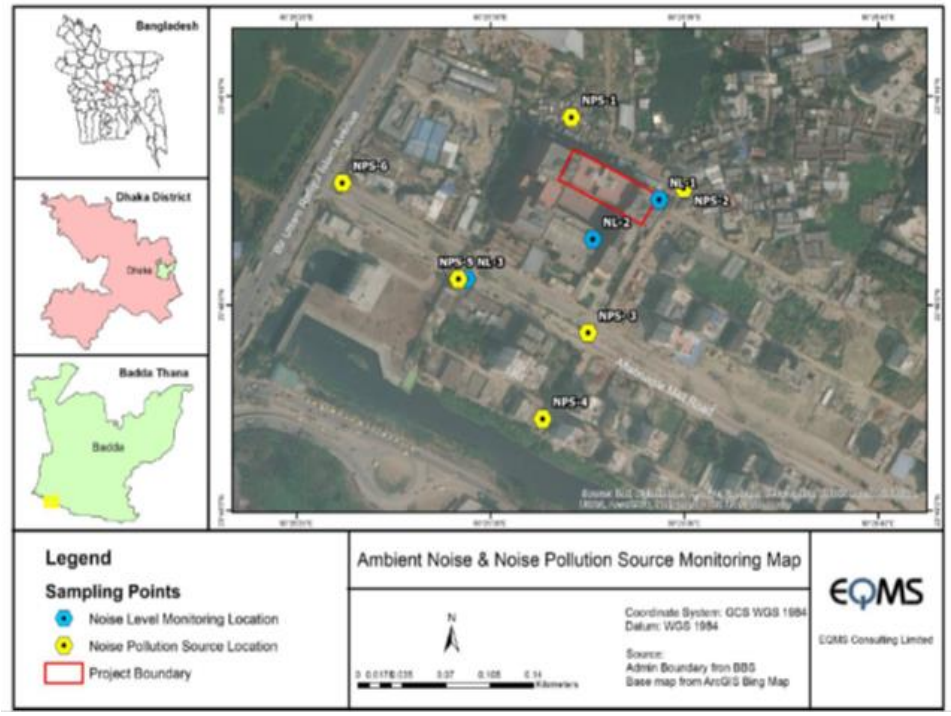


Figure 4.6 Noise Sampling Station, Project Site

4.2.5 Groundwater Quality

The hydro-geological setting confirms two distinguishable aquifer systems in the study area, one is Dupitila sands forming confined/semi-confined aquifer beneath the Pleistocene deposits, and the other is the recent alluvium in the floodplains containing shallow aquifers under water-table or semi-confined conditions. The Dhaka aquifer system consists of three aquifer layers at different depth location up to around 300 m. Due to groundwater abstraction for water supply, the water level for the upper aquifer has dropped to more than 70 m depth from the surface in some locations. Accordingly to Chief Engineer, EWU has a deep tubewell with the capacity of 500,000 liter per day with a depth of about 250 m.

On 30 March 2019, drinking water sample was collected from one of the sources of water in EWU (Figure 4.7) for laboratory analysis of fecal coliform, pH, arsenic, lead, cadmium, and chromium (hexavalent). Results show that the water sample meets the limits of WHO and ECR 1997, Schedule 3(B) Rule 12 for all the drinking water quality parameters tested. Table 4.5 shows the result of sampling.

Table 4.5 Result of Drinking Water Analysis

Parameter	Unit of Measure	Allowable limit		Sampling Station: Water source in EWU
		ECR 1997, Schedule 3(B) Rule 12	WHO	Result of Analysis
Date of sampling: 30 March 2019				
Fecal Coliform	n/100 ml	0	Must not be detectable in any 100 ml sample	0
pH	-	6.5-8.5	-	7.58
Arsenic (As)	mg/l	0.05	0.01	<0.010
Lead (Pb)	mg/l	0.05	0.01	0.001
Cadmium (Cd)	mg/l	0.005	0.003	BDL (below detectable limit)
Chromium (Cr^{+6})	mg/l	0.05	0.05	0.002

Figure 4.7 Water Sampling at the Project Site

4.3 Socioeconomic Environment

Dhaka is the most populated city in Bangladesh, and it is also one of the most populated cities in the world. According to the United Nations, "The World's Cities in 2018" Data Booklet, the population in Dhaka is 19.578 million, ranks 9th most populous cities in the world.

The project site is within Badda Thana. Based on the data from the Bangladesh Bureau Statistics (2013), the population in Shahbagh is 96,111 with 23,777 households and population density of 13,194 persons per km^2. The average household size is 4.Badda has an area of about 1.44 km^2.

Religion and employment The population is predominantly Muslim (94.66%) with small community of Hindu (3.79%). Main sources of income are service, industry and agriculture.

Housing Type of housing is mainly pucca (59%) followed by semi-pucca (26%), kutcha (14%) and Jhupri (1%). More than half of the population is renting (73%) and only 24% own their place and about 4% is rent-free.

Sanitation Almost 90% of the population has access to sanitary latrine facility.

Electricity and water supply The population is well connected to the electricity grid (98%) and about 77% of the population use tap water as source of drinking water. The rest of the population (19%) use tube well.

5.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Associated potential environmental impacts will be mainly during the interior works of selected classrooms which are minimal, 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 generally on occupational health and safety.

5.1 Planning for interior works and new HVAC system

This will involve walk-through survey of the selected rooms for upgrade and needing interior works. Along with this survey will be planning for details that will be involved. Poor planning may cause safety and health risks to students. To avoid these risks, consultations with students, faculty, and the Engineering and Maintenance Department (EMD) of EWU will be done on scheduling and re-assignments of rooms to other students as other departments also use the rooms for upgrade. Failure to properly re-assign rooms will cause disruptions and inconvenience to other students. The interior works will comply with the requirements of BNBC 2006 and maintain the integrity of the electrical and mechanical specifications of the connections.

An interior works plan will be prepared by the Contractor for approval by the PIU and the Chief Engineer of EMD to ensure smooth implementation. Engineers from the EMD will design the new HVAC that will accommodate the upgrading of allocated spaces for computing laboratories and classrooms. The plan will cover, among others, scheduling, management of workers, materials and waste management, noise and dust control, and emergency preparedness.

5.2 Interior works in selected rooms

Recruitment of workers

Some temporary jobs may be created by the interior works which may result to disputes if there is no transparency in recruitment and giving priority to local labour. The Contractor will be required to consider available local labour.

Orientation of workers

Prior to the start of work, the PIU together with the environmental safeguard consultant will conduct an orientation to the Contractor and workers on their responsibility to comply with applicable regulations of EWU, implementing the EMP, and compliance to ADB requirements and the government. This will create awareness on safety and emergency.

5.2.1 Establish new computing laboratories and conduct interior works

Setting-up of 12 new laboratories, interior works in four classrooms, and convert five rooms into four state-of-the art computing laboratories may cause conflict of schedule with other room users resulting to disruptions and inconvenience. This will also cause potential increase in dust and noise levels, generation of waste, and safety risks to students, faculty and staff, and also workers, and presence of workers within the premises. To minimize these impacts, the Contractor will be required to do the following:

- Proper coordination with CSE, and scheduling of work
- Notify students or CSE one day in advance about the work schedule

- CSE to ensure minimal disruption to other room users
- Provide temporary enclosure or isolate the area to contain noise and dust
- Conduct noise-generating works at night or on days when students are gone
- Require the mandatory use masks/earmuffs and other appropriate safety gear
- Provide bins to collect waste generated
- Separate wastes to check for recyclables and designate collection points
- Collect and dispose waste generated progressively to avoid accumulation of waste
- Provide appropriate cover of waste to prevent spilling during hauling
- Dispose waste in designated disposal site approved by Dhaka North City Corporation (DNCC). This may likely be at Aminbazar landfill. There are new eight secondary transfer stations in DNCC funded by ADB.[9]
- Identify and provide space for workers to stay during break-time
- Keep fire extinguishers ready and provide first-aid kit at the work areas
- Require workers to have proper identification
- Wearing of workers' uniform (if any) will be mandatory
- Provide appropriate personal protective equipment (PPE) to workers
- Install clear and visible warning/danger signs within work areas
- Assign security personnel in the work areas to prevent unauthorized access by students or staff
- Provide demarcation to separate students from workers
- Label products/materials like paints, lubricants, etc.

Upon completion of interior works and rooms upgrade, the Contractor will restore all areas potentially damaged or affected during interior works, and to dispose the remaining waste and debris at designated sites.

5.2.2 Occupy new classrooms and computing laboratories

Improper use and lack of maintenance and care to the new rooms may result to premature wear and tear. Users may generate waste and improperly dispose in the rooms. To minimize this risk, CSE together with EMD will do the following:

- Conduct orientation and awareness to staff and students on proper care of the facility
- Prepare maintenance and procedures plan to manage new labs and classrooms
- Include waste management in maintenance plan and designate waste management coordinator
- Conduct yearly orientation to students on proper waste management,
- Implement segregation of waste at source and 3Rs (reuse, reduce, recycle)

5.3 Installation of the new HVAC system

Poor installation of HVAC system may potentially cause accidents and safety risks to workers and students. To avoid any potential risks to safety, the following will be required by EWU to prospective vendor or contractor:

- Must visit the working site prior to submission of tender
- Will be liable for damage to any property of EWU during the work period
- Must submit technical catalog for major items

[9] Loan 2554/Loan 2555-Bangladesh: Urban Public and Environmental Health Sector Development Program approved on 28 September 2009.

- Before installation, sample of all materials must be approved by the Engineer-in-Charge of EMD
- Supply of any inferior or defective material and poor workmanship must be replaced by the vendor or contractor at their own cost according to the direction of the EMD
- Will take all the necessary measures for the safety of their workers and for the site as approved by EWU authority
- Will provide relevant documentation of the system
- All machine installations must be tested and commissioned satisfactorily according to the specifications and standard requirements of HVAC system. If there is any modification needed for commissioning, this will be done by the vendor or contractor.
- All types of safety measures will be taken by the supplier
- Will provide all the necessary trainings for the operation & maintenance of the HVAC system to the EWU engineers and technicians.

Compliance by the vendor or contractor to the safety requirements of EWU on the installation of the new HVAC system will be monitored by the PIU and the environmental consultant at the PMU.

5.4 Emergency response plan

Safety and emergency preparedness are in place at EWU. To enhance the capability to deal with emergencies, the following will be considered:

- Prepare emergency/disaster preparedness plan and procedures
- Designate a Disaster Coordinator
- Conduct yearly training/orientation/mock drills on safety and emergency awareness
- Provide clear and visible emergency warning signs

Fire-fighting systems have been strategically located in EWU (Figure 5.1). As part of emergency preparedness, a draft emergency response plan (ERP) will be finalized in consultation with students, faculty, and administrative staff. Table 5.1 presents the key elements of the draft ERP.

Table 5.1 Key Elements of ERP (Draft)

Elements	Description
Approach	The aim of this emergency response plan is to guide personnel in 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	• Earthquakes • Cyclones • Energy/utility outages • Fire hazards • Hazardous materials releases • Terrorism
Planning	• Identify hazards and assess risk • Assess capabilities and resources • Develop an emergency plan and procedures • Conduct training • Public relations

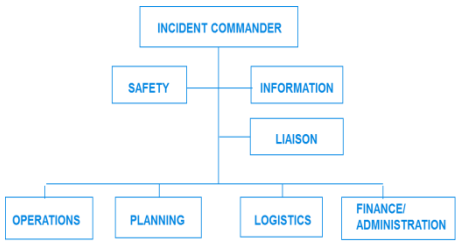
Elements	Description
	• Conduct drills and exercises • Develop audit procedures
Emergency preparedness requirements	• Identified assembly points and/or evacuation points • A well-defined escape routes • Fire-fighting system will be supplied in strategic locations • Proper security arrangements functioning at all times • Efficient transport and communications system • Smoking will be prohibited within areas with flammable substances (if any) • Water will be kept available for fire-fighting • Availability of sufficient number of trained staff to deal with any emergency situation • Clear and audible emergency alarm/whistles and public address system • Conduct drills to familiarize students, faculty, and administrative on the evacuation routes and use of the fire-fighting system • Emergency contact number of the medical centre (and nearest hospital), ambulance and fire service and police station) • Main electrical equipment is switched off when not in use
Incident command system	

Figure 5.1 Some photos of the fire-fighting system at EWU

6.0 ANALYSIS OF ALTERNATIVES

There were no alternatives in terms of location, design or technology. The interior works will be within the existing building of the CSE Department including the installation of the new HVAC system. However, a "no project" option will mean that IT students in EWU will not have the opportunity for innovative learning, and keeping abreast with emerging approaches and solutions that the interior works and upgrading of computing equipment can provide. The faculty and staff will also lose the chance to upgrade their skills which is one of the key elements in producing competent IT graduates for the job market.

The "with project" option entails there will be opportunities to train faculty members in improving outcome-based education teaching-learning pedagogy, update IT curriculum to meet industry needs, and establish state-of-the-art classrooms and computing laboratories including incubation and StartUp Center. These interventions will increase R&D initiatives and is expected to produce more IT graduates to meet the continuing demand of the industry for IT professionals. Table 6.1 presents a comparison of "no project" option and "with project" option.

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 IT industry	There will be demand for IT graduates to meet the requirements of the IT industry	Limited or no possibility of producing better graduates due to poor IT facilities
Inconvenience and disruption to students' daily activities during interior works and upgrading of equipment	There will be minimal and temporary disruption to students' activities	No impacts
Opportunities for students to have more options for IT training	There will be more options for R & D, training, and link to the private sector expected to improve chances of employability	No opportunities
Contribution to Vision 2021	Will contribute to the goals and objectives	No contribution

7.0 INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

7.1 Introduction

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 EWU about the proposed interior works in selected classrooms and upgrading of computing equipment within the CSE building and also for EWU 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.

7.2 Methodology

Identification of stakeholders Stakeholders are considered to be primary if they will be directly affected during construction and post-construction such as 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, NGOs, transport cooperatives and the general public. Stakeholders were invited by EWU project team focal person through phone calls, letter, and visit in person.

Approach Participants were informed of the proposed project and the potential environmental implications of the interventions in EWU. After the presentations, participants were given the time for questions and answers to raise their concerns. Discussions were done in Bangla and English.

Record of the meeting General information of the participants such as name, gender, occupation, and signature were collected and shown in the attendance list. Registration to the attendance list is voluntary.

7.3 Results of consultation

A total of 51 participants (14 females) joined the consultations on 4 April 2019 at the CSE Faculty Lounge of EWU. Stakeholders invited were residents from the settlements within United Commercial Bank Ltd. and Jahurul Islam Avenue in front of EWU, undergraduate and graduate students, representatives from the Student Council, and CSE faculty members.
Table 7.1 presents the summary of consultations.

Table 7.1 Summary of Consultations

Issues Raised	Response from Project Team
Rooms to be renovated are not department-specific, thus, may cause shortage of classrooms during interior works	Schedule of interior works will be arranged with adjustment of classes to avoid shortage of classrooms
Increased student intake will require more Teaching Assistants and would like to have space allocated for them after interior works	Will consider allocation of space
Measures for minimizing dust and noise pollution as this may affect students and library users	Measures to contain noise and dust levels will be outlined in the environmental management

Issues Raised	Response from Project Team
	plan (EMP) that the contractor is expected to comply Focal Person of PIU with assistance from PMU and ADB will monitor compliance
Students wanted to know the process in case there will be complaints during interior works	There will be a grievance redress mechanism (GRM) that the PIU will set up.
Waste management after interior works	Bins of different colors will be in every floor to separate biodegradable from non-biodegradable
Request for disclosure of more project information	More details will be disclosed upon approval of the DPP
Frequency of consultation	Consultation will continue during project implementation; complaints (if any) will be subject to GRM
Lack of emergency training and awareness	Safety and emergency awareness such as posters, fire-fighting systems, marked emergency exits, etc. are already in place in the entire university. Mock drills will be scheduled and conducted regularly.

7.4 Consultations and information during implementation

Consultations with students, faculty, and adminstrative staff will continue. This could be on emergency and disaster preparedness, maintenance of the new IT equipment, improvement of alumni networking or the steps to follow in R&D industry collaboration. To meet disclosure requirements of ADB, project brief (both in Bangla and English) will be posted in the website of CSE once the DPP is approved. A one-page project brief (also both in English and Bangla) will be made available to interested individuals in EWU and UGC. The one-page flyer or Q&A will include details on the grievance redress mechanism. Also, the IEE which will be posted to ADB website will provide more information on the project.

8.0 GRIEVANCE REDRESS MECHANISM

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.

Objectives of GRM This ensures a process of receiving and resolving complaint(s) promptly from persons that may be affected by the interior works or by project implementation. 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.

Structure A grievance redress committee (GRC) will be created and may consist of: (1) PMU Head, (2) representative from the local government, (3) representative of interior works contractor, and (4) 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 throughout the project cycle. However, given the nature of the intervention in EWU, where environmental issues may be of concern only during the interior works, the GRC may be inactive once they are completed. MOE and UGC will ensure the representation of women in GRC.

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.

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. Cost of implementing the GRM will be part of the administration cost borne by the PMU.

Information disclosure PIU will disclose details on GRM through the project website of EWU and the PIU office. Details will include the contact person, a hotline phone number, and a simplified flowchart on how to file a complaint.

Record-keeping A record 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 semi-annual monitoring reports submitted to ADB during construction stage and annually during post-construction/operation stage.

Procedure Complaint can be lodged either by approaching the Engineer In-charge or the representative 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 (see Figure 8.1): (i) through the PIU or through the Engineer In-charge of interior works or the representative of the Contractor, (ii) through the GRC, and (iii) the DOE under the provisions set forth by the Environment Court Act 2000 (amended in 2002 and 2010) or the appropriate courts of law. 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:

(i) *First level – Engineer In-charge or representative of contractor/PIU Head* Complaint to be resolved at the PIU level within seven days and advise the Complainant accordingly.

(ii) *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.

(iii) *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.

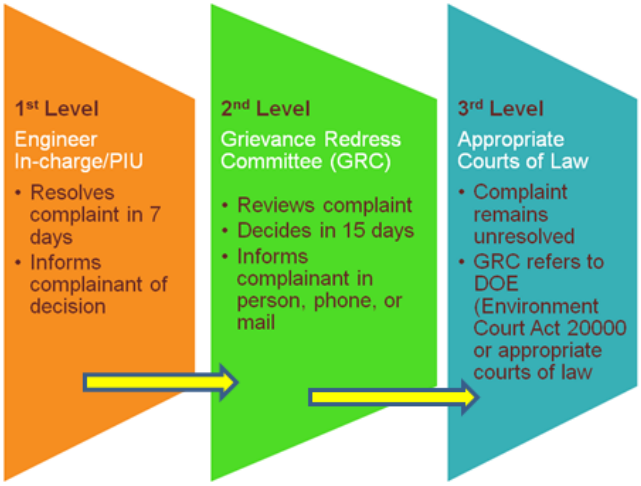


Figure 8.1 Three-tier Grievance Redress Mechanism

9.0. ENVIRONMENTAL MANAGEMENT PLAN

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.

9.1 Monitoring

The environmental monitoring is a time-bound process to ensure that non-compliance 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 in their website as required by SPS 2009 and Access to Information Policy 2018. Table 9.2 presents the environmental monitoring plan (EMoP).

9.2 Implementation Arrangements

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

Project implementation unit (PIU) EWU will set-up a PIU who will be responsible for managing the project. The PIU will ensure that the EMP and EMoP are properly implemented, timely reporting to PMU of the environmental monitoring report required by ADB (see Appendix 5 for proposed format), public consultations (if needed), and in handling of complaints according to the GRM. Key responsibilities of PIU are as follows:

- Designate a staff to oversee implementation of EMP and EMoP;
- Ensure compliance of contractor to EMP and EMoP;
- Engage stakeholders, as appropriate;
- Conduct onsite spot-checks to monitor compliance of contractor
- In the event of non-compliance by Contractor or any unanticipated environmental impacts, coordinate with the PMU environmental safeguard consultant in preparing a corrective action plan (CAP) to address the issue with time-bound actions; CAP will be submitted to ADB for review and will be disclosed to ADB website;
- Ensure that any grievance/complaint received are addressed in a timely manner;
- Maintain a record of grievance/complaint received, resolution or action taken, and include the details in the environmental monitoring report;
- Keep a list of relevant permits issued by the GOB for the project, if any; and,
- Prepare the respective environmental monitoring report and submit to the PMU for consolidation and finalization by the environmental safeguard consultant.

In the event there will be a change or upgrade in the interior works of selected classrooms, this IEE will be updated and/or revised and submitted to ADB prior to any construction works. The updated/revised IEE will be also disclosed to ADB website.

Contractor of interior works 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. Maintain a record of complaint/grievance submitted at the project level through the contractor including the action taken to address the issue.

The designated staff of the Contractor 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

Project Activity	Potential Environmental Impacts	Mitigation/Enhancement Measures	Estimated Cost	Implementing Unit	Supervising and Monitoring Unit
Planning Stage					
Walk-through survey of rooms to be renovated	• Potential safety and health risks to students and building users due to poor planning	• Consult students, faculty, and the Engineering and Maintenance Department on the schedule of interior works • Interior works to meet the requirements of BNBC 2006 and relevant provisions in the BNBC 2015 (draft) • Maintain required electrical and mechanical specifications of connections	Included in project cost	Contractor	PIU
	• Lack of technical capacity on safeguards at CSE	• PIU will designate staff to coordinate with the environmental safeguard consultant in PMU	PIU Budget	PIU, environmental safeguard consultant	PMU and ADB
Prepare interior works plan for approval of PIU	• Smooth work implementation	To include the following in the workplan: • Schedule of works • Workers' management • Materials management plan • Waste management • Noise and dust control • Materials management plan • Emergency preparedness	Included in the project cost	Contractor, PIU	PMU, Environmental Safeguard consultant
Interior works for selected rooms					
Orientation of workers and staff	• Understanding the responsibility of Contractor and workers to comply with applicable regulations of EWU, implementing the EMP, compliance to ADB requirements and the government • Create awareness on safety and emergency	• Conduct briefing on EMP, records management, compliance and reporting • Identify areas to be monitored and the required mitigation measures • Inform workers what to do and not to do during emergency	Included in the Contractor cost	PIU, environmental safeguard consultant	PMU

Project Activity	Potential Environmental Impacts	Mitigation/Enhancement Measures	Estimated Cost	Implementing Unit	Supervising and Monitoring Unit
		• Provide emergency info to workers like contact person, hotline, etc.			
Hiring of project staff and workers	• Dispute over transparency in hiring	• Contractor will be required to give priority to local labour	---	Contractor, PIU	PMU
• Refurbishment of 4 existing labs (Rooms 630, 634, 637, and 638) • Four state-of-the-art classrooms (223, 224 225+226, and 227) • Establish 12 new labs in the following rooms: 335, 336, 337, 338, 339, 431, 432, 433, 434, 435, 436, 437	• Conflict of schedule with other users of the room • Disruption and inconvenience to other students and/or room users	Contractor will do the following: • Proper coordination with CSE and scheduling of work • Notify students or CSE one day in advance about the work schedule • CSE to ensure minimal disruption to other room users	Included in Contractor cost	Contractor	PIU
	• Increase noise level	• Provide temporary enclosure or isolate the area to contain the generation of noise and dust • Conduct noise-generating works at night or on days when students are gone • Use masks/earmuffs and other appropriate safety gear			
	• Increase dust level				
	• Generation of waste	• Provide bins to collect waste generated • Separate wastes to check for recyclables • Identify collection points • Collect and dispose progressively to avoid accumulation of waste • Provide appropriate cover of waste to prevent spilling during hauling • Dispose waste in designated disposal site by DNCC			
	• Safety risks to students and workers	• Identify and provide space for workers to stay during breaktime • Keep fire extinguishers ready • Provide first-aid kit at the work areas • Require workers to have proper identification			

Project Activity	Potential Environmental Impacts	Mitigation/Enhancement Measures	Estimated Cost	Implementing Unit	Supervising and Monitoring Unit
		• Wearing of workers' uniform (if any) will be mandatory • Provide appropriate personal protective equipment (PPE) to workers • Install clear and visible warning/danger signs within work areas • Assign security personnel in the work areas to prevent unauthorized access by students or staff • Provide demarcation to separate students from workers • Label products/materials like paints, lubricants, etc.			
Clean up of work areas after completion of interior works	• Improper disposal of construction debris • Failure to restore work areas up to standard	• Restore/reinstate all the areas potentially damaged during interior works • Provide workers with proper safety gear and equipment • Dispose remaining waste and debris at designated sites	Included in Contractor costs	Contractor	PIU
Installation of new HVAC system	• Poor installation may potentially cause accidents and safety risks to workers and students	To avoid any potential risks to safety, the following will be required to prospective vendor or contractor: • Will visit the working site prior to submission of tender • Will be liable for damage to any property of EWU during the work period • Will submit technical catalog for major items • Before installation, sample of all materials will be approved by the Engineer-in-Charge of EMD • Replace at their own cost any supply of inferior or defective material and poor workmanship based on direction of EMD	Included in the vendor or contractor cost	Contractor	PIU and Environmental Consultant in PMU

Project Activity	Potential Environmental Impacts	Mitigation/Enhancement Measures	Estimated Cost	Implementing Unit	Supervising and Monitoring Unit
		• Take all the necessary measures for the safety of their workers and for the site as approved by EWU authority • Provide relevant documentation of the system • All machine installations will be tested and commissioned satisfactorily according to the specifications and standard requirements of HVAC system. If there is any modification needed for commissioning, this will be done by the vendor or contractor. • All types of safety measures will be taken by the supplier • Provide all the necessary trainings for the operation & maintenance of the HVAC system to the EWU engineers and technicians			
Post-interior works					
Occupy newly renovated rooms and labs	Improper use and lack of care to the new rooms and labs	• CSE to conduct orientation and awareness to staff and students on proper care of the facility • CSE to prepare plan/procedures to manage new labs and classrooms	Include in the operation cost	CSE Department	PIU
	Generation of waste	• Designate waste management coordinator • Prepare waste management plan • Conduct yearly orientation to students waste management, • Implement segregation of waste at source and 3Rs (reuse, reduce, recycle)	Include in the operation cost	CSE Department	PIU
	Potential incidence of emergency or natural disaster	• Prepare emergency/disaster	---	CSE Department	PIU

Project Activity	Potential Environmental Impacts	Mitigation/Enhancement Measures	Estimated Cost	Implementing Unit	Supervising and Monitoring Unit
		preparedness plan and procedures • Designate a Disaster Coordinator • Conduct yearly training/orientation/drills on safety and emergency awareness • Provide clear and visible emergency warning signs			

Table 9.2 Environmental Monitoring Plan

Project Stage	Parameter	Location	Method of Measurement	Frequency	Responsibility	
					Implementation	Supervision
Interior works	Generation of waste and other debris	Work areas	• Number of bins provided • Collection area • Separation of waste	Daily	Contractor	PIU, environmental safeguard consultant
	Ambient air quality and noise	Work areas	• Presence of appropriate and adequate enclosures	Twice a week	Contractor	PIU, environmental safeguard consultant
	Availability of project information	PIU	One-page flyer, project brief or Project Q&A	Quarterly	PIU	PMU, environmental safeguard consultant, PMU
	Recruitment from local labour	PIU office	Number of local workers recruited	Once at the start of interior works	Contractor	PIU
	Orientation of workers on health and safety	Work areas or designated room	Number of participants	Once at the start of interior works	environmental safeguard consultant, Contractor	PIU
	Clear and visible warning signs for safety	Work areas	Ocular inspection/spot checks	Once a month	Contractor	PIU, environmental safeguard consultant
	Proper storage and management of materials and wastes	Work areas or designated place	Ocular inspection/spot checks	Weekly	Contractor	PIU, environmental safeguard consultant
	Use of PPE and safety gear	Work areas	Ocular inspection/spot checks	Weekly	Contractor	PIU, environmental safeguard consultant
	Good housekeeping	Work areas	Ocular inspection/spot checks	Weekly	Contractor	PIU
Installation of new	Generation of waste and debris	Work areas	• Number of bins provided	Weekly	Contractor	PIU, environmental

Project Stage	Parameter	Location	Method of Measurement	Frequency	Responsibility	
					Implementation	Supervision
HVAC system			• Collection area • Separation of waste			safeguard consultant
	Use of PPE and other safety gear	Work areas	Ocular inspection/spot checks	Weekly	Contractor	PIU, environmental safeguard consultant
	Clear and visible warning signs for safety	Work areas	Ocular inspection/spot checks	Once a month	Contractor	PIU, environmental safeguard consultant
	Good housekeeping	Work areas	Ocular inspection/spot checks	Weekly	Contractor	PIU
Post-interior works	Orientation to users on care and maintenance of new rooms and computing labs	CSE	Number of trainees	Annually	CSE and Engineering & Maintenance Department (EMD)	PIU
	Good housekeeping	CSE	Ocular inspection/spot checks	Monthly	EMD and CSE	PIU
	Condition/maintenance of fire extinguishers/fire-fighting units/fire alarms	CSE	Ocular inspection/spot checks	Annual	EMD and CSE	PIU
	Emergency manual and procedures	CSE	Check manuals	Annually	EMD and CSE	PIU
	Emergency mock drills	CSE	Number of trainees	Semi-annual	EMD and CSE	PIU

10.0 CONCLUSION AND RECOMMENDATION

Assessment of potential environmental impacts associated with the interiors works at EWU show that they are minimal, of short duration, temporary, reversible, and can be easily mitigated by proper planning, coordination, and best practices in engineering works. The mitigation measures are outlined in the EMP and the parameters to be monitored are listed in the EMoP.

Stakeholders were consulted and a GRM to deal with potential complaints on the project was described. Consultations will continue during project implementation. An environmental safeguard consultant will be engaged at PMU throughout 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 semi-annually during construction and annually post-construction. These monitoring reports will be similarly disclosed to ADB website.

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

Appendix 1
List of Participants and Photographs during Consultation

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

Public Consultation Meeting
held on April 4, (Thursday), Time: 3.00 pm
Venue: Faculty Lounge
East West University (EWU)

List of Participants

Sl No.	Name	Occupation	Male	Female	Cell No.	Signature
1.	Md. Mohsin Uddin	lecturer, CSE	✓		01535431270	
2.	Engr. Jadu Ram Paul	Service	✓		01711-939373	
3.	Md. Mamun-Or-Rashid	Sr. Assistant	✓		01742255395	
4	Mohammad Motiur Rahman	Deputy Librarian, EWU	✓		01682580145	
5	MD.SAPIAL ISLAM	A.Service	✓		01711-269765	
6.	Md. Mohsin Hossain	Service	✓		01712-669445	
7.	Md. Abu Musa	Service	✓		01819079470	
8.	Md. Rafiqul Islam	AE (T&T)	✓		01911624704	
9.	Ikhtiar Uddin Ahmed	Civil Engr.	✓		01622773333	
10.	Enam Biswas	Student, UTA	✓		01804937937	
11.	Kanize Fatema-Tuz-Zohora	GTA, CSE		✓	01737552888	
12.	Jamshid Jendrus Chowdhury	UTA, CSE		✓	01840911348	
13.	Nazmun Nahar Khanom	UTA, CSE		✓	01812936269	
14	Md Rashidul Hasan	Service	✓		01917373593	
15	Md. Mirza Chowdhury	Business	✓		01682199778	
16	Nasrin Ume Farzana	Department Officer, EWU		✓	01817597855	
17	S.M.RIFAT-BIN-RAFIQ	LAB OFFICER	✓		01719-900804	
18	Priyanka Mondal	Student, CSE		✓	01715068031	
19	Mohammad Mehedi Hasan	student, CSE	✓		01521437785	Mehedi
20	Nishat Tasnim Mim	Student, CSE		✓	01982665771	Nishat
21	Md. Foton	II	✓		01915528497	
22	MD. Faruk Hossain	II	✓		01869725947	
	B.M.P Billal	II	✓		01854913142	
	Dinesh Kumar	Business	✓		01711034162	
	SAJAL DAS	II	✓		01627653991	

Name	Occupation	Male	Female	Cell No.	Signature
Joy Barai	Student	✓		01625277276	
MD TANBIN HOSSAIN HOWL	student	✓		01841002187	TANBIN
Kamazum Monira Mou	student		✓	01933345886	Mou
Al Shahriar Nitoy	Student	✓		01674562802	
Shakera Chowdhury	Student		✓	01679706541	
Khan Md. Habibullah	Senior Lecturer	✓		01912400247	
M Saddam Hossain Khan	Lecturer	✓		01911536727	
Tanni Mittra	Senior Lecturer		✓		
Anika Tabassum	lecturer		✓		
MD. ANISUR RAHMAN	Engineer	✓		01770930589	
MD. Nazmul Hossain	Engineer	✓		01554850331	
Jannat Binte Alam	Graduate		✓	01918462808	
Zobayan Mahatab Md Sakib	Student Engineer	✓		01794-925560	
Asif Mahmud	Student	✓		01957195387	
Imtiaj Ahmed	Student	✓		01706068325	
Sayed Atique Nawaz	Student	✓		01960008530	
Anika Tasnim	Student		✓	01625745709	
Sabbir Ahmed	Student	✓		01611216355	
Mohammad Nasif Zaman	Student	✓		01813668824	
Tasneem JABID	Teacher	✓			
S. M. Meeraj Hossain	Accounts Manager	✓		01718307540	
Mohammad Yar Ahmed	Dean, EWU	✓			
Md. Sadat Ahmed	Student	✓		01744514152	
Lima Akter Setu	Student		✓	01701782282	
Md. Rifayet Azam	Student	✓		01980899021	
Mohammad Eklas Uddin	Director Finance	✓		01911330093	


Some photographs from the consultation

Appendix 2
Sample Complaint Form for GRM

Complaint/Suggestion/Comment Form			
Loan No.: _____BAN: Improving Computer and Software Engineering Tertiary Education Project			
Please provide the following information:			
	Date of Filing:		
Name of Person/Organization:			
Contact Details:			
Address			
Telephone/Mobile Phone			
Email (if available)			
Signature of Person Filing Complaint			
Representative in filing this complaint?	Yes		
Please provide details	Name		
	Address		
	Telephone		
	No		
	Not applicable		
Complaint/Suggestion/Comment (*Please provide details as appropriate: what happened, how and why it happened, when and where, how many times it occurred*)			
Please describe any inconvenience/harm caused or may have been caused			
Please provide suggestion to resolution of your complaint (if any)			
Please let us know how you prefer to be contacted	Mail or email		
	Phone		
	Meeting		
Contractor/PIU/PMU Use only			
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		

PMU Environmental Safeguard Form 1 - GRM

Appendix 3
Terms of Reference
Environmental Safeguard Consultant, PMU

(National, 4 person-months within 24 months, intermittent)

Preferably 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 ADB following the Safeguard Policy Statement (SPS) 2009 will be mandatory. The candidate should have good communication skills (oral and written), a good team player with strong organizational and problem solving skills.

Duties and tasks include, but 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 GOB are complied with by the project;
(ii) Ensure that the EMP and EMoP are included in the bid documents and civil works contracts;
(iii) Implement a system for monitoring the environmental safeguards;
(iv) In coordination with the PIU-designated staff, conduct regular site visits at the construction sites to verify/check compliance to 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 contractor to the environmental, health and safety requirements;
(ix) Address any grievances through the GRM in a timely manner, prepare record of such grievances for inclusion in the environmental monitoring report;
(x) Prepare the semi-annual environmental monitoring reports to be submitted to ADB, and upon ADB review, address any comments raised (if any); and,
(xi) Assist in any relevant works that may be assigned by PMU/PIU.

Appendix 4
Proposed Format of Environmental Monitoring Report during Interior Works and Installation of the new HVAC system

Environmental Monitoring Report

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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Appendix 5
Sample Environmental Site Inspection and Monitoring Checklist

Loan No.:

Name of University	Location
Inspection Date	Inspection Time

Items for Inspection	Y	N	NA	Remarks (i.e. problem observed, possible cause of non-compliance and/or proposed corrective action)
General administration				
Details of grievance redress mechanism known to students, faculty and staff, and workers				
First aid kit available to workers				
Photographs of before and after completion of work on board				
Incident register book on-site				
Any complaint filed with the contractor by staff or student				
Emergency preparedness and response				
Fire extinguishers properly maintained and not expired				
Emergency contacts available in case of any incident				
Accidents/incidents reported, reviewed, and corrective/preventive actions recorded				
Occupational health and safety				
Use of personal protective equipment				
Clear danger and warning signs in work areas				
Good housekeeping - site kept clean and tidy				
Containers properly labelled for easy recycling or waste segregation				
Bin for collecting garbage and food waste				
Air quality				
Any evidence of excessive dust generation				
Stockpiles of dusty materials and dust-generation activities				
Noise				
Evidence of excessive noise				
Any noise mitigation measure adopted ?				

Reviewed by:

Name and signature _____ Date _____
Designation in PIU _____